SCHEME & SYLLABUS

B.Tech Electronics & Communication Engineering
Effective from 2012-13

Department of Electronics & Communication Engineering
Deenbandhu Chhotu Ram University of Science & Technology,
Murthal (Sonipat), Haryana, 131039
Mission
To facilitate and promote studies and research in emerging areas of Electronics and Communication Engineering with focus on new frontiers of technologies, innovators, and entrepreneurs who will contribute to national growth in particular and to international community as a whole.

Vision
To facilitate and promote education and research in emerging areas of Electronics and Communication Engineering with focus on new frontiers of technologies to create technocrats who will contribute to national growth, in particular, and to international community as a whole.
Programme Educational Objectives:

1. Core Competence: To give more emphasis on understanding and analysis of all core courses of Electronics & Communication Engineering to develop strong understanding of advanced Electronics & Communication engineering courses with analytical capability at higher levels of academics and R&D activities.

2. Preparations: To prepare students to excel in higher level research and academic programmes or to succeed in industry / Technical profession through global, rigorous education.

3. Application and Synthesis: To give more emphasis on application and synthesis in all courses related to Design of electronic Circuits and their Simulation along with optimization. It helps in developing practical skills for experimentation and develop confidence for tackling the problem and initiating its solution.

4. Professionalism: To inculcate in students professional and ethical attitude, effective communication skills, team work, multidisciplinary approach, and an ability to relate engineering issues to broader social context.

5. Learning Environment: To provide students with academic environment composed of excellence, leadership, ethical codes and guidelines.

Programme Outcomes:

Programme outcomes are narrower statements that describe what students are expected to know and be able to do by the time of graduation. These relate to the skills, knowledge, and behavior that students acquire in their B. Tech. through the program.

Engineering programs must demonstrate that their students attain the following outcomes:

a) An ability to apply knowledge of mathematics, science, and engineering,

b) An ability to design and conduct experiments, as well as to analyze and interpret data,

c) An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability,

d) An ability to function on multidisciplinary teams,

e) An ability to identify, formulate, and solve engineering problems,

f) An understanding of professional and ethical responsibility,

g) An ability to communicate effectively,
h) To broaden education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context. To indulge in Research and development activities that will be helpful to further technological development.

i) A recognition of the need for an ability to engage in life-long learning,

j) A knowledge of contemporary issues,

k) An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
DEENBANDHU CHHOTU RAM UNIVERSITY OF SCIENCE & TECHNOLOGY MURTHAL
(SONEPAT)
ORDINANCE FOR CREDIT BASED SYSTEM
For
BACHELOR OF TECHNOLOGY
(w.e.f from the academic session 2008-09)

1 Preliminaries

1.1 This ordinances shall apply to all the UG programme in the University Teaching Departments.

UG Programme

<table>
<thead>
<tr>
<th>Courses</th>
<th>Normal duration</th>
<th>Extended duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>B. Tech.</td>
<td>Four Years (08 semesters)</td>
<td>Seven Years</td>
</tr>
</tbody>
</table>

An academic year shall consist of two semesters (odd & even) of approximately 20 weeks duration inclusive of the period of examination and semester break. The eligibility criteria for admission to each programme, fee structure, academic calendar, scheme of studies and examinations, examination schedule, sports calendar and cultural activity calendar etc. for the academic year shall be published in the prospectus.

2. ORDINANCE: BACHELOR OF TECHNOLOGY

Notwithstanding anything contained in any other ordinance with regard to the matter hereunder, the courses of study for the Degrees of Bachelor of Technology and the conditions for admission thereto shall be as under:

2.1 The Bachelor of Technology Degree courses shall extend over a minimum period of four academic years. However students will be admitted on the basis of 3 years diploma directly in the 2nd year under the LEET scheme. Teaching in each academic year shall be divided into two semesters, each semester extending to 20 weeks including practical, semester examination and semester break. Teaching for odd semesters will normally be from August to December and for even semesters from January to May.

2.2 At the end of the each semester, there shall be an examination wherein candidates shall be examined in the courses studied by them in that semester. Each semester examination shall be designated as First Semester Examination, Second Semester Examination, and Third Semester Examination and so on.

The Examination for all semester will normally be held in December/January and also in May/ June on such dates as may be fixed by the Controller of Examination as per the Schedule provided by the University. The date(s) of commencement of examination as well as the last date(s) for the receipt of examination forms and fees shall also be notified by the controller of Examinations to the concerned University Teaching Departments.

The courses of the study and the subjects of examinations shall be as approved by the Academic Council from time to time. The medium of instructions and Examination shall ordinarily be English except otherwise decided by the Academic Council. The question paper will be set in English, except otherwise decided by the board of studies concerned and approved by the Academic Council. Every candidate shall be examined in the subjects as laid down in the syllabus approved by the Academic Council from time to time. The credits for each subject as also the contact hours per week will be mentioned in the scheme of studies approved by the Academic Council.
Evaluation Process:

a. Major Test (Theory Examination):

Written question papers for the semester examination shall be set by an **External/ Internal paper setter** appointed by the Vice-Chancellor from a panel of examiners submitted by the chairman of the department duly approved by the BOS of the concerned department and the answer sheets shall generally be evaluated by the **internal examiners** but can be evaluated from **outside experts** with the permission of the Vice-Chancellor. At the most 50% question papers can be set by the external examiners. In case a question paper is not received in time from an external examiners or he refuses to set the question paper, the paper can be got set from an internal examiner. The evaluation of answer sheets will be done by the examiners as per the procedure laid down by the University for the purpose.

b. Practical Examination:

Examination in practical and viva-voce shall be conducted jointly by the external and Internal Examiners appointed by the Vice-Chancellor from a panel of examiners submitted by the chairman of the department duly approved by the BOS of the concerned. If an External Examiner is not able to join, alternate examiner (including those of the same University dept) may be appointed by the Chairperson of the concerned dept. with the intimation to the Controller of Examinations in the following preferential order:

i) From outside  
ii) from DCRUST Murthal

c. Sessionals:

Sessional works shall be evaluated by the teachers of the various subjects based on the work done during semester on the basis of the following weightage:

I. For Theory subjects:

i) Minor Test –I 30% of the weightage of the sessional  
ii) Minor Test-II 30% of the weightage of the sessional  
iii) Assignment/Performance 20% of the weightage of the sessional in the class  
iv) Surprise Quiz/Tutorial 20% of the weightage of the sessional Tests (2+2=4)

II. For Practical/Project/Seminar/Drawing:

i) Viva-Voce/ Test 30% of the weightage of the practical  
ii) Laboratory Record/ Project Report/Seminar Report/Drawing Sheet 40% of the weightage of the practical  
iii) Objective Tests/Multiple Choice Questions 30% of the weightage of the practical

d. General Proficiency
I. Field Work
(Technical Activities/ Extra Curricular Activities/ Industrial, Educational tour/ Sports/games/community Service/ Hostel Activities) 40% of the weightage (equal weightage of each)

II. Presentation/Viva -Voce 40% of the weightage

III. Faculty Counselor Assignment 20% of the weightage

The I and II components will be evaluated by a committee, preferably interdisciplinary constituted by the Vice-Chancellor on recommendation of the Dean Academic Affairs. A Faculty Counselor will be attached to group of students which will remain associated with him /her during the entire period of the degree programme in the University. Each faculty member will serve as a faculty counselor. They will act like a local guardian for the students associated with him / her and will help them in terms of carrier guidance, personal difficulties.

Every student has to appear in both the minor tests. If a student does not take a minor test, he/she shall be awarded zero marks in that test. The marks obtained in sessional/practical/theory/drawing/general proficiency are to be submitted to the Examination Branch duly signed by the Chairperson of the department before the close of semester examination or a date fixed by the COE. The examination branch/course coordinator shall convert the marks in to equivalent grades as per the grading procedure.

The examination shall be open to a candidate who:

- has attended regularly the prescribed courses of studies for the relevant semester examination in the department recognized by the University for the degree of Bachelor of Technology.

- has his/her name submitted to the Controller of Examinations by the Chairperson of the department.

- has a good moral character (certificate be issued by the chairperson of the department concern if required).

- has attended not less than 75% of the total classes held in each theory / lab/project/ seminar/ drawing etc. This requirement shall be fulfilled separately for each subject of study. A deficiency up to 10% may be condoned by the Chairman of the department. A further condonation of 5% in attendance may be allowed in severe/ Compassionate circumstances by the Vice-Chancellor. However it may not be treated as a matter of right by the students. (In case a student fails to fulfill the necessary requirement of the attendance in any subject(s) in any semester, he/ she shall not be promoted to next semester and will have to repeat that academic semester in the next academic session along with regular students.)

- whose result declaration is delayed for no fault of his/her or has applied for revaluation may attend classes of the next higher semester provisionally at his /her own risk and responsibility subject to his/her passing the concerned semester Examination. Such a candidate shall also be governed by the clause 2.6 given below. In case the candidate fails to pass the concerned Semester Examination, his / her attendance and studies in the next higher semester in which he /she was allowed to attend classes provisionally, shall stand cancelled.
If a candidate, after attending the classes for the course of studies in the Department either not appeared or having appeared in any semester examination has failed in one or more paper(s) for that examination, he/she can appear for such paper(s) at subsequent examinations without attending a fresh course of studies for that semester. Such a candidate may, in the meantime, prosecute his / her studies for the next semester(s) and appear in the examination(s) for the same along with the examination for the lower semester(s).

The examinations for reappear in any subject(s) in the **odd semester** and that of in the **even semester** shall be held in the respective semesters along with the regular students. In addition to above, examination for reappear in the subjects in odd semesters will also be held during the even semesters examinations and vice-versa.

**A Candidate shall be eligible for Promotion to:**

- **5th semester** if passed at least 2/3rd papers of semester 1st, 2nd, 3rd and 4th taken together.
- **6th semester** if passed at least 2/3rd papers of semester 1st, 2nd, 3rd, 4th and 5th semester taken together.
- **7th semester** if passed at least 2/3rd papers of semester 1st, 2nd, 3rd, 4th, 5th and 6th semester taken together.
- **8th semester** if passed at least 2/3rd papers of semester 1st, 2nd, 3rd, 4th, 5th, 6th and 7th semester taken together.

**A Candidate through LEET Scheme shall be eligible for Promotion to:**

- **5th semester** if passed at least 2/3rd papers of semester 3rd and 4th taken together.
- **6th semester** if passed at least 2/3rd papers of semester 3rd, 4th and 5th semester taken together.
- **7th semester** if passed at least 2/3rd papers of semester 3rd, 4th, 5th and 6th semester taken together.
- **8th semester** if passed at least 2/3rd papers of semester 3rd, 4th, 5th, 6th and 7th semester taken together.

The amount of Exam/Reappear/ Re-evaluation/ Improvement fee to be paid by the candidates shall be as prescribed by the University from time to time. A candidate who has paid dues for the higher class and is dropped for want of fulfillment of any of the above conditions shall not be required to pay his dues again on re-admission after fulfillment of above conditions.

Re-evaluation is permitted only for major tests (Theory course) as per University rules for re-evaluation.

A candidate who is unable to pass the Bachelor of Technology Course within a maximum of **seven consecutive academic years** from the date of his admission shall **lose the right to pursue the degree**
2.8 The minimum passing marks/grade for passing any semester Examination shall be:

i. 40% in each major test (theory paper).
ii. 40% in each Practical Examination/Viva-Voice Examination
iii. 40% in aggregate of sessionals and examinations for each theory and practical subject provided that a candidate, who fails to obtain the requisite marks in aggregate of sessionals and examination, shall be required to reappear in the concerned subject in the subsequent theory/practical examination(s) subject to close 2.7. Such candidates will not be required to repeat the sessional works.
iv. Minimum pass grade in each course is ‘D’ grade. Grade will be awarded after adding the marks of sessional and major test/practical examination.
v. Grade D in General Proficiency
vi. SGPA of 4.0

A candidate who fails to obtain the requisite marks/grade in any course shall be required to appear in the concerned course in the subsequent examination(s) as per the clause 2.6&2.7.

2.9 If a candidate has completed his/her degree with a CGPA \[\leq 6.5\] and he/she wants to improve his/her grade, he/she may be allowed to improve by depositing the requisite fee as per the University Rules. He/she is allowed to appear in at the most half of the theory papers only of a semester along with the regular candidates of that semester and the sessional part will be retained. Such opportunity may be given only twice in succession, subject to the condition that he/she have to complete the degree within 7 consecutive years of his/her registration. If the improved CGPA is less than the original, then the original will be retained.

2.10 The result of a student at the end of each semester Examination and after completion of course shall be declared on the basis of the SGPA & CGPA (cumulative grade point average) obtained by the student. However result of a student admitted through LEET SCHEME for the diploma holders will be declared on the basis of CGPA of the grades obtained by him/ in this University only.

2.11 At the end of each semester examination, the COE shall publish the result, provided that in a case where candidate who was permitted to take examination for higher semester but has not cleared the lower semester examination his result for the higher semester examination will be declared provisionally. Each successful candidate shall be issued a copy of the result card on having passed the semester examination.

2.12 Notwithstanding the integrated nature of the course wherever it is spread over more than one academic year, the Ordinance in force at the time a student joins the course shall hold good only for the examination held during or at the end of the semester and nothing in this Ordinance shall be deemed to debar the University from amending the Ordinance and the amended Ordinance, if any, shall apply to all students whether old or new.

3. SCHOLARSHIP:

Scholarship may be awarded to students as per the terms and conditions stipulated by the funding agencies. However, it should be mentioned in the prospectus.

4. THE CREDIT SYSTEM:
The University has introduced credit system of study for all the Under Graduate and Post Graduate programs for all the students admitted from the Academic Year 2008-09. The prominent features of the credit system are the process of continuous evaluation of a student’s performance, and a flexibility to allow the student to progress at an optimum pace.

Each Academic Program has a certain number of credits which describe its weightage. A student’s performance is measured by the number of credits that he/she has completed satisfactorily. A minimum grade point average is required to be maintained for satisfactory progress.

Each subject (component) has a certain number of credits which reflect its weightage and is normally decided on the basis of effective contacts hours. It is mentioned in the scheme of studies and examinations.

4.1 The semester examination for the odd semesters shall ordinarily be held in the month of December/January and for the even semesters in the month of May/June, on such dates as may be fixed by University authority. The concerned teacher/course coordinator should ensure that 100% syllabus is covered in each subject before the Semester Examination.

4.2 A faculty member shall be appointed as a course-coordinator by the Chairperson of the department who shall have the full responsibility for conducting the minor tests, coordinating the work of evaluation with other faculty members involved in the course and awarding of grades. A common paper will be set for the minor tests of the common courses.

In case of perceptible deviation in the awards given by different teachers of the same course, the course coordinator will moderate the awards by calling meeting of the teachers associated. However, where a single teacher is associated with the course, moderation of awards will be done in consultation with the chairperson of the department.

4.3 For the time being the existing system of centralized examination will be followed for conducting the Semester Examination. However the system may be reviewed as the University grows and more and more number of departments/courses/students are added to it.

4.4 The marks/grade awarded to a student in any particular subject will be based on the performance of the student evaluated throughout the semester. The syllabus of the minor tests will be what is covered in that particular term. The Semester Examination will be based on the entire syllabus.

4.5 The marks/grades will be displayed on the notice board of the department by the Chairperson before forwarding it to the Examination Branch.

4.6 The Chairperson of the department shall forward the awards/grades to the Examination Branch within a week after the semester ends and examination process starts. The evaluated answer sheets of minor tests are to be kept by the course so-ordinator for at least one year. The Examination Branch will keep the evaluated answer sheets of the semester examination for at least one year.

5. GRADING SYSTEM:

For the award of grades in a subject, all component-wise evaluation shall be done in marks. The marks would be converted to grades as per the guidelines given below:
5.1 Award of Grades Based on Absolute Marks

The University will follow system of grading for all (irrespective of no. of students) based on absolute marks (after applying moderation if any) as given below:

<table>
<thead>
<tr>
<th>Range of Marks (%)</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>90 to 100</td>
<td>A+</td>
</tr>
<tr>
<td>80 to 89</td>
<td>A</td>
</tr>
<tr>
<td>70 to 79</td>
<td>B+</td>
</tr>
<tr>
<td>62 to 69</td>
<td>B</td>
</tr>
<tr>
<td>55 to 61</td>
<td>C+</td>
</tr>
<tr>
<td>46 to 54</td>
<td>C</td>
</tr>
<tr>
<td>40 to 45</td>
<td>D</td>
</tr>
<tr>
<td>Less than 40</td>
<td>F</td>
</tr>
</tbody>
</table>

NOTE:

(i) The awards/grades shall be submitted by the teacher concerned through course coordinator to the Chairperson of the department. The awards/grades should be finalized within 7 days of the semester examination.

(ii) In case of any difficulty/issue related to courses/conduct/moderation of awards/grades/reconduct of paper, the matter will be referred to a departmental monitoring committee comprising of Chairperson, senior most teachers by rotation, course coordinator and faculty nominee of the Dean of Faculty. The committee will be headed by the chairperson. The committee, on receipt of complaint from student or teacher, shall meet at the earliest and will give its decision within one week. The decision of the committee shall be final.

(iii) The procedure for evaluation and award of grades [Audit Pass (AP) or Audit Fail (AF)] for training shall be decided by the respective Chairman/Chairperson of the department. The candidate shall be required to submit a comprehensive report within one month of completion the training. Training Report will be completed under the supervision of the officer of the company/institution under whose guidance and supervision the training was completed by the candidate in that company/institute. The candidate will add supervisor’s certificate in the beginning of the report stating that the report is an out-come of work done by the candidate during his/her training.

5.2 GRADE POINTS:

The grading point of academic performance will be as under:

<table>
<thead>
<tr>
<th>Academic Performance</th>
<th>Grades</th>
<th>Grade Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outstanding</td>
<td>A+</td>
<td>10</td>
</tr>
<tr>
<td>Excellent</td>
<td>A</td>
<td>9</td>
</tr>
<tr>
<td>Very Good</td>
<td>B+</td>
<td>8</td>
</tr>
<tr>
<td>Good</td>
<td>B</td>
<td>7</td>
</tr>
<tr>
<td>Average</td>
<td>C+</td>
<td>6</td>
</tr>
<tr>
<td>Below Average</td>
<td>C</td>
<td>5</td>
</tr>
<tr>
<td>Marginal</td>
<td>D</td>
<td>4</td>
</tr>
<tr>
<td>Very Poor</td>
<td>F</td>
<td>0</td>
</tr>
<tr>
<td>Absent</td>
<td>G</td>
<td>-</td>
</tr>
</tbody>
</table>
Audit Pass  AP  -
Audit Fail  AF  -
Incomplete Dissertation  X  -

NOTE:

1. Pass Grade is Grade D and higher grades
2. Grade F is Fail grade.

‘F’ Grade

The F grade denotes poor performance, i.e., failing a subject (or subject component). A student has to reappear in the semester examination only, in which he/she obtains ‘F’ grades, until a passing grade is obtained, within the stipulated time of completion of that programme as mentioned in clause 1.1. For the elective subject(s) in which ‘F’ grades have been obtained, the student may take the same course or any other course from the same category/group. The candidate will be allowed to take up the examination next time along with regular students but he/she will be awarded up to B+ only. The same principle will be applicable to project also.

‘G’ Grade

If any student, who is otherwise eligible for appearing in the semester examination as per the ordinance, but he/she is unable to appear in the semester examination then he/she will be awarded ‘G’ grade. The candidate will be allowed to take up the examination next time along with regular students and he/she will be awarded the grade as per grade system explained above and the restriction of awarding a maximum of B’ grade will not be applicable in his/her case. The same principle will be applicable to the Project also.

AP/AF Grade

These grades are awarded to qualifying/Non-Credit subject(s) (as per scheme supplied by concerned departments). The candidate will not be eligible for award of degree without qualifying these courses.

Continuous Absence

If a student is continuously absent from the Department for more than four weeks without intimation to the Chairperson of Department, his/her name will be struck off from the roll of department. The readmission shall not be allowed to the candidate during the same academic session.

‘X’ Grade

This grade is awarded for incomplete Project work as per guidelines given below and will be converted to a regular grade on the completion of the Project work and its evaluation.

A student who is unable to complete his/her Project may be awarded an ‘X’ grade by the Chairman/Chairperson/chairperson on the recommendation of his/her supervisor.

A student who has been awarded ‘X’ grade shall be required to formally register for the next semester and pay the requisite fee.
‘X’ grade will be awarded in exceptional circumstances beyond student’s/supervisor’s control. Normally, the following grounds may be considered for the award of ‘X’ grade:

(a) Technical reasons/grounds such as Supervisor/equipment not being available.
(b) Any other reason to the satisfaction of supervisor.

5.3 Evaluation of Performance

The performance of a student will be evaluated in terms of Cumulative Grade Point Average (CGPA) which is the Grade Point Average for all the completed semesters at any point of time.

The CGPA is calculated on the basis of all pass grades, except audit courses, obtained in all completed semesters.

\[
CGPA = \frac{\sum (Course \ credits \times \ Grade \ point) \ for \ courses \ with \ pass \ grade \ except \ audit \ courses}{\sum (Course \ credits) \ of \ courses \ with \ pass \ grade \ except \ audit \ courses}
\]

Illustration for calculating SGPA/CGPA:

Ist Semester

<table>
<thead>
<tr>
<th>Course No.</th>
<th>Course Credits</th>
<th>Grade Awarded</th>
<th>Earned Credits</th>
<th>Grade Points</th>
<th>Point Secured</th>
</tr>
</thead>
<tbody>
<tr>
<td>MALXXX</td>
<td>5</td>
<td>C+</td>
<td>5</td>
<td>6</td>
<td>30</td>
</tr>
<tr>
<td>CSLXXX</td>
<td>4</td>
<td>C</td>
<td>4</td>
<td>5</td>
<td>20</td>
</tr>
<tr>
<td>PHLXXX</td>
<td>4</td>
<td>A+</td>
<td>4</td>
<td>10</td>
<td>40</td>
</tr>
<tr>
<td>PHPXXX</td>
<td>1.5</td>
<td>B+</td>
<td>1.5</td>
<td>8</td>
<td>12</td>
</tr>
<tr>
<td>MELXXX</td>
<td>4</td>
<td>F</td>
<td>0</td>
<td>0</td>
<td>00</td>
</tr>
<tr>
<td>AMLXXX</td>
<td>4</td>
<td>B</td>
<td>4</td>
<td>7</td>
<td>28</td>
</tr>
</tbody>
</table>

Credits registered in the semester (total of column 2) \(= 22.5\)
Earned Credits in the semester \(= 18.5\)
Total of column 4 (total of column 2 excluding F grade)

Point secured in this semester in passed courses \(= 130\)

\[
SGPA = \frac{Point \ secured \ in \ passed \ courses}{Credits \ earned} = \frac{130}{18.5} = 7.027
\]

IInd Semester
<table>
<thead>
<tr>
<th>Course No.</th>
<th>Course Credits</th>
<th>Grade Awarded</th>
<th>Earned Credits</th>
<th>Grade Points</th>
<th>Point Secured</th>
</tr>
</thead>
<tbody>
<tr>
<td>MALXXX</td>
<td>5</td>
<td>D</td>
<td>5</td>
<td>4</td>
<td>20</td>
</tr>
<tr>
<td>EELXXX</td>
<td>5</td>
<td>F</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>CYLXXX</td>
<td>4</td>
<td>B</td>
<td>4</td>
<td>7</td>
<td>28</td>
</tr>
<tr>
<td>CYPXXX</td>
<td>1.5</td>
<td>C+</td>
<td>1.5</td>
<td>6</td>
<td>09</td>
</tr>
<tr>
<td>MELXXX</td>
<td>4</td>
<td>A</td>
<td>4</td>
<td>9</td>
<td>36</td>
</tr>
<tr>
<td>HULXXX</td>
<td>2</td>
<td>AP</td>
<td>2</td>
<td>N.A.</td>
<td>00</td>
</tr>
</tbody>
</table>

Credits registered in the semester (total of column 2) = 21.5
Earned Credits in the semester = 14.5
Total of column 4 (total of column 2 excluding F&AP grades)
Cumulative Earned Credits (earned credits in previous semesters and current semester) = 18.5 + 14.5 = 33.0
Points Secured in this semester in passed courses = 93
Cumulative points secured (total of point secured in previous semesters and current semester) = 130 + 93 = 223

CGPA = \[
\frac{\text{Cumulative points secured in all passed courses}}{\text{Cumulative earned credits, excluding audit courses}} = \frac{130 + 93}{18.5 + 14.5} = 6.757
\]

Each successful candidate shall be issued a copy of the result card on having passed the semester examination.

**Conversion of CGPA into Marks**

**The CGPA if multiplied by 9.5 will give the equivalent marks in %age.**

Candidates who pass all the prescribed subjects for all the semesters, but obtained:

(i) Less than CGPA of 5.26 Pass class
(ii) 5.26 ≤ CGPA < 6.32 2nd Division
(iii) 6.32 ≤ CGPA < 7.9 1st Division
(iv) CGPA of 7.9 or more 1st Division with Honours provided that they have passed all the semester exams. within the normal period of course will be awarded aforesaid division.
<table>
<thead>
<tr>
<th>S. No.</th>
<th>Course No.</th>
<th>Course Title</th>
<th>Teaching Schedule</th>
<th>Marks of Class work</th>
<th>Examination Marks</th>
<th>Total</th>
<th>Credit</th>
<th>Duration of Exam</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>L</td>
<td>T</td>
<td>P</td>
<td>Theory</td>
<td>Practical</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>HUM101B</td>
<td>COMMUNICATIVE ENGLISH</td>
<td>3</td>
<td>1</td>
<td>-</td>
<td>25</td>
<td>75</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>MATH101B</td>
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**NOTE:**

1. Every student has to participate in the sports activities. Minimum one hour is fixed for sports activities either in the morning or evening. Weightage of sports is given in General Proficiency Syllabus.
2. The students will be allowed to use non-programmable scientific calculator. However, sharing/exchange of calculator is prohibited in the examination.
3. Electronic gadgets including Cellular phones are not allowed in the examination.
4. All the branches are to be divided into group 'A' and 'B' as per the suitability of the institute/college, so that there is an equitable distribution of teaching load in odd and even semesters.
### DEENBANDHU CHHOTU RAM UNIVERSITY OF SCIENCE & TECHNOLOGY, MURTHAL (SONEPAT)
### SCHEME OF STUDIES & EXAMINATIONS
### B.Tech. 1st YEAR (SEMESTER – II) (COMMON FOR ALL BRANCHES)
Credit Based Scheme w.e.f. 2012-13

<table>
<thead>
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<th>Teaching Schedule</th>
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**Total**

Gr-B: 17 | 5 | 12 | 245 | 375 | 230 | 850 | 29
Gr-A: 19 | 6 | 8 | 230 | 450 | 370 | 850 | 30

**NOTE:**

1. Every student has to participate in the sports activities. Minimum one hour is fixed for sports activities either in the morning or evening. Weightage of Sports is given in General Proficiency Syllabus.
2. Each student has to undergo a workshop of at least 4 weeks (80-100 hours) at the end of II semester during summer vacations. Out of the four weeks, two weeks would be dedicated to general skills and two weeks training for specialized discipline/department. The evaluation of this training shall be carried out in the III semester.
3. The students will be allowed to use non-programmable scientific calculator. However, sharing/exchange of calculator is prohibited in the examination.
4. Electronic gadgets including Cellular phones are not allowed in the examination.
5. The elective course HUM102B ORAL COMMUNICATION SKILLS is deleted with effect from session 2013-14.
6. All the branches are to be divided into group ‘A’ and ‘B’ as per the suitability of the institute/college, so that there is an equitable distribution of teaching load in odd and even semesters.
### DEENBANDHU CHHOTU RAM UNIVERSITY OF SCIENCE & TECHNOLOGY, MURTHAL (SONEPAT)
### SCHEME OF STUDIES AND EXAMINATION
### B. TECH. II YEAR (ELECTRONICS & COMMUNICATION ENGINEERING)
### SEMESTER III
### Credit Based Scheme w.e.f. 2013-2014

<table>
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<th>Teaching Schedule</th>
<th>Marks of Class Work</th>
<th>Exam. Marks</th>
<th>Total Marks</th>
<th>Credit</th>
<th>Duration of Exam</th>
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<tr>
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<td>75</td>
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<td>100</td>
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<td>ECE207B</td>
<td>SIGNALS &amp; SYSTEMS</td>
<td>3 1 -</td>
<td>25</td>
<td>75</td>
<td>-</td>
<td>100</td>
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### NOTE:

1. Every student has to participate in the sports activities. Minimum one hour is fixed for sports activities either in the morning or evening. Weightage of Sports is given in General Proficiency Syllabus.
2. The students will be allowed to use non-Programmable Scientific Calculator. However, sharing/exchange of calculator is prohibited in the examination.
3. Electronic Gadgets including Cellular Phones are not allowed in the examination.
4. Assessment of Workshop Training (ME217B) will be based on seminar, viva-voce, report and certificate of professional training obtained by the student from in-house workshop.
5. All the branches are to be divided into group ‘A’ and ‘B’ as per the suitability of the institute/college, so that there is an equitable distribution of teaching load in odd and even semesters.
<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Course No.</th>
<th>Course Title</th>
<th>Teaching Schedule</th>
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<th>Exam. Marks</th>
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**Total**

Gr-B: 23 6 8 255 525 195 975 34

Gr-A: 22 6 8 230 450 195 875 30

**NOTE:**

1. Every student has to participate in the sports activities. Minimum one hour is fixed for sports activities either in the morning or evening. Weightage of is given in General Proficiency Syllabus.
2. The students will be allowed to use non-Programmable Scientific Calculator. However, sharing/exchange of calculator is prohibited in the examination.
3. Electronic Gadgets including Cellular Phones are not allowed in the examination.
4. At the end of 4th semester each student has to undergo four weeks Professional Training of 4 weeks in an Industry/Institute/Professional Organization/Research Laboratory/training centre etc. with the prior approval of the Training and Placement Officer of the University and submit in the department a typed report along with a certificate from the organization & its evaluation shall be carried out in the 5th Semester.
5. The ENVIRONMENTAL STUDIES (GES201B) & ENVIRONMENTAL STUDIES FIELD WORK (GES203B) are compulsory & qualifying courses.
6. All the branches are to be divided into group ‘A’ and ‘B’ as per the suitability of the institute/college, so that there is an equitable distribution of teaching load in odd and even semesters.
### DEENBANDHU CHHOTU RAM UNIVERSITY OF SCIENCE & TECHNOLOGY, MURTHAL (SONEPAT)

**SCHEME OF STUDIES AND EXAMINATION**

**B. TECH. III YEAR (ELECTRONICS & COMMUNICATION ENGINEERING)**

**SEMESTER V**

Credit Based Scheme w.e.f. 2014-2015

<table>
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<th>Sr. No.</th>
<th>Course No.</th>
<th>Course Title</th>
<th>Teaching Schedule</th>
<th>Marks of Class Work</th>
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<tr>
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<td>ELECTRONIC MEASUREMENT AND INSTRUMENTATION LAB(ECE,AEI,common with 6th Sem. IC)</td>
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<td>CONSUMER ELECTRONIC LAB</td>
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<td>LINEAR INTEGRATED CIRCUIT LAB</td>
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<td>MICROPROCESSORS &amp; INTERFACING LAB (BME,CSE,ECE,AEI)</td>
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**NOTE:**

1. Every student has to participate in the sports activities. Minimum one hour is fixed for sports activities either in the morning or evening. Weightage of Sports is given in General Proficiency Syllabus.
2. The students will be allowed to use non-Programmable Scientific Calculator. However, sharing/exchange of calculator is prohibited in the examination.
3. Electronic Gadgets including Cellular Phones are not allowed in the examination.
4. Assessment of Professional training–I (ECE335B) will be based on seminar, viva-voce, report and certificate of professional training obtained by the student from the industry / institute / research lab / training centre etc.
# DEENBANDHUGHOTRAMUNIVERSITY OF SCIENCE & TECHNOLOGY, MURTHAL (SONEPAT)
## SCHEME OF STUDIES AND EXAMINATION
### B. TECH. III YEAR (ELECTRONICS & COMMUNICATION ENGINEERING)
#### SEMESTER VI
Credit Based Scheme w.e.f. 2014-2015

<table>
<thead>
<tr>
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<th>Exam. Marks</th>
<th>Total Marks</th>
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<th>Duration of Exam</th>
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<td>REPORT WRITING SKILLS (common for all branches)</td>
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**Total:**

| 20 | 6 | 10 | 275 | 500 | 225 | 1000 | 32 |

**NOTE:**

1. Every student has to participate in the sports activities. Minimum one hour is fixed for sports activities either in the morning or evening. Weightage of Sports is given in General Proficiency Syllabus.
2. The students will be allowed to use non-Programmable Scientific Calculator. However, sharing/exchange of calculator is prohibited in the examination.
3. Electronic Gadgets including Cellular Phones are not allowed in the examination.
4. At the end of 6th semester each student would undergo four weeks Professional Training in an Industry/ Institute/ Professional / Organization/ Research Laboratory / training centre etc. with the prior approval of the Training and Placement Officer of the University and submit in the department a typed report along with a certificate from the organization.
# Scheme of Studies and Examination
## B. Tech. IV Year (Electronics & Communication Engineering)
### Semester VII
Credit Based Scheme w.e.f. 2015-2016

<table>
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<tr>
<th>Sr. No.</th>
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<th>Exam. Marks</th>
<th>Total Marks</th>
<th>Credit</th>
<th>Duration of Exam</th>
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<td>Practical</td>
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<td>ECE403B</td>
<td>DIGITAL SIGNAL PROCESSING(ECE,AEI)</td>
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### List of Open Electives:

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<td>5</td>
<td>EEE457B</td>
<td>ENERGY RESOURCES &amp; TECHNOLOGY</td>
<td>10</td>
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### Note:
1. Every student has to participate in the sports activities. Minimum one hour is fixed for sports activities either in the morning or evening. Weightage of Sports is given in General Proficiency Syllabus.
2. Students will be permitted to opt for any one elective run by the other department. However, the department shall offer those elective for which they have expertise. The choice of the students for any elective shall not be binding for the department to offer, if the department does not have expertise. The minimum strength of the students should be 20 to run an elective course.
3. Assessment of Professional Training-II, undergone at the end of VI semester, will be based on seminar, viva-voce, report and certificate of Professional Training obtained by the student from the industry, institute, research lab, training center etc.
4. The students will be allowed to use non-programmable scientific calculator. However, sharing/exchange of calculator is prohibited in the examination.
5. Assessment Electronics gadgets including Cellular phones are not allowed in the examination.
## DEENBANDHU CHHOTU RAM UNIVERSITY OF SCIENCE & TECHNOLOGY, MURTHAL (SONEPAT)

**SCHEME OF STUDIES AND EXAMINATION**

**B. TECH. IV YEAR (ELECTRONICS & COMMUNICATION ENGINEERING)**

**SEMESTER VIII**

Credit Based Scheme w.e.f. 2015-2016

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<th>Sr. No.</th>
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<th>Exam. Marks</th>
<th>Total Marks</th>
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<td>Practical</td>
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**Total**

| 14 | 2 | 12 | 245 | 300 | 255 | 800 | 31 |

### DEPT. ELECTIVE-I

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<td>NEURAL NETWORK &amp; FUZZY LOGIC</td>
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<td>ECE408B</td>
<td>ELECTRONIC MATERIALS AND NANO TECHNOLOGY</td>
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<td>3</td>
<td>ECE410B</td>
<td>BIOMEDICAL ELECTRONICS</td>
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<td>ECE412B</td>
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<td>ECE420B</td>
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<td>ECE426B</td>
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<td>ECE428B</td>
<td>POWER SYSTEM STABILITY AND FACTS</td>
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**NOTE:**

1. Every student has to participate in the sports activities. Minimum one hour is fixed for sports activities either in the morning or evening. Weightage of Sports is given in General Proficiency Syllabus.
2. The students will be allowed to use non-Programmable Scientific Calculator. However, sharing/exchange of calculator is prohibited in the examination.
3. Electronic Gadgets including Cellular Phones are not allowed in the examination.
4. Project coordinator will be assigned the project (ECE436B) load of, maximum of 2 hrs. per week including his own guiding load of one hr. However, the guiding teacher will be assigned maximum of one period of teaching load irrespective of number of students/groups under him/her. Project involving design, fabrication, testing, computer simulation, case studies etc., which has been commenced by students in VII semester will be completed in VIII semester.
5. For the course ECE438B (Seminar), a student will select a topic from emerging areas of Engineering & Technology and study it independently. Student will give a seminar / talk on the topic.
6. The evaluation of the student for his / her General Fitness for Profession shall be carried out by a team consisting of Dean Faculty of Engineering & Technology, Chairperson of concerned department and external examiner appointed by University.
7. The minimum strength of the students should be 20 to run an elective course.
COMMUNICATIVE ENGLISH
B. Tech. Semester - I (Common for all Branches)

<table>
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<th>L</th>
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<td>4</td>
<td></td>
<td>75</td>
<td>100</td>
<td>3 Hrs.</td>
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</tbody>
</table>

Class Work : 25 Marks
Theory : 75 Marks
Total : 100 Marks
Duration of Exam. : 3 Hrs.

COURSE OBJECTIVES:
• Course Endeavors to Refurbish and Fortify the Linguistic Awareness and Communicative Competence of the learners by offering insights into various This Morphological, Semantic, and Syntactic & Stylistic aspects of English Language.
• The ultimate aim of the course is to equip the learners with different forms of written and spoken communication in order that they withstand the competition at the transnational technical environment

UNIT I

Communicative Grammar:
A) Spotting the errors pertaining to tenses, conditional sentences, Concord – grammatical concord, notional concord and the principle of proximity b/w subject and verb
B) Voice, Reported Speech.

UNIT II

Language through Literature:
Linguistic Reading of the following texts:
A) ‘Kabuliwallah’ by Rabindranath Tagore*
B) ‘Am I Blue?’ by Alice Walker*
C) ‘If you are Wrong, Admit It’ by Dale Carnegie*
D) ‘Engine Trouble’ by R.K. Narayan*
The prescribed texts will be used as case studies for various components of the syllabus.
*The Source is given in the list of Texts Books given below.

UNIT III

Group Communication:
A) Communication: concept, Process and Barriers
B) Communicating using Standard Pronunciation with the help of IPA
C) Formal Speaking with peers (e.g. discussion, talks on current issues in a class)
D) Writing official letters on issues concerning students and social life
E) Writing small reports on scientific issues, IT issues, University fests/programme.
F) E-mail writing and writing for web

UNIT IV

Communicative Creativity:
A) Comprehension: Extracting, interpreting, summarizing, reviewing and analyzing the prescribed texts.
B) Composition: Developing themes and situations through role play activities or dialogue writing.

Text Books:
2. Communicative English for Engineers and Professionals by Nitin Bhatnagar & Mamta Bhatnagar New Delhi: Pearson / Longman
Suggested Reading:

SCHEME OF END SEMESTER EXAMINATION (MAJOR TEST)

Theory
1. The duration of the exam will be 3 hours.
2. The Question Paper for this theory course shall have seven questions in all covering all the units of the syllabus.
3. The student is required to attempt all the seven questions.
4. Questions No. 1 based on Unit I is of 15 marks. It may be in the form of ‘Do as directed: trace the error, choose the correct alternative, supply the correct alternative/s, change the voice, convert the speech from direct to indirect or vice-versa’.
5. Question no 2 and 3 based on prescribed texts in Unit II. Question no 2 of 10 marks is to evaluate the comprehension of the text through short answer questions or a long answer question to assess the students’ reading comprehension, interpretative and analytical abilities. Question no 3 of 15 marks will judge the linguistic aspect of the text such as using a particular word in its various syntactic forms Like noun, adjective, verb etc.; matching the lists of words and their explanation; providing opposite/similar meanings and other grammar components prescribed in Unit I of the syllabus.
6. Question no 4 based on Unit III is of 10 marks. It may be in the form of transcription of words given, describe an event, classmate, discuss an issue etc.
7. Question no 5 based on Unit III is of 10 marks. It requires the student to frame either a small report on a topic given or write the given official letter, or e-mail a message.
8. Question no 6 based on unit IV is of 10 marks. It evaluates the Comprehension and Interpretation of the texts prescribed in Unit II. The vocabulary, general understanding and interpretation of the content may be evaluated in the form of question answer exercise, culling out important points, suggesting a suitable topic/title, summarising and interpreting.
9. Question No. 7 based on unit IV is of 5 marks. It requires the student to develop a hypothetical situation in a dialogue form, or to develop an outline, key expression, for role play activity.

COURSE OUTCOMES:
• Students will be able to face the challenges in communication primarily in a technical environment
• Enables the learner to take up all Oral and writing tasks with ease and confidence.
• Acts as a launching pad to students concerned with professional advancement.
COURSE OBJECTIVES:
• This course intends to cover topics that will ultimately relate to problems in signal transmission, analysis of complex circuits etc.
• The course covers material which is essential to anyone who does mathematical computation in Engineering and sciences.
• This course helps in translating a physical problem into mathematical model.
• This course creates an ability to model, solve and interpret any physical or engineering problem.

UNIT I

Infinite series:
Convergence and divergence, Comparison, D’ Alembert's ratio, Integral, Raabe’s, Logarithmic and Cauchy root tests, Alternating series, Absolute and conditional convergence.
Applications of Differentiation: Taylor's and Maclurin's series, Asymptotes, Curvature Asymptotes.

UNIT-II

Partial Differentiation & its Applications:
Functions of two or more variables; partial derivatives, Total differential and differentiability, Derivatives of composite and implicit functions, Jacobians, Higher order partial derivatives.
Homogeneous functions, Euler's theorem, Taylor's series for functions of two variables (without proof), maxima-minima of function of two variables, Lagrange's method of undetermined multipliers, Differentiation under integral sign.

UNIT-III

Applications of Single & Multiple Integration:
Applications of single integration to find volume of solids and surface area of solids of revolution. Double integral, change of order of integration, Double integral in polar coordinates, Applications of double integral to find area enclosed by plane curves and volume of solids of revolution.
Triple integral, volume of solids, change of variables, Beta and gamma functions and relationship between them.

UNIT-IV

Vector Calculus:
Differentiation of vectors, scalar and vector point functions Gradient of a scalar field and directional derivative, divergence and curl of a vector field and their physical interpretations.
Integration of vectors, line integral, surface integral, volume integral, Green, Stoke's and Gauss theorems (without proof) and their simple applications.

Text Books:

Reference Books:

COURSE OUTCOMES:
• On completing this course students should be able to solve system of Linear equations, be familiar with properties of matrices, understanding the concept of convergences and finding the sum of infinite series.
• Able to solve differential equations and use these methods to solve applied problems.
• This course enables a learner to identify, formulate and solve the problems.

NOTE:
1. In the semester examination, the examiner will set two questions from each unit (total 08 questions in all), covering the entire syllabus. The students will be required to attempt only 5 questions selecting at least one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.
PHY101B  
ENGINEERING PHYSICS - I
B. Tech. Semester - I (Common for all Branches)

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COURSE OBJECTIVES:
• This course aims to create an understanding the physics of substances that are of practical utility.
• It helps the students to gain a deep understanding of the key elements in engineering.
• This course covers areas which are essential for better understanding of core subjects.

UNIT I

PHYSICAL OPTICS:
Interference: Division of wave front-Fresnel’s Biprism, Division of amplitude – Newton’s rings, Michelson interferometer, applications.
Diffraction: Difference between Fraunhofer and Fresnel diffraction, Fraunhofer diffraction through a slit, Plane transmission diffraction grating and its spectra, dispersive and resolving powers.
Polarization: Polarised and unpolarized light, double refraction, Nicol prism, quarter and half wave plates, Plane, Elliptically & circularly polarised light, Polarimetry: Biquartz and Laurent’s half-shade Polari meters.

UNIT II

LASER & FIBRE OPTICS:
Introduction, Spontaneous and stimulated emissions, Laser action, characteristics of laser beam, Ruby laser, He-Ne, Nd-Yag and semiconductor lasers, applications of laser. Introduction, Propagation of light in fibers, Types of fiber (pulse & continuous), numerical aperture, Modes of propagation in optical fibre, application of optical fiber.

ACOUSTIC OF BUILDINGS:
Introduction, Reverberation, Sabine’s formula for reverberation time, Absorption coefficient and its measurements, factors affecting the architectural acoustics and their remedy, Sound absorbing materials.

UNIT III

TRANSMISSION OF HEAT AND THERMAL RADIATION:
Modes of transmission of heat, Thermal conductivity, Rectilinear flow of heat through a rod, Radial flow of heat through a spherical shell, determination of Thermal conductivity of good and bad conductors.
Black body, Emissive and Absorptive Powers, Wein’s Displacement Law, Kirchhoff’s Law, Stefan’s Law, Determination of Stefan’s Constant.

UNIT IV

NUCLEAR & ELEMENTARY IDEA OF PARTICLE PHYSICS:
Outline of interaction of charged particles and of Gamma-rays with matter. Counters: Gas filled counters (Ionization Chamber, Proportional Counter and G M Counter). Detector: Scintillation detector, Semiconductor detectors (p-n junction detector), Biological effects of nuclear radiation. Introduction to elementary particles, Interaction in particle physics: strong, electromagnetic, weak and gravitational.

Text Books:
1. A text book of Optics – Brij Lal and Subramanyam
2. Perspectives of Modern Physics - Arthur Beiser (TMH)
3. Modern Engineering Physics – A.S. Vasudeva (S. Chand)
6. Engineering Physics by S.P. Taneja (Chand Pub.)

Reference Books:

COURSE OUTCOMES:
• On completing this course student will be able to understand the formulation of various material and internal structure of various components
• Students will learn how quantum mechanics is useful for the fields like medicine and industry.
• Students will learn about lasers, optical fibers and their applications in modern communication system.
• This course will provide a multidisciplinary dimension exhibiting stronger interdependence in various fields.

NOTE:
1. In the semester examination, the examiner will set two questions from each unit (total 08 questions in all), covering the entire syllabus. The students will be required to attempt only 5 questions selecting at least one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.
MANUFACTURING PROCESSES
B. Tech. Semester – I/II (Common for all Branches)

L T P Credits
3 1 - 4

Class Work : 25 Marks
Theory : 75 Marks
Total : 100 Marks
Duration of Exam. : 3 Hrs.

COURSE OBJECTIVES:
• This course will introduce the principles of design for manufacturing.
• The course intends to provide understanding of modern manufacturing operations including machining, casting, forging, welding, brazing, soldering, finishing, heat treating, assembly, plastic materials processing, powder metallurgy, and specialized manufacturing processes.
• This course analyses the capabilities and limitations of each manufacturing process

UNIT I
Introduction:
Plant Layout, Principles of Plant Layout and Objectives of Layout, Types of Plant and shop layouts and their Advantages

UNIT II
Engineering Materials:
Foundry:
Introduction to Casting Processes, Basic Steps in Casting Process, Pattern, Types of Patterns, Pattern allowances, Risers, Runners, Gates, Molding Sand and its composition, Sand Preparation, Molding Methods, Core Sands and Core Making, Core Assembly, Mold Assembly, Melting (Cupola) and Pouring, Fettling, Casting Defects and Remedies. Testing of Castings.

UNIT III

UNIT IV

Text Books:

Reference Books:

COURSE OUTCOMES:
• This course will provide a set of functional requirements and product development constraints.
• Learner will be able to decide cost-effective material options based upon net part shape, expected loading, operating environment, cost constraints.
• Learner will be able to fabricate basic parts and assemblies.
• This course ascertains product and process quality levels through precision measurement tools and statistical quality control charts.
• Student will be able to communicate effectively with industry personnel by developing a manufacturing-centric vocabulary.

NOTE:
1. In the semester examination, the examiner will set two questions from each unit (total 08 questions in all), covering the entire syllabus. The students will be required to attempt only 5 questions selecting at least one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.
PRINCIPLES OF ELECTRICAL ENGINEERING

B. Tech. Semester – I/II (Common for all Branches)

L  T  P  Credits
3  1  -  4

Class Work : 25 Marks
Theory : 75 Marks
Total : 100 Marks
Duration of Exam. : 3 Hrs.

UNIT I
D.C. Circuit Analysis:
Basic concepts of electric circuits, Ohm’s Law, Independent energy sources, Dependent energy sources, passive elements, circuit properties, Kirchoff’s laws, applications of Kirchoff’s laws, Nodal and Loop methods of Analysis, , Superposition Theorem, Thevenin’s Theorem, Norton’s Theorem, Reciprocit Theorem, Maximum Power Transfer Theorem, Millman’s Theorem, Star-Delta or delta-star transformation, Applications of network theorems P-spice for DC circuit analysis.

UNIT II
A.C. Circuits:
Sinusoidal signal, Phasors, polar & rectangular, exponential & trigonometric representations, Resistance, Inductance & Capacitance components, behavior of these components in A.C. circuits, Phasor relationship for circuit elements, Impedance & Admittance, instantaneous & peak values, average and RMS values, active power, reactive power, apparent power, power factor, complex power, behavior of AC series, parallel circuits, RL, RC & RLC A.C. circuits (series and parallel), Resonance-series and parallel R-L-C Circuits, Q-factor, cut-off frequencies & bandwidth.

UNIT III
Three Phase Circuits:
Phase and line voltages and currents, balanced star and delta circuits, power equation, measurement of power by two wattmeter method.

Measuring Instruments:
Principle, Construction & working of moving coil type voltmeter & ammeter, moving iron type voltmeter & ammeter, Electrodynamic type wattmeter, single-phase induction type energy meter.

UNIT IV
Transformers:
Ampere’s law, Mutual Inductance, Construction, Working principle and phasor diagrams of Single-phase Transformer, Emf equation, Equivalent circuit, testing, efficiency and regulation of single-phase transformer; Auto transformer.

Rotating Machines:
Construction and working principle of dc motor and generator and its characteristics. Construction and working principle of 3-phase Induction machines & 3-phase synchronous machines, torque-speed characteristics.

Text Books:
1. Basic Electrical Engg (2nd Edition) : Kothari & Nagarath, TMH
2. Electrical Technology (Vol-I): B.L Theraja & A K Theraja, S.Chand
5. Basic Electrical Engineering, S.N. Singh, PHI

Reference Books:
1. Electrical Engineering Fundamentals: Deltoro, PHI
2. Basic Electrical Engineering (TMH WBUT Series), Abhijit Chakrabarti & Sudipta Nath, TMH
4. Introduction to Electrical Engineering, M.S. Naidu & S, Kamakshaiah, TMH

COURSE OUTCOMES:
• By end of this course student will be able to explain basic circuit concepts and responses.
• Student will acquire skills in handling machines and measuring tools

NOTE:
In the semester examination, the examiner will set two questions from each unit (total 08 questions in all), covering the entire syllabus. The students will be required to attempt only 5 questions selecting at least one question from each unit.
ME103B
ENGINEERING GRAPHICS AND DRAWING
B. Tech. Semester – I/II (Common for all Branches)

L T P Credits
1 4 3

Class Work: 40 Marks
Theory: 60 Marks
Total: 100 Marks
Duration of Exam.: 3 Hrs.

COURSE OBJECTIVES:
• This course aims to provide knowledge regarding use of technological tools effectively in engineering design.
• Helps in Transferring engineering designs to engineering and manufacturing processes
• Plan, design, implement, and improve cost-effective design of products

UNIT I
Basics of Engineering Graphics and Drawing:
Drawing Papers, Mini drafter, Pencils. Drawing Paper Layout, Title Block, Types of Lines, Lettering, Dimensioning, types of Projections; First and Third Angle systems of Orthographic Projections. Projection of Points in different Quadrants.

Projections of Straight Lines:
Contained by both Reference Planes, Contained by one and inclined to other Reference Plane, Contained by one and Parallel to other Reference Plane, Perpendicular to one of the Reference Planes, Inclined to one Plane but Parallel to the other Reference Planes, Inclined to both the Reference Planes, True Length of a Line and its Inclination with Reference Planes, Traces of a Line.

UNIT-II
Projections of Planes:
Parallel to one Reference Plane, Inclined to one Plane but Perpendicular to the other, Inclined to both Reference Planes.

Projections of Polyhedral Solids and Solids of Revolution:
In simple positions with axis perpendicular to a Reference Plane, with axis parallel to both Reference Planes, with axis parallel to one Reference Plane and inclined to the other Reference Plane, Projections of sections of Prisms, Pyramids, Cylinders and Cones. True Shape of Sections of Solids.

UNIT-III
Development:
Of Surfaces of various Solids objects.

Free Hand Sketching:
Orthographic Views from Isometric, Views of Simple Machine Components such as Brackets, Bearing Blocks, Guiding Blocks and Simple Couplings and Pipe Joints.

UNIT-IV
Isometric Projections:
Introduction, Isometric Scale, Isometric Views and Drawing of various Plane and Solids objects. Perspective drawing and oblique view.

Orthographic Drawings:
Threads, Bolts, Nuts and Washers, Bolted, Riveted and Welded Joints

Text Books:
1. Engineering Drawing: MB Shah and BC Rana, Pearsons

Reference Books:
1. A Text Book of Engineering Drawing: RK Dhawan, S Chand & Company

COURSE OUTCOMES:
• By end of this course student will gain an understanding of engineering design procedures, constraints and limitations.
• Student will be able to implement this knowledge in other engineering spheres.

NOTE:
1. For class work, the students shall be assigned to prepare at least ten drawing sheets covering all units and each topic of the syllabus.
2. For practical examination, the examiner will set a question paper containing total eight questions, two questions from each unit covering each topic of the syllabus; students are required to attempt five questions at least one from each unit.
**PHY103B**  
**PHYSICS LAB - I**  
**B. Tech. Semester – I (Common for all Branches)**

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<td>1</td>
<td>20 Marks</td>
<td>30 Marks</td>
<td>50 Marks</td>
<td>3 Hrs.</td>
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**COURSE OBJECTIVES:**
- To reinforce the theoretical topics with required experiments to stress the fundamental concepts.
- To provide practical understanding of important experimental techniques in physics with knowledge in theoretical aspects.
- To implement important experimental setups, concepts of diffraction, refraction, De'sauty bridge, polarimeter etc.

**LIST OF EXPERIMENTS:**

1. To find the wavelength of sodium light by using Newton's rings experimental setup.
2. To find the wavelength of sodium light by Fresnel's bi prism experimental setup.
3. To find the wavelength of various colours of white light with the help of a plane transmission diffraction grating.
4. To find the refractive index and Cauchy's constants of a prism by using spectrometer.
5. To find the wavelength of sodium light by using Michelson interferometer.
6. To find the resolving power of a telescope.
7. To find the pitch of a screw using He-Ne laser.
8. To find the specific rotation of sugar solution by using a polarimeter.
9. To compare the capacitances of two capacitors by De'sauty bridge.
10. To find the flashing and quenching potentials of Argon and also to find the capacitance of unknown capacitor.
11. To study the photo conducting cell and hence to verify the inverse square law.
12. To find the temperature co-efficient of resistance by using platinum resistance thermometer and Callender and Griffith bridge.
13. To find the frequency of A.C. mains by using sonometer.
14. To find the velocity of ultrasonic waves in non-conducting medium by piezo-electric method.
15. To determine the value of Stefan's constant.
16. To find the coefficient of thermal conductivity of a good conductor by Searle's method.
17. To determine the coefficient of thermal conductivity of a bad conductor by Lee and Charlton method.

**Recommended Books:**
1. Advanced Practical Physics – B.L. Worshnop and H.T. Flint (KPH)

**COURSE OUTCOMES:**
- Students will be able to validate important concepts of electrical, electronics and optical.
- Students will be able to visualize and establish behavior of various devices and phenomenon.

**NOTE:-**

1. Total ten experiments are to be performed in the semester.
2. At least seven experiments should be performed from the above list. Remaining three experiments should be performed as designed and set by the concerned institution as per the scope of the syllabus.
ME107B WORKSHOP PRACTICE
B. Tech. Semester – I/II (Common for all Branches)

L T P Credits
- - 4 2

Class Work : 40 Marks
Practical : 60 Marks
Total : 100 Marks
Duration of Exam. : 3 Hrs.

COURSE OBJECTIVES:
• To reinforce the theoretical topics with required experiments to stress the fundamental concepts.
• To provide knowledge of handling and using measuring tools, machine tools, lifting and marking tools.
• To provide the students with hands on experience on Carpentry, Forging, Casting, Welding, House Wiring etc

LIST OF EXPERIMENTS/ JOBS:

1. To study different types of measuring tools/instruments used in metrology and determine least counts of Vernier calipers, micrometers and Vernier height gauges.
2. To study different types of machine tools (lathe, shaper, planer, slotter, milling, drilling machines).
3. To prepare a job on a lathe involving facing, outside turning, taper turning, step turning, radius making and parting-off.
4. To study different types of fitting tools and marking tools used in fitting practice.
5. To prepare lay out on a metal sheet by making and prepare rectangular tray, pipe shaped components e.g. funnel.
6. To prepare joints for welding suitable for butt welding and lap welding.
7. To study various types of carpentry tools and prepare simple types of at least two wooden joints.
8. To prepare simple engineering components/ shapes by forging.
9. To prepare mold and core assembly, to put metal in the mold and fettle the casting.
10. To prepare horizontal surface/ vertical surface/ curved surface/ slots or V-grooves on a shaper/ planner.
11. To prepare a job involving side and face milling on a milling machine.
12. To study of CNC lathe, CNC Milling and EDM Machines.

COURSE OUTCOMES:
• Student will be familiar with various manufacturing processes, tools and machines.
• Student will be able to design simple engineering components/ shapes.

NOTE:-
1. At least ten experiments/ jobs are to be performed/ prepared by students in the semester.
2. At least 8 experiments/ jobs should be performed / prepared from the above list, remaining two may either be performed/ prepared from the above list or designed and set as per the scope of the syllabus of Manufacturing Processes.
EE103B PRINCIPLES OF ELECTRICAL ENGINEERING LAB  
B. Tech. Semester – I/II (Common for all Branches)

L T P Credits  Class Work : 20 Marks  
- - 2  1  Practicals : 30 Marks  
Total : 50 Marks  
Duration of Exam. : 3 Hrs.

COURSE OBJECTIVES:
• To reinforce the theoretical topics with required experiments to stress the fundamental concepts.  
• To gain practical insight of electrical theorems, transformer, generator, voltmeter, ammeter, wattmeter etc.

LIST OF EXPERIMENTS:
1. To verify KCL and KVL.  
2. To verify Thevenin’s & Norton’s Theorems.  
3. To verify maximum power transfer theorem in D.C. Circuit.  
4. To verify reciprocity theorem.  
5. To verify Superposition theorem.  
6. To study frequency response of a series R-L-C circuit and determine resonant frequency & Q-factor for various Values of R, L, C.  
7. To study frequency response of a parallel R-L-C circuit and determine resonant frequency & Q-Factor for various values of R, L, C.  
8. To perform direct load test of a transformer and plot efficiency Vs load characteristic.  
9. To perform direct load test of a D.C. shunt generator and plot load voltage Vs load current curve.  
10. To study various type of meters.  
11. Measurement of power by three voltmeters / three ammeters method.  
12. Measurement of power in a three phase system by two watt meter method.

COURSE OUTCOMES:
• An Ability to perform voltage, current, impedance, transient, and frequency response measurements.  
• An ability to layout, connect, and troubleshoot electrical circuits.

NOTE:
1. At least 10 experiments are to be performed by students in the semester.  
2. At least 8 experiments should be performed from the above list; remaining two experiments may either be performed from the above list or designed and set by the Dept. as per the scope of the syllabus of EE101B.
MATH102B  
MATHEMATICS - II  
B. Tech. Semester -II (Common for all Branches)

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<td>25 Marks</td>
<td>75 Marks</td>
<td>100 Marks</td>
<td>3 Hrs.</td>
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COURSE OBJECTIVES:
• This course intends to cover matrices, differential equations and transforms
• The course covers material which is essential to anyone who does mathematical computation in Engineering and sciences.
• This course helps in translating a physical problem into mathematical model
• This course creates the ability to model, solve and interpret any physical or engineering problem

UNIT-I
LINEAR DIFFERENTIAL EQUATIONS OF SECOND AND HIGHER ORDER: Complete solution, complementary function and particular integral, method of variation of parameters to find particular Integral, Cauchy's and Legendre's linear equations, simultaneous linear equations with constant co-efficients.

UNIT-II
LAPLACE TRANSFORMS AND ITS APPLICATIONS: Laplace transforms of elementary functions, properties of Laplace transforms, existence conditions, transforms of derivatives, transforms of integrals, multiplication by t^n, division by t. Evaluation of integrals by Laplace transforms. Laplace transform of Unit step function, unit impulse function and periodic function. Inverse transforms, convolution theorem, application to linear differential equations and simultaneous linear differential equations with constant coefficients.

UNIT-III
Power series, radius and circle of convergence, Taylor's Maclaurin's and Laurent's series. Zeroes and singularities of complex functions, Residues

UNIT-IV
FOURIER SERIES AND FOURIER TRANSFORMS : Euler's formulae, conditions for a Fourier expansion, change of interval, Fourier expansion of odd and even functions, Fourier expansion of square wave, rectangular wave, sawtoothed wave, half and full rectified wave, half range sine and consine series.
Fourier integrals, Fourier transforms, Shifting theorem (both on time and frequency axes), Fourier transforms of derivatives, Fourier transforms of integrals, Convolution theorem, Fourier transform of Dirac-delta function

Text Books:
1. Advanced Engg. Mathematics F Kreyszig

Reference Books:

COURSE OUTCOMES:
• On completing this course students should be able to implement concepts of transforms, matrices and differential equations
• Students will be able to use differential equations to solve applied problems.
• This course enables a learner to able to identify, formulate and solve the problems
• This course plays a vital role in many areas of engineering

NOTE:
In the semester examination, the examiner will set two questions from each unit (total 08 questions in all), covering the entire syllabus. The students will be required to attempt only 5 questions selecting at least one question from each unit.

The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

1. In the semester examination, the examiner will set two questions from each unit (total 08 questions in all), covering the entire syllabus. The students will be required to attempt only 5 questions selecting at least one question from each unit.

2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

**PHY102B ENGINEERING PHYSICS – II**

B. Tech. Semester -II (Common for all Branches)

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**COURSE OBJECTIVES:**

- This course aims to create an understanding of quantum physics, crystal structure, nanostructures and microstructures.
- It helps the students to gain a deep understanding of the key elements in engineering.
- This course covers areas which are essential for better understanding of core subjects.

**UNIT I**

**ELECTRODYNAMICS & QUANTUM PHYSICS:**

Introduction, Displacement current, Equation of continuity, Gauss’s Law in dielectric, applications of Gauss’s law, Maxwell’s equations (both differential and integral form), plane e.m. wave equations in free space, dielectric and conducting medium; Poynting vector.


**UNIT II**

**CRYSTAL STRUCTURE:**

Space Lattice, unit cell and translation vectors, Miller indices, Bravis lattice structure in 3D, simple crystal structure (NaCl, ZnS and CsCl2), Elementary idea of reciprocal lattice, Ewald Construction, Experimental x-ray diffraction method, Laue method, powder Method.

**FREE ELECTRON THEORY:**

Elements of classical free electron theory, Drude’s Theory of Conduction and its limitations, quantum theory of free electrons, Fermi level, Density of states, Fermi-Dirac distribution function, Thermionic emission, Richardson's equation.

**UNIT-III**

**BAND THEORY OF SOLIDS:**

Origin of energy bands, Kronig, Penney Model (qualitative), E-K diagrams, Brillouin Zones, Concept of effective mass and holes, Classification of solids into metals, Semiconductors and insulators, Fermi energy and its variation with temperature, Conduction in Intrinsic and Extrinsic Semiconductors. Hall Effect and its Applications.

**UNIT-IV**

**SUPERCONDUCTIVITY & NANOSCIENCE:**

Introduction to superconductivity, Critical temperature, Meissner Effect, Types of Superconductor, London Equations, penetration depth and coherence length, BCS Theory (qualitative ideas), High temperature superconductors.

Concept of Nano-materials, Size dependence of band gap, Top-down and bottom-up approach for preparing nano-materials, MEMS & NEMS, Properties and applications of Fullerene, Graphene, CNT, Nanowires, Nano-composites, Quantum dots.

**Text Books:**

2. Quantum Mechanics – Ghatak & Loknathan.
6. Engineering Physics by S.P. Taneja (Chand Pub.)

**Reference Books:**

1. Introduction to Solid State Physics (VII Ed.) - Charles Kittel (John Wiley).
2. Quantum Mechanics – Powell and Crasemann (Oxford & IBH)
3. Classical Electrodynamics by S.P. Puri (Narosa)

**COURSE OUTCOMES:**

- On completing this course student will be able to understand the concept of crystal structure and band theory of solids.
- Students will know the differences between classical and quantum physics and implementation of quantum physics.
- Students will learn about microstructures and nanostructures fabrication and utility.
- This course will provide a multidisciplinary dimension exhibiting stronger interdependence in various fields.
NOTE:
1. In the semester examination, the examiner will set two questions from each unit (total 08 questions in all), covering the entire syllabus.
2. The students will be required to attempt only 5 questions selecting at least one question from each unit.

CH101B ENGINEERING CHEMISTRY
B. Tech. Semester – I/II (Common for all Branches)

L T P Credits
3 1 - 4

Class Work : 25 Marks
Theory : 75 Marks
Total : 100 Marks
Duration of Exam. : 3 Hrs.

COURSE OBJECTIVES:
• This course aims to create an understanding of thermodynamics and applications
• This course intends to provide working principles, mechanisms of reactions and applications of building blocks like polymers, batteries etc
• To provide overview of surface coatings in order to protect metals
• It helps the students to gain a deep understanding of the key elements in engineering.
• This course covers areas which are essential for better understanding of core subjects.

UNIT I
Thermodynamics:
Second law, concept of entropy, entropy change for ideal gas, free energy and work functions, free energy change, chemical potential, Gibb’s Helmholtz equation, Clausius –Clapeyron equation. Related numerical problems with above topics.

Phase-rule:
Terminology, Derivation of Gibb’s Phase Rule equation, One component system (water system), Two components systems, system with Eutectic point (Pb-Ag), system with congruent melting point (Zn-Mg), system with incongruent melting point (Na-K), Applications of above systems. Elementary idea of Zone refining and Zone leveling.

UNIT-II
Water and its treatment:
Hardness of water and its determination, units of hardness, alkalinity of water and its determination, related numerical problems, water softening, Ion-exchange process, mixed bed demineralisation, desalination of water by using different methods.

Corrosion and its prevention:
Galvanic & concentration cell, dry and wet corrosion, Electrochemical theory of corrosion, Galvanic corrosion, Pitting corrosion, differential aeration corrosion, water line corrosion, stress corrosion, factor effecting corrosion, Preventing measures, electroless Plating of Ni and Cu.

UNIT-III
Polymers and Polymerization:
Organic polymers, polymerisation, various types of polymerisation, effect of structure on properties of polymers, preparation properties and technical applications of thermoplastics (PE, PVC, PVA, Teflon), thermosets (PF, UF & MF) and elastomers (Synthetic Rubber including SBR, Buna-S, Buna-N, Thiokol & Polyurethanes), Inorganic polymers (general properties), Glass transition temperature, silicones

Composite Materials & their application:
optical fibres, Fullerenes, organic electronic material, composite materials & their classification, constituents of composites, role of interface in composite performance and durability, fiber – Reinforced composite, advantage and applications of composites.

UNIT-IV
Lubricants and fuels:
Friction, mechanism of lubrication, classification and properties of lubricants and selection of Lubricants, Definition and classification of fuel, Calorific value and methods of its determination.

Analytical methods:
Thermal methods; Principle, method and application of TGA, DTA & DSC, interaction of E.M radiation with a molecule and origin of spectrum, Vibrational & electronic spectra (Experimental details are excluded), spectrophotometry, conductometric titrations, elementary discussion on Flame-photometry.

Text / Reference Books:
4. Chemistry in Engineering & Tech., Vol. I & II, Rajaram, Kuriacose (TMH)
5. Engineering Chemistry, ShashiChawla (DhanpatRai and co.)
7. Engineering chemistry, S.S Dara (S.chand&co.)

COURSE OUTCOMES:
• By the end of this course student will be aware of reaction mechanisms involved in corrosion, water treatment.
• Student will know the design procedure of batteries
• Student will have the knowledge to identify and formulate polymers, to synthesize nano materials
• Student will be aware of properties of lubricants and heat treatment processes

**NOTE:** In the semester examination, the examiner will set two questions from each unit (total 08 questions in all), covering the entire syllabus. The students will be required to attempt only 5 questions selecting at least one question from each unit.

**CSE101B  INTRODUCTION TO COMPUTERS AND PROGRAMMING**  
B. Tech. Semester – I/II (Common for all Branches)

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**COURSE OBJECTIVES:**
- This course is designed to provide a basic study of computer system, operating system, algorithms and networks.
- This course covers comprehensive study of C programming language. It stresses the strengths of C, which provide students with the means of writing efficient, maintainable and portable codes.
- The nature of C language is emphasized in wide variety of examples and applications.

**UNIT I**
An introduction of Computer System:
Anatomy of a digital Computer, Different Units of Computer System, Classification of Computer Systems, Radix Number systems. Binary codes: BCD, Gray, EBCDIC, ASCII

Operating System:

**UNIT-II**
Programming Languages and algorithms:
Machine, Assembly and High Level Language; Assembler, Linker, Loader, Compiler, Interpreter, debuggers, Programming fundamentals: problem definition, algorithms, flowcharts and their symbols

Computer Networks:
Basic concepts of Computer Networks, Working of Internet and its Major features. Network Topologies: Bus, Star, Ring, Hybrid, Tree, Complete, Irregular; Types of Networks: LAN, MAN and WAN.

Electronic Mail: advantages and disadvantages, e-mail addresses, message components, message composition, mailer features, E-mail inner workings, E-mail management, Newsgroups, mailing lists, chat rooms.

**UNIT-III**
Basics of ‘C’ Language :
C Fundamentals, Basic data types, local and external variables and scope, formatted input/ output, expressions, selection statements, loops and their applications; arrays, functions, recursive functions, pointers and arrays. Strings literals, arrays of strings; applications, Structures, Unions and Enumerations.

**UNIT-IV**
Advanced Features of ‘C’ Language
Preprocessor directives, macro definition, conditional compilation, storage classes, type’s qualifiers, Low level programming (Bitwise operators, Bit fields in structures, other low level techniques), error handling, file operations (low level/high level).


**Reference Books:**
1. The C Programming Language by Dennis M Ritchie, Brian W. Kernigham, 1988, PHI.
3. Information technology, Dennis P. Curtin, Kim Foley, Kunal Sen, Cathleen Morin, 1998, TMH.
4. Theory and problem of programming with C, Byron C Gottfried, TMH.

**COURSE OUTCOMES:**
- Student will be able to write, compile, and debug programs in C language.
- Ability to use different data types, decision structures, loops and functions in a programme.
- Understand the dynamics of memory by use of pointers.
- Understand basic computer system and networks.
NOTE:
In the semester examination, the examiner will set two questions from each unit (total 08 questions in all), covering the entire syllabus. The students will be required to attempt only 5 questions selecting at least one question from each unit.

ECE102B  
BASICS OF ELECTRONICS ENGINEERING
B. Tech. Semester – II (OPTIONAL- Common for all Branches)

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COURSE OBJECTIVES:
• This course will provide a scope for students to know about basics of all major subjects of electronics engineering.
• This course covers a brief overview of digital electronics, analog electronics, communication system and 8085 microprocessor.

UNIT I
Semiconductor Physics, Diodes and Applications:
Basic concepts, intrinsic and extrinsic semiconductors, diffusion and drift currents, Hall Effect and its applications-pn junction under open circuit, reverse bias and forward bias conditions, p-n junction in the breakdown region, ideal diode, and types of diodes –zener diode, varactor diode, LED and photodiode. Rectifier (half wave and full wave).
Amplifiers:
Introduction of different types of BJT amplifiers & their characteristics.

UNIT-II
Operational Amplifiers:
OP-amps, its characteristics, inverting, non-inverting, summing, averaging, scaling, difference, integrator and differentiator amplifiers.
Power Supplies:
Introduction and working of switched mode power supply (SMPS), voltage regulator.

UNIT-III
Digital Electronics:
Binary, Octal and Hexadecimal number system and conversion, Boolean algebra, truth tables of logic gates AND, OR, NOT, EX-OR, EX-NOR, NAND, NOR AND their implementation using diodes transistors, switches and lamps, Universal gates.
Electronic Instruments:
Transducers, Role, importance and applications of general purpose test instruments viz. multi meter (digital and analog), cathode ray oscilloscope (CRO), function/signal generator.

UNIT-IV
Communication System:
Modulation, need of modulation, Block diagram of basic communication system, overview of AM, FM and PM.
Microprocessor:

Reference Books:

COURSE OUTCOMES:
• The student will be able to have a better understanding of major topics which will be dealt in detail in forthcoming semesters.
• Students will be aware of handling and using various measuring instruments.
NOTE:
1. In the semester examination, the examiner will set two questions from each unit (total 08 questions in all), covering the entire syllabus.
2. The students will be required to attempt only 5 questions selecting at least one question from each unit.

BT102B 
BASICS OF BIOTECHNOLOGY
B. Tech. Semester – II (OPTIONAL - Common for all Branches)

L T P Credits
3 1 - 4

Class Work : 25 Marks
Theory : 75 Marks
Total : 100 Marks
Duration of Exam. : 3 Hrs.

COURSE OBJECTIVES:
• This course will provide a scope for students to know about basics of all major subjects of biotechnology engineering.
• This course covers a brief overview of cell structure, functioning, genetic engineering, chromosomes etc.

UNIT I

Introduction:
Nature and scope of Biotechnology.

Cell Structure and Function:
Prokaryotes and Eukaryotes- cell wall, cell membrane, nucleus, mitochondria, chloroplast, ribosome, vacuoles, bacteria and viruses: brief descriptions.
Biomolecules: A brief account of structure and functions of carbohydrates, lipids, proteins.

UNIT – II

Cell Division:
Mitosis and meiosis

Genes and chromosomes:
Classical- Mendel’s laws and chromosomes, nature of genetic material, DNA and RNA as genetic material, concept of organization of genetic material into chromosomes.
DNA replication: DNA polymerases, replication mechanism.

UNIT-III

Gene Expression:
Central dogma, genetic code, gene expression-a brief account of transcription and translation, housekeeping genes, mutations and their molecular basis.

Genetic Engineering:
An introduction to genetic engineering: cloning (vectors, enzymes), DNA and genomic libraries, transgenics, DNA fingerprinting, genomics.

UNIT – IV

Applications of Biotechnology:
Bioprocess and fermentation technology, cell culture, enzyme technology, biological fuel generation, single cell protein, sewage treatment, environmental biotechnology, biotechnology and medicine, biotechnology in agriculture & forestry industry, food and beverage technology, production of biological inventions, safety in biotechnology.

Text/ Reference Books:

COURSE OUTCOMES:
The objectives of this course will have the following outcomes:
• The student will be able to have a better understanding of major topics which will be dealt in detail in forthcoming semesters.
• Students will have a basic understanding of cell structure, functioning, genetic engineering, chromosomes etc.

NOTE:
1. In the semester examination, the examiner will set two questions from each unit (total 08 questions in all), covering the entire syllabus. The students will be required to attempt only 5 questions selecting at least one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

HUM102B
ORAL COMMUNICATION SKILLS
B. Tech. Semester – II (OPTIONAL- Common for all Branches)

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COURSE OBJECTIVES:
• Course Endeavors to empower communication skills.
• To transform into dynamic personality with confidence.
• To emphasize the importance of language in academic and employability.

UNIT I

Essentials of Speaking Skills:
Familiarity with phonetic sound symbols; Transcription of simple words using International Phonetic Alphabet; Use of dictionary to cultivate standard pronunciation and develop phonetic discrimination

UNIT II

Speaking Skills:
Need and Significance of Effective Oral Communication; Practice of Conversation – Interpersonal and Telephonic Conversation; Formal Group Discussion

UNIT III

Non-Verbal Elements in Oral Communication Skills:
Reading Face, eyes, gesture and body posture, time, space and culture in communicative situations; practicing verbal and non-verbal communication (Body Language) to acquire effective Oral communication.

UNIT IV

Listening Skills:
Essentials of Good Listening, Types of Listening, Barriers in Effective listening, Exercises in Listening to Talk Shows, Speech Reviews; Practice in English Sounds and Speech using RP/MRP.

RECOMMENDED READING:

COURSE OUTCOMES:
• By the end of this course student will be able to express and interpret views without hesitation
• Students will lose stage fear and develop self confidence

NOTE:
In the semester examination, the examiner will set two questions from each unit (total 08 questions in all), covering the entire syllabus. The students will be required to attempt only 5 questions selecting at least one question from each unit.

CE102B
BASICS OF CIVIL ENGINEERING
B. Tech. Semester – II (OPTIONAL- Common for all Branches)

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Class Work : 25 Marks
Theory : 75 Marks
Total : 100 Marks
Duration of Exam. : 3 Hrs.

COURSE OBJECTIVES:
• This course will provide a scope for students to know about basics of all major subjects of civil engineering.
• This course covers a brief overview of materials, surveying, transportation and geotechnical engineering.

UNIT I
Materials for Construction:
Stones, Sands, Lime, Bricks, Timber, Steel their Classification and Properties. Different Types of Cement and their Properties, manufacturing of Cement, Concrete, and properties of Concrete, Ingredients of Concrete and Their Functions
Component parts of a Building, Foundation, Masonry Works, Doors and Windows, Floors, Roofs, DPC, Building Services

UNIT – II
Surveying, Introduction to Surveying:
Definition, importance, classification of surveys, Principle, Leveling: definitions of terms used in leveling, different types of levels, Contours, Definition, representation of reliefs, horizontal equivalent, contour interval, characteristics of contours, methods of contouring, contour gradient, uses of contour maps, Introduction to GIS, GPS and Remote sensing.

UNIT III
Transportation:
Various modes and means of transportation, Different types of transport systems, Importance of road transport, History of Road Development, Indian Road Congress. Main features of 20 years road development plans in India, PMGSY Sources of power, estimation of water power, water budget equation, necessity and importance of harnessing small hydro power plants, Dams, Types of Dams, Location and Impact assessment of a Dam project.

UNIT – IV
Geotechnical Engineering:
History and its applications, Soil Properties, Classification of Soil, Geotechnical and Geophysical investigation of Soil.
Irrigation Engineering: Necessity, advantages, disadvantages, impact of irrigation on human environment, need and development of irrigation in India.

Text Books:
1. Basic Civil Engineering, Satheesh Gopi, Pearson.
2. Basic Civil Engineering, Dr. B.C. Punmia, Ashok Kumar Jain, Arun Kr. Jain, Firewall Media

Reference Books:
1. Surveying by Prof. N. Singh, Tata McGraw Hill, New Delhi
2. Basic Civil Engineering, Rakesh Beohar, Firewall Media
4. Water Resources Engineering by Linsley and Franzini

COURSE OUTCOMES:
• The student will be able to have a better understanding of major topics which will be dealt in detail in forthcoming semesters.
• Students will have a basic understanding of materials, surveying, transportation and geotechnical engineering.
NOTE:
1. In the semester examination, the examiner will set two questions from each unit (total 08 questions in all), covering the entire syllabus. The students will be required to attempt only 5 questions selecting at least one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

ME105B ELEMENTS OF MECHANICAL ENGINEERING
B. Tech. Semester – I/II (Common for all Branches)

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Class Work : 25 Marks
Theory : 75 Marks
Total : 100 Marks
Duration of Exam. : 3 Hrs.

COURSE OBJECTIVES:
• This course provides the basic knowledge of Newtonian mechanics, rigid-body mechanics, and structural analysis, in particular, the principles of statics & dynamics and their applications in engineering.
• To develop an ability to apply knowledge of mathematics, Science and Engineering Outcomes.
• To develop ability to design a system within realistic constraints
• To develop ability to use modern engineering tools

UNIT I

Thermodynamics:
Definitions in thermodynamics, fundamentals of first and 2nd law of thermodynamic- concept of internal energy, enthalpy and entropy, heat pump and refrigerator, elementary numerical problems.

Properties of Steam & Boilers:
Properties of steam, use of steam tables and mollier diagram, measurement of dryness fraction of steam, Carnot and Rankin cycle, elementary numerical problems. Classification of boilers, Comparison of water and fire tube boilers mounting and accessories with their functions, Constructional and operational details of Cochran and Babcock and Wilcox boilers, elementary numerical problems.

Steam Turbines and Condensers:
Classification of turbines and their working principles, Types of condensers and their uses.

UNIT-II

I.C. Engines and Gas Turbines:

Refrigeration and air conditioning:
Rating of refrigeration machine, coefficient of performance, simple vapor compression cycle, fundamentals of air conditioning, use of Psychrometric charts.

UNIT-III

Water Turbines and Pumps:
Introduction, Classification, Construction details and working principle of Pelton, Francis and Kaplan turbines, Classification of water pumps and construction detail & working principle of centrifugal pump.

Measuring Instruments:
Principle, Construction & working of moving coil type voltmeter & ammeter, moving iron type voltmeter & ammeter, Electrodynamic type wattmeter, single-phase induction type energy meter.

UNIT-IV

Introduction to Power transmission and Devices:
Belt drive, Rope drive, Chain drive, Types of gear and Gear train, Types and function of clutches, Types and function of brakes.

Stresses and Strains:
Introduction, Concept & types of Stresses and strains, Poison’s ratio, stresses and strains in simple and compound bars under axial loading, Stress-strain diagrams, Hooks law, Elastic constants & their relationships. Concept of shear force and bending moments in beams, elementary numerical problems.

Text Books:
2. Engineering Thermodynamics – C.P. Arora, Pub. - TMH, New Delhi

Reference Books:

COURSE OUTCOMES:
• Student will be able to analyze stress and strain on mechanical components
• Ability to identify and quantify failure modes for mechanical parts
• Student will gain knowledge of basic machine elements used in machine design, design machine elements for a specific application
NOTE:
1. In the semester examination, the examiner will set two questions from each unit (total 08 questions in all), covering the entire syllabus. The students will be required to attempt only 5 questions selecting at least one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

PHY104B

PHYSICS LAB. - II
B. Tech. Semester – II (Common for all Branches)

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COURSE OBJECTIVES:
* To reinforce the theoretical topics with required experiments to stress the fundamental concepts.
* To provide practical understanding of important experimental techniques in physics with knowledge in theoretical aspects.

LIST OF EXPERIMENTS:

1. To find the low resistance by Carey - Foster's bridge.
2. To find the resistance of a galvanometer by Thomson’s constant deflection method using a
   Post office box.
3. To find the value of high resistances by Substitution method.
4. To find the value of high resistances by Leakage method.
5. To study the characteristics of a solar cell and to find the fill factor.
6. To find the value of e/m for electrons by helical method.
7. To find the ionisation potential of Argon/Mercury using a thyratron tube.
8. To study the variation of magnetic field with distance and to find the radius of coil by
   Stewart and Gee’s apparatus.
9. To study the characteristics of (Cu-Fe, Cu-Constantan) thermo couple.
10. To find the value of Planck's constant by using a photoelectric cell.
11. To find the value of co-efficient of self-inductance by using a Rayleigh bridge.
12. To find the value of Hall Co-efficient of semi-conductor.
13. To study the V-I characteristics of a p-n diode.
14. To find the band gap of intrinsic semi-conductor using four probe method.
15. To calculate the hysteresis loss by tracing a B-H curve.
16. To verify the Truth Table of various Logic Gates.

Recommended Books:
1. Advanced Practical Physics – B.L. Worshnop and H.T. Flint (KPH)

LEARNING OUTCOMES:
* Students will be able to validate important concepts of electrical, electronics and optical.
* Student will be able to visualize and establish behavior of various devices and phenomenon.
NOTE:-
1. Total ten experiments are to be performed in the semester.
2. At least seven experiments should be performed from the above list. Remaining three experiments should be performed as designed and set by the concerned institution as per the scope of the syllabus.

CH103B
CHEMISTRY LAB
B. Tech. Semester – I/II (Common for all Branches)

L T P Credits
- - 2 1

Class Work : 20 Marks
Practical : 30 Marks
Total : 50 Marks
Duration of Exam. : 3 Hrs.

COURSE OBJECTIVES:
• To make students familiarize with the practical aspects of volumetric analysis of water samples
• To impart the knowledge about different types of titrations used in volumetric analysis
• To make students develop in terms of practical skills required for analytical projects.
• To imbibe the advantages of instrumental methods of chemical analysis
• To make students observe practically the aspects of corrosion rate determination, preparation of plastics and process of electroplating.

LIST OF EXPERIMENTS:

1. Determination of Ca++ and Mg++ hardness of water sample using EDTA solution.
2. Determination of alkalinity of water sample.
3. Determination of dissolved oxygen (DO) in the given water sample.
4. To find the melting and eutectic point for a two component system by using method of Cooling curve.
5. Determination of viscosity of lubricant by red wood viscometer (No. 1 & No. 2).
6. To determine Flash point & Fire point of an oil by Pensky-Marten’s flash point apparatus and by Abel’s closed cup apparatus.
7. To prepare Phenol-formaldehyde and urea- formaldehyde resin.
8. To find out saponification No. of an oil.
9. Determination of concentration of KMnO4 solution spectrophotometrically.
10. Determination of strength of HCl solution by titrating it against NaOH solution conductometrically.
11. To determine amount of sodium and potassium in a given water sample by flame photometer.
12. Estimation of total iron in an iron alloy.

Recommended Books:
2. Essential of Experimental Engineering chemistry, Shashi Chawla, Dhanpat Rai Publishing Co.

COURSE OUTCOMES:
After performing the experiments listed in the syllabus, the students will be able to
• Distinguish different types of titrations in the volumetric analysis
• Assess the quality of water based on the analysis done by them.
• Acquire practical knowledge related to the concepts like corrosion and its inhibition process, photochemical reactions, electroplating, etc.
• Exhibit the skills in performing experiments based on the theoretical fundamentals available.
NOTE:-
The student will be required to perform 10 experiments/exercises from the above list and any other two experiments designed by the department based on the theory course (course code CH101B Course Name Chemistry).

CSE103B COMPUTER PROGRAMMING LAB
B. Tech. Semester – I/II (Common for all Branches)

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COURSE OBJECTIVES:
• This course is designed to provide a comprehensive study of the C programming language. It stresses the strengths of C, which provide students with the means of writing efficient, maintainable, and portable code.
• To learn and acquire art of computer programming
• To know about some popular programming languages and how to choose Programming language for solving a problem

LIST OF EXPERIMENTS:
1. Write a program to find the largest of three numbers. (if-then-else)
2. Write a program to find the largest number out of ten numbers (for-statement)
3. Write a program to find the average mail height & average female heights in the class (input is in form of sex code, height).
4. Write a program to find roots of quadratic equation using functions and switch statements.
5. Write a program using arrays to find the largest and second largest no. out of given 50 nos.
6. Write a program to multiply two matrices.
7. Write a program to sort numbers using the Quicksort Algorithm.
9. Write a program to check that the input string is a palindrome or not.
10. Write a program to read a string and write it in reverse order.
11. Write a program to concatenate two strings.
12. Write a program which manipulates structures (write, read, and update records).
13. Write a program which creates a file and writes into it supplied input.
14. Write a program which manipulates structures into files (write, read, and update records).

COURSE OUTCOMES:
• Students will understand the basic terminology used in computer programming.
• Students will be able to write, compile and debug programs in C language.

NOTE:
1. At least 10 experiments are to be performed by students in the semester.
2. At least 8 experiments should be performed from the above list; remaining two experiments may be given by the teacher concerned.

3. At least 5 to 10 more exercises to be given by the teacher concerned.

ME109B  
ELEMENTS OF MECHANICAL ENGINEERING LAB
B. Tech. Semester – I/II (Common for all Branches)

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COURSE OBJECTIVES:
• To reinforce and exercise engineering and measurement principles, exposure to instrumentation and systems,
• To develop creative thinking and diagnostic skills.
• To develop proficiency in data analysis and presentation.
• To learn about various engines and boilers by performing experiments.

LIST OF EXPERIMENTS:

1. To study Cochran & Babcock & Wilcox boilers.
2. To study the working & function of mountings & accessories in boilers.
3. To study 2-Stroke & 4-Stroke diesel engines.
4. To study 2-Stroke & 4-Stroke petrol engines.
5. To calculate the V.R., M.A. & efficiency of single, double & triple start worm & worm wheel.
6. To calculate the V.R., M.A. & efficiency of single & double purchase winch crabs.
7. To draw the SF & BM diagrams of a simply supported beam with concentrated loads.
8. To study the simple & compound screw jacks and find their MA, VR & efficiency.
9. To study the constructional features & working of Pelton Turbine.
10. To prepare stress-strain diagram for mild steel & cast iron specimens under tension and compression respectively on a Universal testing machine.

COURSE OUTCOMES:
• The student will be able to have stronger hold on data analysis and presentation.
• A detailed operational understanding is attained about various boilers and engines.
NOTE:
1. Total ten experiments are to be performed in the Semester.
2. At least eight experiments should be performed from the above list. Remaining three experiments should be performed as designed & set as per the scope of the syllabus of ME – 101: Elements of Mechanical Engineering.

GP102B GENERAL PROFICIENCY & ETHICS
B. Tech. Semester – II (Common for all Branches)

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COURSE OBJECTIVES:
To inculcate moral values and a sense of professionalism in a student along with personality development in terms of quality such as receiving, responding, temperament, attitude and outlook.

A. The student will present a written report before the committee with following in view:
The student will present before the committee his/her achievements during the current academic session in the form of a written report highlighting followings:
I. Academic Performance
II. Extra Curricular Activities / Community Service, Hostel Activities (8 Marks)
III. Technical Activities / Industrial, Educational tour (8 Marks)
IV. Sports/games (4 Marks)
V. Moral values & Ethics (10 Marks)

NOTE: Report submitted by the students should be typed on both sides of the paper.

B. A student will support his/her achievement and verbal & communicative skill through presentation before the committee.

C. Moral values & Ethics
Syllabus - Introduction to Value Education. Understanding ethics, value system, happiness, prosperity
A minor test / Quiz will be conducted and it will be the duty of the concerned teacher assigned to teach Moral values & Ethics to submit the awards to respective chairman of the department / Director/Principal.
The evaluation of this course will be made by the following Committee.

University Departments:
1. Chairperson of the Department
2. Senior Most Faculty Counsellor
3. Vice-Chancellor’s Nominee

Affiliated Colleges:
1. Director/Principal
2. Head of the Department/Sr. Faculty
3. External Examiner to be appointed by the University

COURSE OUTCOMES:
• Upon completing this course students should be able to know the morals, Human Values, Ethics, Safety, Responsibilities and Rights

NOTE: Remuneration will be paid to the external examiner only (at par with the other practical examinations).
MGT201B  ENGINEERING ECONOMICS  
B. Tech. Semester – III (Common for all Branches Except BT& BME)

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<td>Duration of Exam.</td>
<td>3 Hrs.</td>
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COURSE OBJECTIVES:
• At the end of the course the students should be able to understand different types of business organizations and the various scientific principles used in different departments like Personnel department, Financial Department, Marketing Department etc.
• The student should also be able to understand basic economic principles and strategies.

UNIT I

UNIT II
Meaning of Demand, Individual and Market demand schedule, Law of demand, shape of demand curve. Elasticity of demand, measurement of elasticity of demand, factors effecting elasticity of demand, practical importance & application of the concept of elasticity of demand. Various concepts of cost-Fixed cost, variable cost, average cost, marginal cost, money cost, real cost, opportunity cost. Shape of average cost, marginal cost, total cost etc. in short run and long run.

UNIT III
Meaning of production and factors of production; Law of variable proportions, Law of Return to Scale, Internet and External economies and diseconomies of scale. Meaning of Market, Type of Market – perfect Competition, Monopoly, Oligopoly, Monopolistic competition (Main features of these markers).

UNIT IV

Text Books:
1. Ahuja H.L.’Micro Economic Theory’ S. Chand Publication, New Delhi
2. Dewett K.K “Modern Economic Theory” S. Chand Publication, New Delhi

Reference Books:
2. Chopra P.N “Principle of Economics” Kalyani Publishers, Delhi

COURSE OUTCOMES:
• The student will be ready to apply the different scientific methods used in various departments of any organization like Finance department, marketing department, and Personnel department.
• He will also be aware of the basic economic concepts.

NOTE:
1. In the Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, atleast one from each unit. All questions carry equal marks.
2. The students will be allowed to use non-Programmable Scientific Calculator. However, sharing/exchange of calculator are prohibited in the examination.
ECE201B DIGITAL ELECTRONICS
B. Tech. Semester –III (EE, ECE, CSE, EEE, IC, common with BME, AEI in 4th Sem.)

L T P Credits
3 1 - 4

Class Work : 25 Marks
Theory : 75 Marks
Total : 100 Marks
Duration of Exam. : 3 Hrs

COURSE OBJECTIVES:
The objective of the course is to
• Explain how digital circuit of large complexity can be built in a methodological way, starting from Boolean logic and applying a set of rigorous techniques.
• Create minimal realizations of single and multiple output Boolean functions.
• Design and analyze combinational circuits using medium scale integrated (MSI) components, including arithmetic logic units.
• Derive state diagrams and state transition tables for synchronous systems.
• Study the characteristics and performance of digital circuits built using various MOS technologies.

UNIT I
FUNDAMENTALS OF DIGITAL TECHNIQUES :

COMBINATIONAL DESIGN USING GATES:
Design using gates, Simplifications of SOP and POS Boolean Expressions, Karnaugh map up to four variables.

UNIT II
COMBINATIONAL DESIGN USING MSI DEVICES :
Multiplexers and Demultiplexers and their use as logic elements, Decoders, Adders / Subtractors, BCD arithmetic circuits, Encoders, Code Converters, Decoders / Drivers for display devices.

SEQUENTIAL CIRCUITS:

UNIT III
DIGITAL LOGIC FAMILIES:
Switching mode operation of p-n junction, bipolar and MOS devices. Bipolar logic families:RTL, DTL, DCTL, HTL, TTL, ECL, MOS, and CMOS logic families. Tristate logic, Interfacing of CMOS and TTL families.

SEMICONDUCTORS MEMORY DEVICES:
Memory organizations, Characteristics of memory devices, Classifications of semiconductors memories.

UNIT IV
A/D AND D/A CONVERTERS:
Sample and hold circuit, weighted resistor and R -2 R ladder D/A Converters, specifications for D/A converters.
A/D converters : Quantization, parallel -comparator, successive approximation, counting type, dual-slope ADC, specifications of ADCs.

PROGRAMMABLE LOGIC DEVICES:
PLA, PAL, FPGA and CPLDs.

Text Books :
1. Modern Digital Electronics(Edition III) : R. P. Jain; TMH
2. Digital Electronics :Green; Pearson

Reference Books:
1. Digital Integrated Electronics : Taub & Schilling; MGH
2. Digital Principles and Applications : Malvino & Leach; McGraw Hill.
3. Digital Design : Morris Mano; PHI.

COURSE OUTCOMES:
On successful completion of this course students will be able to
• Design and analyze combinational and sequential circuits for various practical problems using basic gates and flip flops
• Implement LSI and MSI circuits using programmable logic devices (PLDs)
• Demonstrate knowledge of hazards and race conditions generated within asynchronous circuits.
• Understand the process of integration and characteristics of different logic families.

NOTE:
In the Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, atleast one from each unit. All questions carry equal marks.
UNIT I
TRANSIENT RESPONSE:
Laplace Transform: Review of properties and applications of Laplace transform of complex waveform. Transient Response of RC, RL, RLC series, parallel, series-parallel circuits to various excitation signals such as step, ramp, impulse and sinusoidal excitations using Laplace transform.

UNIT II
TWO-PORT NETWORKS:

UNIT III
FILTERS:
Filter fundamentals, classification of Filter, Analysis & design of prototype high-pass, prototype low-pass, prototype band-pass, and prototype band-reject Filter, m-derived low-pass & high-pass filters.

TOPOLOGY:
Principles of network topology, graph matrices, network analysis using graph theory

UNIT IV
NETWORK SYNTHESIS:
Network functions, concept of poles and zeros in Network functions, Time domain behavior from the pole-zero plot., Hurwitz polynomials, Positive real functions, procedure of testing of PR functions, concept and procedure of network synthesis, properties of expressions of driving point immitances of LC networks. LC Network synthesis: Foster’s I & II Form, Cauer’s I & II form.

TEXT BOOKS:
1. Network Theory Analysis & Synthesis: Smarajit Ghosh; PHI.

REFERENCE BOOKS:
1. Introduction to modern Network Synthesis: Van Valkenburg; John Wiley
2. Network Analysis: Van Valkenburg; PHI
3. Basic circuit theory:Dasoer Kuh; McGraw Hill.
4. A Course in Electrical Circuit Analysis by Soni & Gupta; Dhanpat Rai Publication.
6. Networks and Systems: D.Roy Choudhury; New Age International
7. Engineering Circuit Analysis; Hayat & Kemmerley TMH.

COURSE OUTCOMES:
The Student will be able to
• Understand the concept of circuit elements, lumped circuits, waveforms, circuit laws and network reduction.
• Solve the electrical network using mesh and nodal analysis by applying network theorems.
• Understand the concept of active, reactive and apparent powers, power factor and resonance in series and parallel circuits.
• Analyze the transient response of series and parallel A.C. circuits and to solve problems in time domain using Laplace Transform.

NOTE:
In the Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, atleast one from each unit. All questions carry equal marks.
COURSE OBJECTIVES:

• To provide clear explanation of the operation of all the important electronic devices available today.
• To show how each device is used in appropriate circuits
• To demonstrate how such circuits are designed

UNIT I

BASIC SEMICONDUCTOR AND PN-JUNCTION THEORY:

CHARACTERISTICS OF DIODE:

UNIT II

DIODE APPLICATIONS:
Half Wave, Full Wave Center Tapped, Full Wave Bridge(Rectification), Series Clipping Circuit, Shunt Clipping Circuit, Clamping Circuit, Bridge Voltage Doubler, Filtering Circuit Using Capacitor & Inductor.

JUNCTION TRANSISTOR:

UNIT III

BJT BIASING:

SMALL SIGNAL CIRCUIT:
Two Port Network, Hybrid(H-Parameter)Model, Typical Values of H-Parameter Model, Conversion of CE, CB, CC Configuration to Equivalent Hybrid Model, CB Circuit Analysis, CE circuit with & without R<sub>e</sub> analysis, CC circuit analysis, Analysis of CE, CB & CC Configuration with approximate Hybrid Model, Miller's Theorem, Dual of Miller Theorem.

UNIT IV

HIGH FREQUENCY ANALYSIS:
Hybrid Pi Model, CE Short Circuit Gain, Frequency Response, Alpha Cut off Frequency, Gain Bandwidth Product, Emitter Follower at High Frequencies.

FET:
Introduction, The Junction FET, Basic Construction, Operation, P- Channel FET, N-Channel FET, High Frequency Model of FET, Low Frequency FET Amplifiers, Transfer Characteristics of FET, MOSFET, Enhancement Mode, Depletion Mode of FET, Circuit Symbol of MOSFET, V-MOSFET.

Reference Books:
3. Electronics Device Circuit By David.A.Bell -- Oxford
4. Integrated Electronics By Millman Halkias -- TMH.

COURSE OUTCOMES:

• Students will get familiar knowledge about the Semiconductor Devices like Diode, BJT, Uni-polar devices like. JFET, MOSFET & UJT, power devices like SCR, TRIAC and DIAC their applications.
• Learn how the concept of noise margin is used to provide immunity in digital circuit.
• Learn how to develop and envelop circuit model for elementary electronics component ,e.g. resistor, source, inductor, capacitor and diode.

NOTE:
In the Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, atleast one from each unit. All questions carry equal marks.
COURSE OBJECTIVES:
- Signals and Systems course brings the Continuous-time and Discrete time concepts together in a unified way and plays an important role in the engineering.
- Students preparation for the current and future developments in their chosen fields.
- Mathematical and computational skills needed in applications area like communication, signal processing and control.

UNIT I
INTRODUCTION TO SIGNAL:

INTRODUCTION TO SIGNAL PROCESSING:

UNIT II
INTRODUCTION TO DISCRETE-TIME SYSTEM AND THEIR PROPERTIES:

LINEAR-TIME INVARIANT (LTI) SYSTEMS AND THEIR ADVANTAGES:

UNIT III
FOURIER SERIES REPRESENTATION FOR PERIODIC SIGNALS:
Introduction to Frequency domain Representation, Concept of frequency for analog signals and discrete –time signals, Fourier Series Representation of Periodic Signals, Convergence of the Fourier Series, Properties of Discrete-Time Fourier Series, I/P O/P Relationship for LTI Systems using Fourier Series, Filtering Concept.

DISCRETE-TIME FOURIER TRANSFORM:

UNIT IV
Z-TRANSFORM AND ITS INVERSE:

APPLICATION OF Z-TRANSFORM:

Text Books:

Reference Books:
COURSE OUTCOMES:
The Student will be able to
• Understand the classification of signals and systems.
• Describe the concepts of Fourier series, Fourier Transform.
• Get familiarized with the behavior of Linear Time Invariant System.
• Get familiarized with sampling and Reconstruction of Analog Signals, ESD, PSD and Z-transforms.

NOTE:
In the Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, at least one from each unit. All questions carry equal marks.
COURSE OBJECTIVES:

- Demonstrate familiarity with major algorithms and data structures.
- Analyze performance of algorithms.
- Determine which algorithm or data structure to use in different scenarios.
- Be familiar with writing recursive methods.

UNIT I

Basic Terminology: Elementary Data Organization, Data Structure Operations.
Arrays: Array Definition and Analysis, Representation of Linear Arrays in Memory, Traversing of Linear Arrays, Insertion and Deletion, Single Dimensional Arrays, Two Dimensional Arrays, Multidimensional Arrays, Sparse Matrix.

UNIT II

Linked Lists: Singly linked lists: Representation of linked lists in memory, Traversing, Searching, Insertion into, Deletion from linked list, Polynomial Addition, Header Linked List, Doubly linked list, generalized list.

UNIT III

Trees: Basic Terminology, Binary Trees and their representation, expression evaluation, Complete Binary trees, Extended binary trees, Traversing binary trees, Searching, Insertion and Deletion in binary search trees(with and without recursion), AVL trees, Threaded trees, B trees.

UNIT IV


Reference Books:
1. An introduction to data structures and application by Jean Paul Tremblay & Pal G. Sorenson (McGraw Hill)
2. R.L. Kruse, B.P. Leary, C.L. Tondo, Data structure and program design in C, PHI
7. Data Structure and Program design in C by Robert Kruse, PHI
8. Theory and Problems of Data Structures by Jr. Symour Lipschetz. Schaum’s outline by TMH.

COURSE OUTCOMES:
The Student will be able to
- Demonstrate understanding of the abstract properties of various data structures such as stacks, queues, lists, trees and graphs.
- Use various data structures effectively in application programs.
- Demonstrate understanding of various sorting algorithms, including bubble sort, insertion sort, selection sort, heap sort and quick sort.
- Understand and apply fundamental algorithmic problems including Tree traversals, Graph traversals, and shortest paths.
- Demonstrate understanding of various searching algorithms.
- Program multiple file programs in a manner that allows for reusability of code.
- Trace and code recursive functions.

NOTE:
In the Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, atleast one from each unit. All questions carry equal marks.
ECE221B  
DIGITAL ELECTRONICS LAB  
B. Tech. Semester –III (EE, ECE, CSE, IC, EEE, common with BME, AEI in 4th Sem.)

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Class Work :  20 Marks  
Practical :  30 Marks  
Total :  50 Marks  
Duration of Exam. :  3 Hrs.

COURSE OBJECTIVES:  
- To impart the concepts of digital electronics practically and train students with all the equipments which will help in improving the basic knowledge  
- Design and analyze combinational circuits using medium scale integrated (MSI) components, including arithmetic logic units.  
- Derive state diagrams and state transition tables for synchronous systems.

LIST OF EXPERIMENTS:

1. Study of TTL gates –AND, OR, NOT, NAND, NOR, EX-OR, EX-NOR  
2. To realize the universal property of NAND gate  
3. To realize the universal property of NOR gate  
5. To verify the operation of Multiplexer & De-multiplexer.  
6. To verify the operation of Comparators.  
7. To perform Half adder and Full adder  
8. To perform Half Subtractor and Full subtractor.  
10. To verify the operation of bi-directional shift register.  
11. To study analog to digital and digital to analog converter  
12. To design & verify the operation of 3 bit synchronous counter.  
13. To design & verify the operation of synchronous UP/DOWN decade counter using JK flip flop & derive a seven segment display using the same.  
14. To design & verify the operation of asynchronous UP/DOWN decade counter using JK flip flop & derive a seven segment display using the same.  
15. Design a 4-bit shift register, verify its operation and verify the operation of a ring counter and a Johnson counter.

COURSE OUTCOMES:

- The students will have good knowledge about the concepts of digital electronics and they will be able to apply all these concepts practically.  
- Design and analyze combinational and sequential circuits for various practical problems using basic gates and flip flops  
- Implement LSI and MSI circuits using programmable logic devices (PLDs)

Note:-

1. Total ten experiments are to be performed in the semester.  
2. At least seven experiments should be performed from the above list. Remaining three experiments should be performed as designed and set by the concerned institution as per the scope of the syllabus.
ECE223B  ANALOG ELECTRONICS LAB  
B. Tech. Semester – III (BME, ECE, common with 4th Sem. AEI)

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<td>Duration of Exam.</td>
<td>3 Hrs.</td>
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COURSE OBJECTIVE:
• To evaluate performance characteristics of diodes, transistors, JFETs, and op-amps.
• To have a deeper knowledge about various configuration of transistors.

LIST OF EXPERIMENTS:

1. Study of half wave and full wave rectifiers
2. Study of power supply filter.
3. Study of diode as a clipper and clamper.
4. Study of zener diode as a voltage regulator.
5. Study of CE amplifier for voltage, current and Power gains input, output impedances.
6. Study of CC amplifier as a buffer.
7. To study the frequency response of RC coupled amplifier.
8. Study of transistor as a constant current source in CE configuration.
9. To study characteristics of FET.
10. Study of FET common source amplifier.
11. Study of FET common drain amplifier.
12. Graphical determination of small signal hybrid parameter of bipolar junction transistor.
13. Study and design of a DC voltage doubler.

COURSE OUTCOMES:
Through this course, the students:
• Acquire a basic knowledge in solid state electronics including diodes, MOSFET, BJT, and operational amplifier.
• Develop the ability to analyze and design analog electronic circuits using discrete components.
• Observe the amplitude and frequency responses of common amplification circuits.
• Design, construct, and take measurement of various analog circuits to compare experimental results in the laboratory with theoretical analysis.

Note:-
1. Total ten experiments are to be performed in the semester.
2. At least seven experiments should be performed from the above list. Remaining three experiments should be performed as designed and set by the concerned institution as per the scope of the syllabus.
COURSE OBJECTIVES:
• To make the students capable of analyzing any given electrical network.
• To make the students learn how to synthesize an electrical network from a given impedance/admittance function.

LIST OF EXPERIMENTS:
1. Transient response of RC circuit.
2. Transient response of RL circuit.
3. To find the resonance frequency and Band width of RLC series circuit.
4. To calculate and verify "Z" parameters of a two port network.
5. To calculate and verify "Y" parameters of a two port network.
6. To determine equivalent parameter of parallel connections of two port network.
7. To plot the frequency response of low pass filter and determine half-power frequency.
8. To plot the frequency response of high pass filter and determine the half-power frequency.
9. To plot the frequency response of band-pass filter and determine the band-width.
10. To calculate and verify "ABCD" parameters of a two port network.
11. To synthesize a network of a given network function and verify its response.
12. Introduction of P-Spice.

COURSE OUTCOMES:
Students will be:
• Able to apply the nodal and mesh methods of circuit analysis.
• Able to express complex circuits in their simpler Thévenin and Norton equivalent forms.
• Able to apply linearity and superposition concepts to analyze RL, RC, and RLC circuits in time and frequency domains.
• Able to analyze resonant circuits both in time and frequency domains.
• Able to construct and make time and frequency domain measurements on elementary RL, RC, and RLC circuits.

Note:-
1 Total ten experiments are to be performed in the semester.
2 At least seven experiments should be performed from the above list. Remaining three experiments should be performed as designed and set by the concerned institution as per the scope of the syllabus.
CSE221B DATA STRUCTURES LAB
B. Tech. Semester –III (CSE, ECE,AEI)

L T P Credits
- - 2 1

Class Work : 20 Marks
Practical : 30 Marks
Total : 50 Marks
Duration of Exam. : 3 Hrs.

COURSE OBJECTIVES:
• Demonstrate familiarity with major algorithms and data structures
• Analyze performance of algorithms.
• Choose the appropriate data structure and algorithm design method for a specified application
• Determine which algorithm or data structure to use in different scenarios.

LIST OF EXPERIMENTS:

1. Write a program to perform binary search in an array.
2. Write a program to perform binary search in an array.
3. Write a program to perform binary search in an array.
4. Write a program to perform various operations on matrices.
5. Write a program to swap two nos. using calls by value and reference.
6. Write a program to implement bubble sort.
7. Write a program to implement insertion sort.
8. Write a program to implement selection sort.
9. Write a program of link list implementation of a stack.
10. Write a program of link list implementation of a queue.
11. Write a program of array implementation of a stack.
12. Write a program of array implementation of a queue.
13. Write a program to search an element in a link list.
14. Write a program to maintain a link list.
15. Write a program to implement BST.

COURSE OUTCOMES:
• Implementation of two dimensional array operations
• Implementation of stack and queue using array
• Stack operations to perform the following: Converting infix expression into postfix expression, evaluating the postfix expression
• Implementation of single linked list
• Implementation of binary tree
• Recursive and non recursive functions to perform the Linear search operation for a Key value in a given list of integers.
• Implement Bubble Sort, selection sort and insertion sort method to sort a given list of integers in descending order.

Note: Teacher may give 5 to 10 more exercises based on course CSE 201B
## COURSE OBJECTIVES:

- To study carpentry tools and welding tools.
- To train on CNC lathe, CNC Milling and EDM Machines.
- To study about metal sheets and prepare components from metal sheets.

Each student has to undergo a workshop at least 4 weeks (80-100 hours) at the end of II semester during summer vacations. **Out of the four weeks, two weeks would be dedicated to general skills and two weeks training for specialized discipline/department.** The evaluation of this training shall be carried out in the III semester.

## LIST OF JOBS TO BE CARRIED OUT DURING THIS PERIOD

1. To study and prepare different types of jobs on machine tools (lathe, shaper, planer, slotter, milling, drilling machines).
2. To prepare lay out on a metal sheet by making and prepare rectangular tray, pipe shaped components e.g. funnel.
3. To prepare joints for welding suitable for butt welding and lap welding.
4. To study various types of carpentry tools and prepare simple types of wooden joints.
5. To prepare simple engineering components/ shapes by forging.
6. To prepare mold and core assembly, to put metal in the mold and fettle the casting.
7. To study of CNC lathe, CNC Milling and EDM Machines.
8. Any work assigned in electrical workshop, computer hardware/language lab, electronics workshop, biomedical hardware, automobile workshop etc.

This student will prepare job(s)/project as an individual or in a group using workshop in house infrastructure.

The student shall submit a typed report.

Training will be evaluated on the spot out of 20 marks.

The report will be evaluated in the III Semester by a Committee consisting of two teachers.

The student will interact with the committee through presentation to demonstrate his/her learning. The basis of evaluation will primarily be the knowledge and exposure of students on different kinds of Machines/Instruments/tools/skills etc. The committee will evaluate out of 30 marks.

The committee shall submit the awards out of 50 marks.

## Course Outcomes:

- Students can understand carpentry tools and welding tools.
- Students trained on CNC lathe, CNC Milling and EDM Machines and get knowledge about metal sheets and prepare components from metal sheets.
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<th>Course Title</th>
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<td>OR ENVIRONMENTAL STUDIES (Common for all branches) (Gr-A)</td>
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<td>3</td>
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<td>DIGITAL CIRCUIT AND SYSTEM</td>
<td>3 1 -</td>
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Note:
1. Every student has to participate in the sports activities. Minimum one hour is fixed for sports activities either in the morning or evening. Weightage is given in General Proficiency Syllabus.
2. The students will be allowed to use non-Programmable Scientific Calculator. However, sharing/exchange of calculator is prohibited in the examination.
3. Electronic Gadgets including Cellular Phones are not allowed in the examination.
4. At the end of 4th semester each student has to undergo four weeks Professional Training of 4 weeks in an Industry/Institute/Professional Organization/Research Laboratory/training centre etc. with the prior approval of the Training and Placement Officer of the University and submit in the department a typed report along with a certificate from the organization & its evaluation shall be carried out in the 5th Semester.
5. The ENVIRONMENTAL STUDIES (GES201B) & ENVIRONMENTAL STUDIES FIELD WORK (GES203B) are compulsory & qualifying courses.
6. All the branches are to be divided into group ‘A’ and ‘B’ as per the suitability of the institute/college, so that there is an equitable distribution of teaching load in odd and even semesters.
COURSE OBJECTIVES:
• To understand the study of ecology of various systems of Nature, study of biogeochemical cycles, environmental protection laws
• To understand the waste water treatment in terms of BOD & COD, and their treatment by reactors.
• Prevention of Air pollution & Industrial Air Emission Control
• Hazardous waste management and minimization techniques.
• Prevention of Noise pollution

UNIT – I
The 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.
a) Forest resources: Use and over-exploitation: deforestation, case studies, Timber exploitation, mining, dams and their effects and forests tribal people.
b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.
c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
d) Food resources: World food problems, changes, caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
e) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources; case studies.
f) 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:
• Concept of an ecosystem.
• Structure and function of an ecosystem.
• Producers, consumers and decomposers.
• Energy flow in the ecosystem.
• Ecological succession.
• Food chains, food webs and ecological pyramids.
• Introduction, types, characteristic features, structure and function of the following eco-system: a) Forest ecosystem.
b) Grassland ecosystem.
c) Desert ecosystem.
d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries).

Biodiversity and its conservations:
• Introduction – Definition: Genetic, species and ecosystem diversity.
• Biogeographically classification of India.
• Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values.
• Biodiversity at global, National and local levels.
• India as a mega-diversity nation.
• Hot-spots of biodiversity.
• Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts.
• Endangered and endemic species of India.

UNIT – III
Environmental Pollution:
Definition, causes, effects and control, measures of:
a) Air pollution
b) Water pollution
c) Soil pollution
d) Marine pollution
UNIT – IV

Social issues and the Environment:
- From unsustainable to sustainable development
- Urban problems related to energy
- Water conservation, rain water harvesting, watershed management
- Resettlement and rehabilitation of people; its problems and concerns, case studies
- Environmental ethics: Issues and possible solutions
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, Case studies
- Wasteland reclamation
- Consumerism and waste products
- Environment Protection Act
- Air (Prevention and Control of Pollution) Act
- Water (Prevention and Control of Pollution) Act
- Wildlife Protection Act
- Forest Conservation Act
- Issues involved in enforcement of environmental legislation
- Public awareness

Human population and the Environment.
- Population growth, variation among nations.
- Environment and human health.
- Human Rights.
- Value Education.
- HIV/ AIDS.
- Woman and Child Welfare.
- Role of Information Technology in Environment and human health.
- Case Studies.

REFERENCES:
7. Down to Earth, Centre for Science and Environment ®.
COURSE OUTCOMES:
After the course study:
• The students will have a clear view of structure of the environment.
• They understand the types of resources present around us.
• They understand the importance of maintaining the quality and also the quantity of environment.
• They can understand the concept of risk analysis when we face the pollutions in different ways.
• They would realize to respect the nature.
• They understand the pain of our mother earth because of pollutions.
• They understand the concept of sustainability between socio-economics with the environment.
• Understand the methods available to reduce pollution.
• Attain brief knowledge on environmental laws.
• Understand the importance of conserving the resources.

Note:
1. In the Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, at least one from each unit. All questions carry equal marks.
2. The awards of this paper shall not be counted in the award of the Degree/DMC.
CSE210B
COMPUTER ARCHITECTURE & ORGANIZATION
B. Tech. Semester – IV (ECE,CSE,common with 5th Sem. AEI)

L    T     P       Credits
3    1     -       4

Class Work : 25 Marks
Theory     : 75 Marks
Total      : 100 Marks
Duration of Exam. : 3 Hrs.

COURSE OBJECTIVES:
• To understand the architecture of a modern computer with its various processing units.
• To understand the performance measurement of the computer system.
• The memory management system of computer is to be studied in detail.

UNIT I
General System Architecture:
Classification of computers (Based on Computation methodology (Analog, digital, hybrid), based on generations, based on size & capability, based on Flynn’s criteria); Multilevel viewpoint of a machine: digital logic, micro architecture, ISA, operating systems, high level language; Register Transfer language; Computer Buses (basic design using multiplexers), Bus width, Bus clocking (synchronous, asynchronous), bus arbitration, Bus examples (ISA bus, PCI bus, Universal serial bus); Computer Arithmetic, Addition, subtraction (signed magnitude, signed 2’s complement, Multiplication (Booth’s algorithm).

UNIT II
CPU Organization:
CPU Architecture types (accumulator, register, stack, memory/register) Instruction cycle (Fetch-Decode-Execute); Instruction set based classification of processors (RISC, CISC, and their comparison); Addressing modes (register, immediate, direct, indirect, indexed); Operations in the instruction set; Arithmetic and Logical, Data Transfer, Control Flow; Instruction set formats (fixed, variable, hybrid).

UNIT III
Input/Output & Control Unit:
Input Output Interface, Asynchronous data transfer (Strobe control, handshaking, serial transfer); Serial Vs parallel data transmission; Modes of data transfer (Programmed I/O, Interrupt driven, Direct Memory access (DMA)).
Control Unit design: Control unit design methods (hardwired & microprogrammed) Control Memory, Address Sequencing, Microinstructions.

UNIT IV
Memory Organization:
Memory device characteristics (access/cycle time, cost per bit, volatility, storage density); Memory hierarchy; Main memory Design (Semiconductor RAM & ROM organization, memory expansion, Static & dynamic memory types, their comparison); Associative memory Design; Match logic, Locality of reference principle (Temporal & Spatial); Cache mapping (Direct, associative, set associative); Cache writing policies (Copy-Back, Write-through); Virtual Memory (Address space, memory space, Address mapping using pages, Page replacement).

Text Books:

Reference Books:

COURSE OUTCOMES:
• Students can understand the architecture of modern computer.
• They can analyze the Performance of a computer using performance equation.
• Understanding of different instruction types.
• Students can calculate the effective address of an operand by addressing modes.
• They can understand how computer stores positive and negative numbers.
• Understanding of how a computer performs arithmetic operation of positive and negative numbers.
• Cache memory and its importance.

Note:
In the Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, atleast one from each unit. All questions carry equal marks.
COURSE OBJECTIVES:

• This course is designed to provide a comprehensive introduction to digital logic design leading to the ability to understand number system representations, binary codes, binary arithmetic and Boolean algebra, its axioms and theorems, and its relevance to digital logic design.
• Introduction to combinational circuits (such as Karnaugh maps), synchronous sequential logic and Asynchronous sequential logic.
• Analyze and design simple systems composed of programmable logic, such as ROMs and PLAs.
• Aiming at conducting Tutorial, seminars and remedial classes.

UNIT I

NUMBER SYSTEM AND CODES:
Number System, Binary Codes, Boolean Algebras, Sets, Relations and Lattices.

MINIMISATION OF SWITCHING FUNCTIONS:
Five and Six variable Karnaugh map, Quine Mcluskey and VEM Methods of Simplifications

UNIT II

LOGICAL DESIGN:
Design with Basic logical Gates, logic Design with Integrated Circuits, NAND and NOR Circuits, Design of High-Speed Adders

FUNCTIONAL DECOMPOSITION AND SYMMETRIC FUNCTIONS:

UNIT III

SYNCHRONOUS SEQUENTIAL CIRCUITS:
Sequential Circuits, The Finite State Model-Basic Definitions, Memory Elements and Their Excitations Functions, Synthesis of Synchronous Sequential Circuits.

CAPABILITIES, MINIMISATION. AND TRANSFORMATION OF SEQUENTIAL MACHINES:
The Finite State Model-Further Definitions, Capabilities and limitations of Finite State Machines, State Equivalence, and Machine Minimization, Simplification of Incompletely Specified Machines.

UNIT IV

ASYNCHRONOUS SEQUENTIAL CIRCUITS:
Fundamental-Mode Circuits, Synthesis, State Assignment in Asynchronous Sequential Circuits.

STRUCTURE OF SEQUENTIAL CIRCUITS:
State Assignments using Partitions, The Lattice of Closed Partitions, and Reduction of the output Dependency.

Text Books:
2. Switching and Finite Automation Theory: Z. Kohavi; TMH

Reference Books:
1. Introduction to Logic Design: MARKOVITZ; TMH
2. Digital Design: Morris Mano; PHI.
3. Digital Electronics: Green; Pearson

COURSE OUTCOMES:
Upon completion of the subject, students will be able to
1. Students will demonstrate knowledge of binary number theory, Boolean algebra and binary codes.
2. Students will analyze and design combinational systems using standard gates and minimization methods (such as Karnaugh maps).
3. Students will analyze and design combinational systems composed of standard combinational modules, such as multiplexers and decoders.
4. Students will demonstrate knowledge of simple synchronous sequential systems.
5. Students will analyze and design flip-flops and latches.
6. Students will analyze and design sequential systems composed of standard sequential modules, such as counters and registers.
7. Students will analyze and design simple systems composed of programmable logic, such as ROMs and PLAs.
8. Students will Perform basic arithmetic operations with signed integers represented in binary.

NOTE:
In the Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, at least one from each unit. All questions carry equal marks.
ECE206B ANALOG ELECTRONICS CIRCUITS
B. Tech. Semester –IV (BME, ECE, common with 5th Sem. AEI)

L T P Credits
3 1 - 4

Class Work : 25 Marks
Theory : 75 Marks
Total : 100 Marks
Duration of Exam. : 3 Hrs.

COURSE OBJECTIVES:
• To understand the circuit design and analysis methods using currently available semiconductor devices, characterization of the device using small signal and large signal models, obtain a qualitative insight into the operation of the circuit to express quantitative relationships.
• Student should be able to recognize/identify and analyze idealized passive linear circuit containing R-L-C.
• Student should develop the habit of thinking about the circuit in mathematical model.

UNIT I
MULTISTAGE AMPLIFIER:
FEEDBACK AMPLIFIERS:

UNIT II
OSILLATORS:
POWER AMPLIFIER:

UNIT III
VOLTAGE REGULATORS:
Voltage Regulation, Basic Series Regulators, Basic Shunt Regulators, Power Supply Parameters, Basic Switching Regulators, Step up Configuration, Step down Configuration, IC Voltage Regulator, SMPS.
SWITCHING CIRCUIT:

UNIT IV
A/D CONVERTERS:
Basic Principle of DAC & ADC, Types of DAC Circuits: Resistor Divider, R/2R Ladder network, Types of ADC circuits: Parallel Comparator, Counter type, Successive approximation & Dual Slope, Specifications.
SPECIAL SEMICONDUCTOR DEVICES:
Optoelectronic Devices, Photoconductors, Photo Diode, Photo Transistor, Photo Voltaic Sensor, Photo Emission, LED, LCD, Laser Diode, Schottky Diode, SCR, TRIAC, DIAC, UJT, Single Electron Transistor, Infrared LEDs, IGBT, Opto Coupler.

Reference Books:
5. Integrated Electronics By Millman Halkias - TMH.
7. Electronics Device & Circuit By I. J. Nagrath - PHI
8. Electronic Principles By Albert Malvino.

COURSE OUTCOMES:
The Students will attain the
• Ability to perform both large-signal DC circuit analysis and small-signal AC circuit analysis including Hybrid-Pi models.
• Ability to perform the detailed design and analysis of the amplifiers using BJT and FET
• Ability to design desired oscillators (RC, LC)
• Ability to simulate electronic circuits using PSPICE.

NOTE:
In the Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, atleast one from each unit. All questions carry equal marks.
ECE208B

POWER ELECTRONICS

B. Tech. Semester –IV (ECE, common with 6th Sem. AEI)

L T P Credits Class Work : 25 Marks
3 1 - 4 Theory : 75 Marks
Total : 100 Marks
Duration of Exam. : 3 Hrs.

COURSE OBJECTIVES:

• To introduce to students the theory and applications of power electronics systems for high efficiency, renewable and energy saving conversion systems.
• To prepare students to know the characteristics of different power electronics switches, drivers and selection of components for different applications.
• To develop students with an understanding of the switching behavior and design of power electronics circuits such as DC/DC, AC/DC, DC/AC and AC/AC converters.

UNIT I

Power Semiconductor Diodes and Transistors:
Characteristics of Power Diodes, Types of Power Diodes, Power Transistors, Power MOSFET, Insulated Gate Bipolar Transistors (IGBT), MOS Controlled Thyristors.

Thyristors:
Terminal Characteristics of Thyristors, Thyristor Turn ON Methods, Switching Characteristics of Thyristors, Thyristors Gate Characteristics, Two Transistor Model of a Thyristor, Thyristor Ratings, Thyristors Protection, Heating Cooling and Mounting of Thyristors, Series and Parallel Operation of Thyristors, Programmable Unijunction Transistors(PUT), Silicon Unilateral Switch(SUS), Silicon Controlled Switch(SCS), Light Activated Thyristors, Static Induction Thyristors, Diac, Triac, Asymmetric Thyristors, Reverse Conducting Thyristors, Firing Circuits for Thyristors, Pulse Transformer in Firing Circuits, Triac Firing Circuit

UNIT II

Thyristors Commutation Techniques:
Class A Commutation (Load Commutation), Class B Commutation (Resonant Pulse Commutation), Class C Commutation (Complementary Commutation), Class D Commutation (Impulse Commutation), Class E Commutation (External Pulse Commutation), Class F Commutation (Line Commutation)

Phase Controlled Rectifier:

UNIT III

Choppers:
Principle of Chopper Operation, Control Strategies, Step Up Choppers, Types of Chopper Circuits, Steady State Time Domain Analysis of Type A Chopper, Thyristor Chopper Circuits, Multiphase Choppers.

Inverters:

UNIT IV

AC Voltage Controller and Cycloconverters:

Applications:

Text Books:
1. P.S Bimbhra : Power Electronics, Khanna Publisher

Reference Books:
1. Sen : Power Electronics, TMH.

COURSE OUTCOMES:

A student who successfully fulfills the course requirements will have demonstrated:
• An ability to understand basic operation of various power semiconductor devices and passive components.
• An ability to understand the basic principle of switching circuits.
• An ability to analyze and design an AC/DC rectifier circuit.
• An ability to analyze and design DC/DC converter circuits.
• An ability to analyze DC/AC inverter circuit.
• An ability to understand the role power electronics play in the improvement of energy usage efficiency and the development of renewable energy technologies.

NOTE:
In the Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, at least one from each unit. All questions carry equal marks.
INTRODUCTION TO COMMUNICATION SYSTEM:

NOISE:
Sources of Noise, External & Internal Noise, Noise Calculations, Noise Figure, Noise Figure Calculation, Noise Temperature, Noise in Communication Systems, Band Pass Noise Model, Cascaded States & its Noise Figure Calculation, Signal in presence of Noise, Pre-Emphasis & De-Emphasis, Noise Quieting Effect, Capture Effect, Noise in Modulation Systems.

UNIT II
LINEAR MODULATION:

ANGLE MODULATION:
Basic definition & derivation for Modulation & Modulation Index, Generation of FM waves, Comparison between PM & FM, Frequency Spectrum of FM, B.W. & required spectra, Types of FM, vector representation of FM, Universal Curve, Multiple FM, Demodulation of FM waves, Demodulation of PM waves, Comparison between AM & FM.

UNIT III
TRANSMITTERS & RECEIVERS:

PROBABILITY THEORY & RANDOM PROCESSES:

UNIT IV
PULSE ANALOG MODULATION:
Sampling theory, TDM, FDM, PAM, PWM, PPM, Modulation & Demodulation techniques of above all.

PULSE DIGITAL MODULATION:

Reference Books:
2. Electronic Communication Systems by Kennedy – TMH
4. Electronic Communication, by Roody Coolen – Pearson
5. Analog Communication by P. Chakarbari – DR & Co.

COURSE OUTCOMES:
Students will be able to:
• Understand the different functions of radio transmitter and receivers.
• Understand and analyze the Composite Video Signal.
• Understand the construction of Picture Tubes and Television Camera Tubes.
• Design color TV Receiver systems

NOTE:
In the Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, atleast one from each unit. All questions carry equal marks.
COURSE OBJECTIVES:

- To acquire the knowledge on basic electromagnetic field theory and specially Maxwell’s equations, Boundary conditions for fields at different material interfaces and plane waves.
- Student will learn scientific, mathematical and engineering principle that enable to understand forces, field and waves.

UNIT I


Gauss Law, Application of Gauss Law, Laplace Equation, Solution of Laplace Equation in Rectangular And Cartesian Coordinates, Uniqueness Theorem of Electrostatic Field Solutions, Methods of Electrostatic Images, Electrostatic Energy, Capacitance.

UNIT II


UNIT III

Introduction, Displacement Current Maxwell’s Equations: In Free Space, Differential Form And Integra Form, Physical Interpretations Of Maxwell’s Field Equations, Boundary Conditions

Electromagnetic Wave In Homogeneous Medium, Wave Equation, Plane Wave And Uniform Plane Wave, Electromagnetic Wave Equations, Wave Propagation In Conducting Medium, Polarization

UNIT IV


Text Books:
1. Electro-magnetic Waves and Radiating System : Jordan & Balmain, PHI

Reference Books:
2. Engineering Electromagnetics : Hayt; TMH

COURSE OUTCOMES:
The Students will be able to
- Gain a comprehensive knowledge on basic concepts of static & time varying Electric and Magnetic fields.
- Understand about the Maxwell’s Equations and its applications.

NOTE:
In the Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, atleast one from each unit. All questions carry equal marks.
COURSE OBJECTIVES:
• Use simulation, test, and measurement equipment to evaluate the functionality and performance of simple digital circuits and systems
• Understand basic limitations, inaccuracies, and tolerances of the test equipment, components, and procedures
• Design digital circuits and systems to efficiently, reliably, and economically achieve desired results
• Master techniques for modeling and troubleshooting circuits and systems through structural and gate-level networks and breadboard designs

LIST OF EXPERIMENTS:

1. To study & design basic gates.
2. To realize and minimize five & six variables using K-Map method
3. To realize and minimize five & six variables using Quine Meluskey method
4. To study conversion of S-R Flip Flop to J-K.
5. To study conversion of J-K flip flop to T flip flop.
6. To study conversion of D flip flop to T flip flop.
7. To design and implement a ckt to detect a Count Sequence.
8. To design and implement a Asynchronous sequential ckt.
9. To design and implement a Synchronous Counter with Count Sequence.
10. To design an Asynchronous Counted for a Count Sequence.
11. Conversion of state digram to the state table and implement it using logical ckt.
12. To design and implement a Melay Machine.
13. To design and implement a Moorey Machine.

COURSE OUTCOMES:
At the end of the course the student should be able to:
• Accomplish number system conversions between decimal, binary, octal and hexadecimal, etc.
• Understand switching or Boolean algebra and Karnaugh Maps
• Analyze and design small scale combinational logic circuits
• Minimize and optimize combinational circuit designs
• Incorporate medium scale integrated circuits, like decoders, encoders, multiplexers, etc., into circuit design
• Analyze and design simple sequential circuits
• Understand the use of combinational and sequential designs in more complex systems

Note:
1. Total ten experiments are to be performed in the semester.
2. At least seven experiments should be performed from the above list. Remaining three experiments should be performed as designed and set by the concerned institution as per the scope of the syllabus.
COURSE OBJECTIVES:
• Understand the nature and scope of modern electronics.
• Describe physical models of basic components.
• Design and construct simple electronic circuits to accomplish a specific function, e.g., designing amplifiers, ADC converters etc.

LIST OF EXPERIMENTS:
1. To Study frequency response of RC coupled amplifier.
2. To Study different types of feedback topology.
3. To Study RC phase shift oscillator.
4. To study Wein bridge oscillator.
5. To Study three terminal IC voltage regulator.
6. To draw characteristics of a transistor.
7. To study CE amplifier and calculate its gain.
8. To study 555 timer as a square wave generator.
9. To study SMPS power supply.
10. To study characteristics of SCR.
11. To study characteristics of DIAC.
12. To study UJT as a relaxation oscillator.

COURSE OUTCOMES:
The student upon completion of this course should be able to:
• Set up a bias point in a transistor.
• Verify the working of diodes, transistors and their applications.
• Build a common emitter/base/collector amplifier and measure its voltage gain.
• Understand the use of RPS and CRT.
• Explore the operation and advantages of operational amplifiers.
• Learn to design different types of filters and apply the same to oscillators and amplifiers.
• Exploring the circuitry which converts an analog signal to digital signal.

Note:-
1. Total ten experiments are to be performed in the semester.
2. At least seven experiments should be performed from the above list. Remaining three experiments should be performed as designed and set by the concerned institution as per the scope of the syllabus.
COURSE OBJECTIVES:
• To provide an in-depth knowledge about characteristics of SCR.

LIST OF EXPERIMENTS:
1. To study Steady-state characteristics of SCR by plotting graph between voltage and current of Thyristors.
2. To Study R and RC Triggering Circuit for SCR.
3. To study UJT as Relaxation Oscillator.
4. To study SCR Half Wave and Full Wave Bridge Controlled Rectifier-Output characteristics.
5. To study 1-Phase Full Wave Bridge Controlled Rectifier using SCR and UJT with R and R-L Load and observe its input/output characteristics with and without free wheeling (commutating ) diode.
6. To study three Phase Full-Wave Uncontrolled Rectifier Operation with R and R-L Load and Observe its input/output Characteristics.
7. To study single Phase Cycloconvener output characteristics.
8. To study Series operation of SCR’s.
9. To study Parallel operation of SCR’s.
10. To study Speed Control of DC motor using SCR’s.
11. To study Lamp-Dimmer Using Diac & Triac With Lamp Load.

COURSE OUTCOMES:
The student upon completion of this course should be able to:
• Analyze various characteristics of SCR at various load conditions.
• Have a better understanding of UJT, TRIAC and DIAC features

Note:-
1. Total ten experiments are to be performed in the semester
2. At least seven experiments should be performed from the above list. Remaining three experiments should be performed as designed and set by the concerned institution as per the scope of the syllabus.
COURSE OBJECTIVES:

• To provide the basic understanding about various modulation techniques.
• To analyze different characteristic parameters of these modulation techniques.

LIST OF EXPERIMENTS:

1. To study and waveform analysis of amplitude modulation and determine the modulation index of amplitude modulation.
2. To study and waveform analysis of amplitude demodulation by any method.
3. To study and waveform analysis of frequency modulation and determine the modulation index of frequency modulation.
4. To study and waveform analysis of frequency demodulation by any method.
5. To study Amplitude Shift Keying (ASK) modulation.
6. To study Frequency Shift Keying (FSK) modulation.
7. To study Phase Shift Keying (PSK) modulation.
8. To study and waveform analysis of phase modulation.
9. To study Phase demodulation.
10. To study Pulse code modulation.
11. To study Pulse amplitude modulation and demodulation.
12. To study Pulse width modulation.
13. To study Pulse position modulation.
14. To study delta modulation.
15. To deliver a seminar by each student on ADVANCE COMMUNICATION SYSTEM.

COURSE OUTCOMES:

• Students are able to analyze digital communication signals.
• Students understand the basics of PAM, QAM, PSK, FSK, and MSK.
• They can analyze probability of error performance of such systems and are able to design digital communication systems based on these modulation techniques as block diagrams.

Note:-
1. Total ten experiments are to be performed in the semester.
2. At least seven experiments should be performed from the above list. Remaining three experiments should be performed as designed and set by the concerned institution as per the scope of the syllabus.
GES203B  ENVIRONMENTAL STUDIES FIELD WORK
B. Tech. Semester –III/IV (Common for all Branches)

L    T     P     Credits  Class Work     :     -
-    -     -     -
Practical : 25 Marks
Total     : 25 Marks

COURSE OBJECTIVES:
• To understand the study of ecology of various systems of Nature, study of biogeochemical cycles, environmental protection laws
• To understand the waste water treatment in terms of BOD & COD, and their treatment by reactors.
• Prevention of Air pollution & Industrial Air Emission Control
• Hazardous waste management and minimization techniques.

FIELD WORK:
• Visit to a local area to document environmental assets – river/ forest/ grassland/ hill/ mountain.
• Visit to a local polluted site-Urban/ Rural/ Industrial/ Agricultural.
• Study of common plants, insects, birds.
• Study of simple ecosystems – pond, river, hill slopes, etc. (Field work equal to 5 lectures hours).

COURSE OUTCOMES:
• The students will have a clear view of structure of the environment.
• They understand the types of resources present around us
• They understand the importance of maintaining the quality and also the quantity of environment.
• They can understand the concept of risk analysis when we face the pollutions in different ways.
  • They would realize to respect the nature.
• They understand the pain of our mother earth because of pollutions.
• They understand the concept of sustainability between socio-economics with the environment.
• Understand the methods available to reduce pollution.
• Attain brief knowledge on environmental laws.
  • Understand the importance of conserving the resources

Note:
The awards of this paper shall not be counted in the award of the Degree/DMC.
GPEC202B GENERAL PROFICIENCY & ETHICS
B. Tech. Semester – IV (Common for all Branches)

L T P Credits Examination :  :
1 - - 2 Practical :  75 Marks

Total :  75 Marks

COURSE OBJECTIVES:
• The study of the course provides an understanding of Morals, characterization.

The purpose of this course is to inculcate a sense of professionalism in a student along with personality development in terms of quality such as receiving, responding, temperament, attitude and outlook. The student efforts will be evaluated on the basis of his/ her performance / achievements in different walks of life.

A Faculty Counselor will be attached to a group of students which will remain associated with him /her during the entire period of the degree program in the University. Each faculty member will serve as a faculty counselor. They will act like a local guardian for the students associated with him / her and will help them in terms of career guidance, personal difficulties.

A. The student will present a written report before the committee with following in view:

The student will present before the committee his/her achievements during the current academic session in the form of a written report highlighting followings:

I. Academic Performance
II. Extra Curricular Activities / Community Service, Hostel Activities (8 Marks)
III. Technical Activities / Industrial, Educational tour (8 Marks)
IV. Sports/games (14 Marks)
V. Moral values & Ethics (15 Marks)

NOTE: Report submitted by the students should be typed on both sides of the paper.

B. A student will support his/her achievement and verbal & communicative skill through presentation before the committee. (30 Marks)

C. Moral values & Ethics

Syllabus - Process for Value Education, self-evaluation concept and process.

A minor test will be conducted during the semester and It will be the duty of the concerned teacher assigned to teach Moral values & Ethics to submit the awards to respective chairman of the department / Director/Principal.

The evaluation of this course will be made by the following Committee.

University Departments:
1. Chairperson of the Department Chairman
2. Senior Most Faculty Counselor Member
3. Vice-Chancellor’s Nominee Member

Affiliated Colleges:
1. Director/Principal Chairman
2. Head of the Department/Sr. Faculty Member
3. External Examiner to be appointed by the University Member

COURSE OUTCOMES:
• Upon completing this course students should be able to know the morals, Human Values, Ethics, Safety, Responsibilities and Rights

NOTE: Remuneration will be paid to the external examiner only (at par with the other practical examinations).
ECE301B COMMUNICATION ENGINEERING
B. Tech Semester – V

L T P Credits
3 1 - 4

Class Work : 25 Marks
Theory : 75 Marks
Total : 100 Marks
Duration of Exam. : 3 Hrs.

COURSE OBJECTIVES:
- To introduce the students, to the basics of different types of encoding and modulation techniques.
- To make a comprehensive coverage of reliable data transmission with all the new developments in communication Engineering.
- To encourage students for developing optimization techniques for improving data communication efficiency.

UNIT I
SPECTRAL ANALYSIS:
Fourier series, Fourier Transform & its properties, Convolution & Correlation, Autocorrelation & Cross Correlation.

ELEMENTS OF DIGITAL COMMUNICATION:

UNIT II
INTRODUCTION TO INFORMATION THEORY:
Measure of Information, Entropy, Rate of Information, Source Coding Theorem, Huffman Coding, Shannon Fano Coding, Discrete Memoryless Channels, Mutual Information, Channel Capacity, Channel Coding Theorem, Channel Capacity Theorem.

ERROR CONTROL CODING:
Types Of Codes, Block Code: Coding And Decoding, Hadamard Codes, Hamming Codes, Cyclic Codes, Convolution Codes: Coding And Decoding, Trellis Code.

UNIT III
DIGITAL CARRIER MODULATION AND DEMODULATION TECHNIQUES
Digital Modulation Formats, Coherent Binary Modulation & Demodulation: ASK, BPSK, BFSK, Coherent Quadrature Modulation & Demodulation Techniques: QPSK, MSK.
NON-COHERENT BINARY MODULATION TECHNIQUES:

UNIT IV
BASE BAND SHAPING FOR DATA TRANSMISSION:

SPREAD SPECTRUM MODULATION:
PN Sequences, A Notion of Spread Spectrum, Direct Sequence Spread Spectrum, Frequency Hopping Spread Spectrum, Application.

Reference Books:
1. Digital Communication By Simon Haykins – Wiley
2. Digital Communicatin By Sklar Ray- Pearson
4. Electronics Communication Systems By Tomasi – Pearson
5. Communication System By Haykin & Moher- Wiley
6. Digital Communication By J. G. Proakis
7. Digital Communication By B. P. Lathi

COURSE OUTCOMES:
- Students will be able to understand the different functions of radio transmitter and receivers.
- Students will be able to understand and analyze the modulation techniques.
- Various encoding techniques and efficiency enhancing techniques will be understood.

NOTE:
In the Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, atleast one from each unit. All questions carry equal marks.
ECE303B  ELECTRONICS MEASUREMENT AND INSTRUMENTATION
B. Tech Semester –V (ECE, AEI & 6th Sem. IC)

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Class Work : 25 Marks
Theory : 75 Marks
Total : 100 Marks
Duration of Exam. : 3 Hrs.

COURSE OBJECTIVES:
- To learn basic measurement concepts.
- To learn importance of signal generators and signal analyzers in electronics.
- To learn relevance of digital instruments in measurements and need for data acquisition systems.

UNIT I

Oscilloscope:
Block diagram, study of various stages in brief, high frequency CRO considerations, Sampling and storage oscilloscope, Measurements of Phase and Frequency (Lissajous Patterns)

Electronic Instruments:
DC and AC voltage measurements, DC and AC current measurements, Multimeter, Ohmmeter, Bolometer, Calorimeter, Power meter, Introduction to digital meters

UNIT II

Generation and Analysis of waveforms:
Block Diagram of pulse generators, signal generators, function generators, wave analyzers, distortion analyzers, spectrum analyzer, Harmonic analyzer, introduction to power analyzer.

Frequency and Time Measurements:
Study of Decade Counting Assembly(DCA), frequency measurements, period measurements, universal counters, Introduction to digital meters

UNIT III

Display Devices:
Nixie Tubes, LED’s, LCD’s, Discharge Devices

Recorders:
Strip charts recorder, single point recorder, UV recorder, Magnetic tape recorder.

UNIT IV

Transducers:
Classification, Transducers of types: RLC Photocell, thermocouple, etc., Basic schemes of measurements of displacement, velocity, acceleration, strain, pressure, liquid level & temperature.

Introduction to signal conditioning:
DC signal conditioning systems, AC signal conditioning systems, Data acquisition and conversion system, characteristics of modern digital data acquisition system, Filter, Settling time, Amplifier Characteristics.

Text Books :
1. A course in Electrical and Electronics Measurements and Instrumentation by A.K.Sawhney; Dhanpat Rai & sons

Reference Books:
1. Electronics Measurements and Instrumentation Techniques By H. Cooper; PHI
2. Electronics Instrumentation by Kalsi; TMH

COURSE OUTCOMES:
- Students will be exposed to general electronic measurement principles and instrumentation techniques ranging from the physical foundations of measurement theory to error theory.
- Students will learn quantum effect standards and high-sensitivity instrumentations.
- Students will be able to understand various digital techniques for controlling instruments and acquiring and processing data, from the logic and electrical simulation of integrated circuits and also their automated testing.

NOTE:
In the Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, atleast one from each unit. All questions carry equal marks.
ECE305B CONSUMER ELECTRONICS  
B. Tech Semester –V

L T P Credits  Class Work : 25 Marks  Theory : 75 Marks  Total : 100 Marks  Duration of Exam. : 3 Hrs.

COURSE OBJECTIVES:
- To understand working principles of various electronic gadgets and consumer products.
- To identify the blocks in the consumer products and operations.
- To study the various technical specifications and facilities of the consumer products.

UNIT I
Monochrome TV (Introduction):  

Monochrome TV (Picture and Camera Tubes):  
Monochrome picture tube, beam reflection, Beam focussing, Screen Phosphor, Face plate, Picture tube characteristics, picture tube circuit controls, Monochrome Camera Tubes: Basic principle, Image Orthicon, Vidicon, Plumbicon

UNIT II
Colour TV Essentials:  
Compatibility, Colour perception, Three Colour theory, Luminance, Hue and Saturation, Dispersion and Recombination of light, Primary and secondary colours, Luminance signal, Chrominance Signal, Colour picture tube, colour TV Camera, Colout TV display Tubes, colour Signal Transmission, Bandwidth for colour signal transmission, Colour TV controls. Cable TV, Block Diagram and principle of working of cable TV.

Plasma and LCD:  
Introduction, liquid crystals, types of LCD’s, TN, STN, TFT, Power requirements, LCD working, Principle of operation of TN display, Construction of TN display, Behaviour of TN liquid crystals, Viewing angle, colour balance, colour TN display, Limitations, advantages, disadvantages, applications.

UNIT III
LED and DMD:  
Introduction to LED Television, comparison with LCD and Plasma TV’s, schematic of DMD, introduction to Digital MicroMirror device, Diagram of DMD, principle of working, emerging applications of DMD.

Microwave Ovens and Air Conditioners:
Microwaves, Transit Time, Magnetron, Waveguides, Microwave Oven, Microwave Cooking. Air conditioning, Components of air conditioning systems, all water Air conditioning systems, all air air conditioning Systems, Split air conditioner.

UNIT IV
Microphones:
Introduction, characteristics of microphones, types of microphone: carbon, moving coil, wireless, crystal, introduction to tape recorder.

Loudspeaker:
Introduction to ideal and basic loudspeaker, loudspeaker construction types of loudspeaker: Dynamic and permanent magnet, woofers, tweeters, brief introduction to baffles, equalisers.

Text Books:
1. Consumer Electronics by S. P. Bali (Pearson Education)
2. Complete Satellite and Cable T.V. by R. R. Gulati (New Age International Publishers)

Reference Books:
1. Monochrome and Colour Television by R. R. Gulati

COURSE OUTCOMES:
- Students will be familiar with blocks, applications and operation of monochrome TV, color TV.
- Students will be able to understand the specifications enlisted with various consumer products.
- The students will come to know about the current state of art of digital imaging.

NOTE:
In the Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, at least one from each unit. All questions carry equal marks.
COURSE OBJECTIVES:
- To make students understand basic operational mechanism of various electronic devices.
- To provide students with detailed knowledge of linear and non-linear circuits used in electronic devices.
- To make students understand specification sheets of any electronic device.

UNIT I
DIFFERENTIAL AMPLIFIER FUNDAMENTALS:
Differential Amplifier, Differential Amplifier Circuit Configuration: DC and AC Analysis of all Four Types of Configurations, FET Differential Amplifiers, Differential Amplifier with Swamping Resistor, Constant Current Bias, Current Mirror, Cascaded Differential Amplifier, Cascade Configurations.

OPERATIONAL AMPLIFIER FUNDAMENTALS:
Amplifier Fundamentals, the Operational Amplifier, Block Diagram Representation, Ideal OP-AMP, OP-AMP Equivalent Circuit, Ideal Voltage Transfer Curve, Open Loop OP-AMP Configurations, OP-AMP with Negative Feedback: voltage series & voltage shunt feedback amplifiers, Current feedback Amplifiers.

UNIT II
CHARACTERISTICS OF OP-AMP:

LINEAR APPLICATIONS:
DC and AC Amplifier, Peaking Amplifier, Summing, Scaling And Averaging Amplifiers, Instrumentation Amplifier, Voltage to Current Converter, Current to Voltage Converter, Difference Amplifier, Integrator, Differentiator, very high input impedance circuit.

UNIT III
NOISE AND STABILITY:

ACTIVE FILTERS AND OSCILLATORS:
Transfer Function, Active Filters, First Order LP & HP Butterworth Filters, Second Order LP & HP Butterworth Filters, Higher Order Filters, Band Pass Filters, Band Rejection Filters, Oscillators: Phase Shift, Wein Bridge Oscillator, quadrature oscillator, Square Wave Generator, Triangular Wave Generator, saw tooth wave generator, Voltage Controlled Oscillator.

UNIT IV
NON LINEAR CIRCUITS:
Voltage Comparator, Zero Crossing Detector, Schmitt Trigger, Peak Detector, Sample and Hold Circuit, Voltage To Frequency and Frequency To Voltage Converter, ADC and DAC, clippers and clampsers, absolute value output circuit.

SPECIALIZED IC APPLICATION:

Reference Books:
1. OPAMPS and Linear Integrated Circuit
2. Design with Operational Amplifiers and Analog Integrated Circuits
3. Integrated Circuits
4. Linear Integrated Circuits

COURSE OUTCOMES:
- The student will understand the basics of linear integrated circuits and operational amplifiers with applications.
- The student will be able to design simple filter circuits for particular application.
- The student will have understanding of analog to digital converters (ADC), and digital to analog converters (DAC).
- The student will gain knowledge in designing stable voltage regulators and understands the applications of PLL and special ICs.

NOTE:
In the Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, atleast one from each unit. All questions carry equal marks.
ECE309B  MICROPROCESSOR AND INTERFACING
B. Tech Semester –V (BME, CSE, ECE, AEI)

L    T     P     Credits                                      Class Work : 25 Marks
3    1 - 4                                             Theory : 75 Marks
                                      Total : 100 Marks
                                      Duration of Exam. : 3 Hrs.

COURSE OBJECTIVES:
- To provide a theoretical & practical introduction to microcontrollers and microprocessors.
- To make students accustomed to assembly language programming techniques.
- To provide knowledge to students for designing hardware interfacing circuit and various microcontroller and microprocessor system design considerations.

UNIT I
THE 8086 MICROPROCESSOR ARCHITECTURE:
Architecture, block diagram of 8086, details of sub-blocks such as EU, BIU; memory segmentation and physical address computations, program relocation, addressing modes, instruction formats, pin diagram and description of various signals.

INSTRUCTION SET OF 8086 & PROGRAMMING:
Instruction execution timing, assembler instruction format, data transfer instructions, arithmetic instructions, branch instructions, looping instructions, NOP and HLT instructions, flag manipulation instructions, logical instructions, shift and rotate instructions, directives and operators, programming examples.

UNIT II
THE X86 FAMILY (80186, 80286, 80386, 80486) MICROPROCESSOR ARCHITECTURE AND PROGRAMMING:
Architecture, block diagram, details of sub-blocks, hardware features and description of various signals, interrupts, multitasking, addressing modes, instruction set and programming example.

THE PENTIUM PROCESSOR AND OTHER ADVANCED PROCESSORS:
Enhanced features of Pentium, Pentium Pro, Pentium-II, Pentium-III, Pentium-IV, Multi-core Technology, Mobile Processor.

UNIT III
INTERFACING DEVICE:
The 8255 PPI chip: Architecture, control words, modes and examples.

PERIPHERAL DEVICES:
Introduction to DMA process, 8237 DMA controller, 8259 Programmable interrupt controller, Programmable interval timer chips.

UNIT IV
COMMUNICATION INTERFACE:
Parallel interface, serial interface, PCI interface, PCMCIA, USB interface.

PERSONNAL COMPUTER:
Modern PC, motherboard, chipset, expansion buses, memory-SIMM and DIMM.

Reference Books:

COURSE OUTCOMES:
- Students will have detailed knowledge of the architecture and operation of microprocessors and microcontroller.
- The course will identify and explain the operations of peripherals and memories typically interfaced with microprocessors and microcontrollers.
- Students should be able to use an Integrated Development Environment (IDE) as a modern software tool for embedded system development.
- Students should understand the hardware/software tradeoffs involved in the design of microprocessor and microcontrollers based systems.

NOTE:
In the Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, atleast one from each unit. All questions carry equal marks.
CSE204B OBJECT ORIENTED PROGRAMMING

B. Tech Semester –V (ECE), (common with IC, EEE 5th Sem., CSE, IT, AEI 4th Sem.)

L T P Credits
3 1 - 4

Class Work : 25 Marks
Theory : 75 Marks
Total : 100 Marks
Duration of Exam. : 3 Hrs.

COURSE OBJECTIVES:
- To provide students a basic knowledge of various object oriented functions that helps in designing programs for various applications.
- To make students learn how to write small/medium scale C++ programs with simple graphical user interface.
- To provide students a base of data structures.

UNIT I
C++ Standard Library, Preprocessor Directives, illustrative Simple C++ Programs. Header Files and Namespaces, library files. Concept of objects, Object Oriented Analysis & Object Modeling techniques.
Object Oriented Concepts: Introduction to Objects and Object Oriented Programming, Encapsulation (Information Hiding), Access Modifiers: Controlling access to a class, method, or variable (public, protected, private, package), Other Modifiers, Polymorphism: Overloading, Inheritance, Overriding, Abstract Classes, Reusability
Classes and Data Abstraction: Introduction, Structure Definitions, Accessing Members of Structures, Class Scope and Accessing Class Members, Controlling Access Function And Utility Functions, Initializing Class Objects: Constructors.

UNIT II
Using Destructors, Classes: Const(Concat) Object And Const Member Functions, Object as Member of Classes, Friend Function and Friend Classes, Using This Pointer, Dynamic Memory Allocation with New and Delete, Static Class Members, Container Classes and Iterators, Function overloading.
Operator Overloading: Introduction, Fundamentals of Operator Overloading, Restrictions On Operators Overloading, Operator Functions as Class Members vs. as Friend Functions, Overloading

UNIT III
Inheritance: Introduction, Inheritance: Base Classes And Derived Classes, Protected Members, Casting Base Class Pointers to Derived-Class Pointers, Using Member Functions, Overriding Base -Class Members in a Derived Class, Public, Protected and Private Inheritance, Using Constructors and Destructors in derived Classes, Implicit Derived -Class Object To Base- Class Object Conversion, Composition Vs. Inheritance.
Introduction to Virtual Functions, Abstract ,Base Classes And Concrete Classes, Polymorphism, New Classes And Dynamic Binding, Virtual Destructors, Polymorphism, Dynamic Binding.

UNIT IV
Files and I/O Streams and various operation on files. Stream Input/Output Classes and Objects, Stream Output, Stream Input, Unformatted I/O (with read and write), Stream Manipulators, StreamFormatStates, StreamErrorStates.
Templates & Exception Handling: Function Templates, Overloading Template Functions, Class Template, Class Templates and Non-Type Parameters, Templates and Inheritance, Templates and Friends.
Templates and Static Members: Introduction, Basics of C++ Exception Handling: Try Throw, Catch, Throwing an Exception:- Catching an Exception, Re-throwing an Exception, Exception specifications, Processing Unexpected Exceptions, Constructors, Destructors and Exception Handling, Exceptions and Inheritance.

Text Books:
2. Programming with C++ By D Ravichandran, 2003, T.M.H

Reference Books:
2. Computing Concepts with C++ Essentials by Horstmann, 2003, John Wiley,
3. The Complete Reference in C++ By Herbert Schildt, 2002, TMH.
4. C++ Programming Fundamentals by Chuck Easttom, Firewall Media

COURSE OUTCOMES:
- Students will learn to prepare object-oriented design for small/medium scale problems.
- Students will learn to demonstrate the differences between traditional imperative design and object-oriented design.
- The course will explain class structures as fundamental, modular building blocks.
- Students will understand the role of inheritance, polymorphism, dynamic binding and generic structures in building reusable code.

NOTE:
In the Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, atleast one from each unit. All questions carry equal marks.
CSE224B
OBJECT ORIENTED PROGRAMMING LAB
B. Tech Semester –V (ECE, common with 4th Sem. CSE, AEI)

L T P Credits
- - 2 1

Class Work : 20 Marks
Practical : 30 Marks
Total : 50 Marks
Duration of Exam. : 3 Hrs.

COURSE OBJECTIVES:
• To provide concepts of objects and their significance in real world.
• To investigate software problem in terms of objects and entities.
• To make students learn to co-relate relationship among different entities involved in a system.

LIST OF EXPERIMENTS:

1. Raising a number n to a power p is the same as multiplying n by itself p times. Write a function called power ( ) that takes a double value for n and an int value for p, and returns the result as double value. Use a default argument of 2 for p. so that if this argument is omitted, the number will be squared. Write a main ( ) function that gets values from the user to test this function.

2. A point on the two dimensional plane can be represented by two numbers: an X coordinate and a Y coordinate. For example, (4,5) represents a point 4 units to the right of the origin along the X axis and 5 units up the Y axis. The sum of two points can be defined as a new point whose X coordinate is the sum of the X coordinates of the points and whose Y coordinate is the sum of their Y coordinates.
   Write a program that uses a structure called point to model a point. Define three points, and have the user input values to two of them. Then set the third point equal to the sum of the other two. and display the value of the new point. Interaction with the program might look like this:
   Enter coordinates for P1: 3 4
   Enter coordinates for P2: 5 7
   Coordinates of P1 + P2 are: 8 11

3. Create the equivalent of a four function calculator. The program should request the user to enter a number, an operator, and another number. It should then carry out the specified arithmetical operation: adding, subtracting, multiplying, or dividing the two numbers. (It should use a switch statement to select the operation) Finally it should display the result. When it finishes the calculation, the program should ask if the user wants to do another calculation. The response can be 'Y' or 'N'. Some sample interaction with the program might look like this:
   Enter first number. Operator, second number: 10/3
   Answer = 3.333333
   Do another (YI N)? Y
   Enter first number. Operator, second number 12 + 100
   Answer = 112
   Do another (Y I N)? N

4. Create two classes DM and DB which store the value of distances. DM stores distances in metres and centimeters and DB in feet and inches. Write a program that can read values for the class objects and add one object of DM with another object of DB. Use a friend function to carry out the addition operation. The object that stores the results maybe DM object or DB object. depending on the units in which the results are required. The display should be in the format of feet and inches or metres and centimetres depending on object on display.

5. Create a class rational which represents a numerical value by two double values - NUMERATOR & DENOMINATOR. Include the following public member Functions:
   • constructor with no arguments (default).
   • constructor with two arguments.
   • void reduce( ) that reduces the rational number by eliminating the highest common factor between the numerator and denominator.
   • Overload + operator to add two rational number
   • Overload » operator to enable input through cin
   • Overload « operator to enable output through cout.
   • Write a main ( ) to test all the functions in the class.

6. Create a program that creates a binary file by reading the data for the students from the terminal. The data of each student consist of roll no., name (a string of 30 or lesser no. of characters) and marks.
7. A hospital wants to create a database regarding its indoor patients. The information to store include:
   Name of the patient
   Date of admission
   Disease
   Date of discharge
Create a structure to store the date (year, month and date as its members). Create a base class to store the above information. The member function should include functions to enter information and display a list of all the patients in the database. Create a derived class to store the age of the patients List the information about all the patients to store the age of the patients. List the information about pediatric patients (less than twelve years in age).

8. Make a class Employee with a name and salary. Make a class Manager inherit from Employee. Add an instance variable, named department, of type string. Supply a method to String that prints the manager's name, department and salary. Make a class Executive inherit from Manager Supply a method to String that prints the string Executive followed by the information stored in the Manager superclass object. Supply a test program that tests these classes and methods.

9. Imagine a tollbooth with a class called toll Booth. The two data items of a type unsigned int to hold the total number of cars, and a type double to hold the total amount of money collected. A constructor initializes both these to 0. A member function called payingCar ( ) increments the car total and adds 0.50 to the cash total. Another function, called nopayCar ( ) increments the car total but adds nothing to the cash total. Finally, a member function called displays the two totals.

COURSE OUTCOMES:
- The students would be able to develop software in terms of objects, associations, and integrity constraints
- The students would be able to generalize and aggregate business entities and transform behavior into functions.
- The students would be able to identify, understand and analyze various sample development models.
- Students can design data flow diagrams and flow charts for small/ moderate problems.

NOTE:-
At least seven experiments should be performed from the above list. Remaining three experiments should be performed as designed and set by the concerned institution as per the scope of the syllabus.
ECE323B  ELECTRONICS MEASUREMENT AND INSTRUMENTATION LAB
B. Tech Semester –V (ECE, AEI, common with 6th Sem. IC)

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COURSE OBJECTIVES:
- To aid students for measuring various electrical and electronic signals.
- To provide students a way of understanding the concept of operational mechanisms of various measuring devices.
- To make students accustomed to reading specification data sheets of various measuring devices.

LIST OF EXPERIMENTS:
1. Speed measurement of DC Motor with the help of Magnetic Pick-up.
2. To measure temperature using thermocouple.
3. To measure temperature using Thermister
4. To measure temperature using RTD
5. To measure displacement using LDR.
6. To measure displacement using L.V.D
7. To measure Pressure using Pressure Transducer.
8. To measure Frequency & Time period of given wave form using frequency Meter
9. To study the operation of Spectrum Analyzer.
10. To measure phase & frequency of a given wave-form using Lissajous patterns
11. To measure weight using Strain Gauge
12. To measure displacement using Inductive and Capacitive Pick-up.

COURSE OUTCOMES:
- Students will learn to measure various parameters of electrical and electronics importance.
- Students would be able to read out various specification data sheets of measuring devices.
- Students will have knowledge of various spectrum analyzers and their application areas.

NOTE:-
1. Total ten experiments are to be performed in the semester.
2. At least seven experiments should be performed from the above list. Remaining three experiments should be performed as designed and set by the concerned institution as per the scope of the syllabus.
COURSE OBJECTIVES:

- To help students understand various components of variable consumer products.
- To provide students an insight into various digital techniques used in imaging products.
- To enhance the knowledge of students about operational mechanisms of various consumer products.

LIST OF EXPERIMENTS:

1. To plot frequency response of different type of loudspeaker.
2. To study different section of Monochrome T.V
3. To study different section of Colour T.V
4. To study working principle of digital camera.
5. To study functional block diagram & front panel control of Microwave Oven.
6. To study functional block diagram & front panel control of Washing Machine.
7. To study display devices like Plasma, LCD, LED, DMD.
8. To demonstration of the working of all type of air conditioner like water air conditioning, split air conditioners etc.
9. To demonstration of the working of domestic refrigerators.
10. To plot the frequency response a microphone.
11. To study the block diagram of Transmitter & Receiver.

COURSE OUTCOMES:

- The students will have a better understanding of mechanisms that actually operates the respective consumer products.
- The students will be able to generate frequency response for loudspeakers as well as microphone.
- The students will have more knowledge about digital display devices.

NOTE:-

1. Total ten experiments are to be performed in the semester.
2. At least seven experiments should be performed from the above list. Remaining three experiments should be performed as designed and set by the concerned institution as per the scope of the syllabus.
ECE327B                      LINEAR INTEGRATED CIRCUITS LAB
B. Tech Semester –V

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<td>Duration of Exam.</td>
<td>3 Hrs.</td>
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</table>

COURSE OBJECTIVES:
- To introduce the basic building blocks of linear integrated circuits.
- To teach the linear and non-linear applications of operational amplifiers.
- To make students perform various logical tasks using operational amplifiers.

LIST OF EXPERIMENTS:
1. Design & realize inverting amplifier, non-inverting and buffer amplifier using 741 Op Amp.
2. Verify the operation of a differentiator circuit using 741 op amp and show that it acts as a high pass filter.
3. Verify the operation of a integrator circuit using 741 op amp and show that it acts as a low pass filter.
4. Design and verify the operations of op amp adder and subtractor circuits.
6. To design & realize using op amp 741, square wave generator.
7. To design & realize using op amp 741, logarithmic amplifier & VCCS.
8. To design & realize using op amp 741, Triangular wave generator.
9. To design & realize using op amp 741 as a Comparator.
10. To design & realize using op amp 741 as a Schmitt trigger.
11. To design & realize differential Amplifier.
12. To design & realize using op amp 741, as a Clipper.
13. To design & realize using op amp 741, as a Clamper

COURSE OUTCOMES:
- On completion of this course, the students will have a thorough understanding of operational amplifiers with linear integrated circuit.
- Students will be able to design circuits using operational amplifiers for various applications.
- Students will be able to generate various waveforms using op-amps.

NOTE:-
1. Total ten experiments are to be performed in the semester.
2. At least seven experiments should be performed from the above list. Remaining three experiments should be performed as designed and set by the concerned institution as per the scope of the syllabus.
ECE329B  MICROPROCESSOR AND INTERFACING LAB
B. Tech Semester –V (BME, CSE, ECE, AEI)

Credits
Class Work : 20 Marks
Practical  : 30 Marks
Total     : 50 Marks
Duration of Exam. : 3 Hrs.

LIST OF EXPERIMENTS:
1. To study the architecture of 8086 microprocessor and 8086 microprocessor kit.
2. Write a program to add the contents of the memory location 3000:0400 H to the content of 4000:0700 H and store the result in 6000:0900 H
3. Write a program to add 16 bit number using 8086 instruction set.
4. Write a multiplication of two 16 bit number using 8086 instruction set.
5. Write a program for division of two 16 bit numbers using 8086 instruction set.
6. Write a program factorial of a number.
7. Write a Program to transfer a block of data without overlap.
8. Write a Program to transfer a block of data with overlap.
9. Write a program to find the average of two numbers.
10. Write a Program to check whether data byte is odd or even.
11. Write a program to find maximum number in the array of 10 numbers.
12. Write a program to find the sum of the first ‘n’ integers.
13. Write a program to generate a square wave.
14. Write a program to generate a rectangular wave.
15. Write a program to generate a triangular wave.

COURSE OUTCOMES:
• The students would be able to write assembly language programs for various applications,
• The student will be able to utilize memory more judiciously using various instructions.
• Students would be able to generate various waveforms.

NOTE:-
1. Total ten experiments are to be performed in the semester.
2. At least seven experiments should be performed from the above list. Remaining three experiments should be performed as designed and set by the concerned institution as per the scope of the syllabus.
ECE335B PROFESSIONAL TRAINING-I
B. Tech Semester –V

L T P Credits
- - 2 2

Class Work : 50Marks
Practical : -
Total : 50Marks

COURSE OBJECTIVES:
- The course helps students to interact with external organizations.
- The course aims at providing knowledge and exposure to the students for different processes involved in an organization.
- The course aims at developing professional attitude in students by learning from professionals.

At the end of 4th semester each student would undergo four weeks Professional Training in an Industry/ Institute/ Professional Organization/ Research Laboratory etc. with the prior approval of the Training and Placement Officer of the University and submit in the department a typed report along with a certificate from the organization.

The typed report should be in a prescribed format.

The report will be evaluated in the V Semester by a Committee consisting of three teachers from different specialization to be constituted by the Chairperson of the department. The basis of evaluation will primarily be the knowledge and exposure of the student towards different processes and the functioning of the organization.

The student will interact with the committee through presentation to demonstrate his/her learning.

Teachers associated with evaluation work will be assigned 2 periods per week load.

COURSE OUTCOMES:
- After the course is completed the student will have additional knowledge about professional attributes.
- The students will develop a more professional outlook.
- The students will know how to deal with time bound tasks in a more effective way.
- The students will have more efficient attribute of multi-tasking.
<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Course No.</th>
<th>Course Title</th>
<th>Teaching Schedule</th>
<th>Marks of Class Work</th>
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<td>L     T   P</td>
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<td>MICROELECTRONICS(ECE, AEI)</td>
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<td>225</td>
<td>1000</td>
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**NOTE:**
1. Every student has to participate in the sports activities. Minimum one hour is fixed for sports activities either in the morning or evening. Weightage of Sports is given in General Proficiency Syllabus.
2. The students will be allowed to use non-Programmable Scientific Calculator. However, sharing/exchange of calculator is prohibited in the examination.
3. Electronic Gadgets including Cellular Phones are not allowed in the examination.
4. At the end of 6th semester each student would undergo four weeks Professional Training in an Industry/ Institute/ Professional / Organization/ Research Laboratory / training centre etc. with the prior approval of the Training and Placement Officer of the University and submit in the department a typed report along with a certificate from the organization.
Course Objectives:

- To gather, interpret, and document information logically, efficiently, and ethically.
- To develop professional work and teamwork habits.
- To design usable, clear, persuasive, accessible documents.
- To make students select the appropriate format for presenting information.

Unit I

Report Writing:
Reports: meaning, their importance and types, Structure of reports, Formats of reports, Use of illustrations

Unit II

Writing of Business and Technical Reports:
Preliminary steps and procedure of writing report, writing various types of reports on technical, business related topics.

Recommended Reading:

Course Outcomes:

- The students will be able to analyze the communication situation fully and accurately: needs, audiences, and users.
- The students will be able to organize information using reader-based principles.
- The students will know how to use graphics effectively.

Note:

Scheme of End-Term Examination (Major Test) and Instructions for Examiner

Theory

1. The duration of the exam will 2 hours.
2. The Question Paper for this theory course shall have three questions in all covering both the units. All will be compulsory with internal choice.
3. Question no. 1 will be of 10 marks. The question may have two/three parts with enough internal choice, covering various components of both the Units.
4. Question no 2 with internal choice will be of 10 marks covering contents of the Unit I. It will be theoretical in nature.
5. Question no 3 will have two parts of 15 marks each. The student will be asked to write reports on business and technical subject/issue covering contents of Unit II. The emphasis would be on testing the actual report writing on a given business and technical situation/subject in letter format.
COURSE OBJECTIVES:
- To introduce the students to the basics of microwave devices and components.
- To make students understand the working principles of various devices operating at microwave frequencies.
- To introduce students to the basics of radar systems.

UNIT I
INTRODUCTION TO MICROWAVES:
Characteristic features - advantages and applications, Waveguides - Basic concepts and properties, Comparison of Waveguide with transmission lines, Propagation in TE & TM mode, Rectangular waveguide, TEM mode in rectangular waveguide, Introduction to circular waveguides and planar transmission lines.

MICROWAVE COMPONENTS:
Directional Couplers, Tees, Hybrid Ring, Attenuators, Cavity resonators, Mixers & detectors, Matched load, Phase shifter, Isolators, Circulators.

UNIT II
MICROWAVE TUBES:
Limitations of conventional tubes, Construction, operation, properties and applications of Klystron amplifier, Reflex Klystron, Magnetron, TWT, BWO, Crossed field amplifiers.

MICROWAVE SOLID STATE DEVICES:
Principle of operation and applications of Varactor diode, Tunnel diode, Schottky diode, Gunn diode, IMPATT, TRAPATT and PIN diodes, MASER, Parametric amplifiers.

UNIT III
MICROWAVE MEASUREMENTS:
Measurement of Frequency, Power, VSWR, Wavelength & Impedance.

RADAR FUNDAMENTALS:
Introduction, RADAR principles, development, frequencies, block diagram and operation and applications.

UNIT IV
RADAR EQUATION:
Simple form of RADAR equation, Prediction of Range Performance, Minimum detectable signal, Pulse repletion frequency & range ambiguities, system losses, propagation effects.

RADAR SYSTEMS:
Block Diagram and operation of CW, Frequency Modulated RADAR, MTI & Pulsed Doppler RADAR, The Doppler effect, blind speed, Applications.

Text Books:
1. Foundations for Microwave Engineering: R.E.Collin, MGH
2. Introduction to Radar Systems: Merrill I. Skolnik, MGH

Reference Books:
1. Radar Principles, Technology, Applications: Byron Edde, Pearson Education
2. Microwave Devices and Circuit: Samuel Liao, PHI.
3. Elements of Microwave Engineering: R.Chatterjee, EWP

COURSE OUTCOMES:
- The student will gain complete knowledge about microwave devices such as Amplifiers, Oscillators.
- The students will have knowledge of microwave Measurement techniques.
- The students will become aware of various radar frequencies and radar classifications.

NOTE:
In the Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, at least one from each unit. All questions carry equal marks.
CONTROL SYSTEM ENGINEERING
B.Tech Semester-VI (ECE, BME, common with 5th Sem. AEI)

L T P Credits
Class Work : 25Marks
3 1 - 4
Theory : 75Marks
Total : 100Marks
Duration of Exam. : 3 Hrs.

COURSE OBJECTIVES:
- To provide an introduction to various types of systems and their feedback control functions.
- To give an introduction to the analysis of linear control systems.
- To give an introduction to the frequency response domain tools to design and study linear control systems.

UNIT I
INPUT / OUTPUT RELATIONSHIP:
System / Plant model, illustrative examples of plants & their inputs and outputs, open loop & closed loop control system & their illustrative examples. Mathematical modeling and representation of physical systems. Concept of transfer function, relationship between transfer function and impulse response, order of a system, block diagram algebra, signal flow graphs: Mason’s gain formula & its application, characteristic equation, derivation of transfer functions of electrical and electromechanical systems.

UNIT II
TIME DOMAIN ANALYSIS:
Typical test signals, time response of first order systems to various standard inputs, time response of 2nd order system to step input, time domain specifications, steady state error and error constants, concept of stability, pole-zero configuration and stability, necessary and sufficient conditions for stability, Hurwitz stability criterion, Routh stability criterion and relative stability. Root locus concept, development of root loci for various systems, stability considerations.

UNIT III
FREQUENCY DOMAIN ANALYSIS:
Relationship between frequency response and time-response for 2nd order system, polar, Nyquist, Bode plots, stability, Gain-margin and Phase Margin, relative stability, frequency response specifications.

UNIT IV
COMPENSATION:
Necessity of compensation, compensation networks, application of lag and lead compensation, basic modes of feedback control, proportional, integral and derivative controllers.

CONTROL COMPONENTS:
Synchros, servomotors, stepper motors, magnetic amplifier.

TEXT BOOK:

REFERENCE BOOKS:
4. Modern Control Engineering, R.C. Dorf & Bishop; Addison-Wesley Publishers.

COURSE OUTCOMES:
- Students will be able to recognize and analyze feedback control mechanisms
- Students can describe various time domain and frequency domain tools used for analysis and design of linear control systems.
- Students can describe the methods to analyze the stability of systems with use of transfer functions.

NOTE:
The Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, at least one from each unit. All questions carry equal marks.
COURSE OBJECTIVES:
- To expose the students to the basics of antennas and various types of antenna arrays and their radiation patterns.
- To introduce the concepts of antenna radiation and fundamental parameters.
- To make students understand the application of different antenna types and their characteristics.
- To make students understand antenna array and Array factor.

UNIT I
INTRODUCTION TO EM WAVES:
Introduction, Electromagnetic Wave Equations, Poynting Theorem & Electromagnetic Power, Short Electric Dipoles, Retarded Vector Potential, Radiation from a Small Current Element
CURRENT ELEMENT CHARACTERISTICS:
Power Radiated by a Current Element and Its Radiation Resistance, Radiation from a Half Wave Dipole, Radiation Patterns, Radiation Power Density, Radiation Intensity

UNIT II
ANTENNA PATTERN:
Antenna Pattern, Antenna Parameters: Front To Back Ratio, Gain, Directivity, Radiation Resistance, Efficiency, Aperture Area, Impedance, Effective Length and Beam width, Reciprocity Theorem for Antenna and Its Applications
ANTENNA PARAMETERS:
Impedance Measurements, Radiation Pattern Measurement, Beam width Measurement, Phase And Current, Radiation Resistance, Directivity And Polarisation Measurement

UNIT III
TYPES OF ANTENNAS:
Introduction, Isotropic, Yagi-Uda, Biconical, Helical, Horn, Slot, Parabolic Feeds, Conical, Log Periodic, Microwave and Patch Antenna.
ANTENNA ARRAYS:
Types of Antenna Array: Broadside Array, End Fire Array, Collinear Array and Parasitic Array, array of point sources, pattern multiplication, Linear Array, Phased Array, Tapering of Arrays, Binomials Arrays, Continuous Arrays and Superdirective Array, effect of ground on antennas.

UNIT IV
TRANSMISSION PARAMETERS:
Reflection and refraction of plane waves at the surface of a perfect conductor & perfect dielectric (both normal incidence as well as oblique incidence), Brewester's angle and total internal reflection, reflection at the surfaces of a conductive medium, surface impedance, transmission-line analogy, poynting theorem, interpretation of E x H, power loss in a plane conductor.
RADIO WAVE PROPAGATION:
Introduction, Ground Wave, Sky Wave, Space Waves and Tropospheric Abnormalities, Multi-Hop Propagation, Effect of Earth, Skip Distance, Ionospheric Abnormalities, Mechanism of Ionospheric propagation, critical frequency, MUF, Duct Propagation.

Text Books:
1. Antennas by J.D.Kraus, TMH.
2. Antenna & Wave Propagation by Raju

Reference Books:
1. Antenna & Radiowave Propagation by Collin, TMH
2. Antenna Theory Analysis & Design by Balanis, Wiley.
3. Electromagnetic Waves & Radiating Systems by Jordan & Balman, PHI.

COURSE OUTCOMES:
- The student will be able to understand various antennas, arrays and radiation patterns of antennas.
- The student will be able to understand the basic working principle of antennas and how the radio waves propagate in the atmosphere.
- The student will know the various techniques involved in various antenna parameter measurements.

NOTE:
In the Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, at least one from each unit. All questions carry equal marks.
COURSE OBJECTIVES:

- To introduce the concept of CAD tools, simulation and synthesis for digital systems.
- To provide knowledge about basics of Verilog HDL language, including its use in synthesis of digital design.
- To provide knowledge about various digital logic IC’s and their implementations.

UNIT I

INTRODUCTION:
System: definition, introduction to digital system, design issues of digital system, computer-aided design tools for designing of digital systems, hardware description languages, simulation and synthesis.

HARDWARE FOR DIGITAL SYSTEM DESIGN:
PLA, PAL, ROM, CPLDs and FPGA.

UNIT II

VHDL BASICS:
Introduction to VHDL, entity and architecture declaration, data objects, classes and data types, operators, overloading, logical operators, types of delays, behavioural, dataflow and structural models.

VHDL STATEMENTS:
Assignment statements; sequential statements and process; conditional statements; Generate statement; case statement, array and loops, resolution functions, concurrent statements.

UNIT III

ADVANCE VHDL TOPICS:
Packages and libraries; subprograms: application of functions and procedures, structural modelling, component declaration, structural layout and generics, configuration statement, Test Benches, ALIAS, Generate statement.

COMBINATIONAL CIRCUIT DESIGN:
VHDL models and simulation of combinational circuits such as multiplexers, demultiplexers, encoders, decoders, code converters, comparators, implementation of boolean functions etc.

UNIT IV

SEQUENTIAL CIRCUITS DESIGN:
VHDL models and simulation of sequential circuits flip flops, shift registers, counters etc., introduction to FSM, VHDL models and simulation of FSM.

DESIGN OF DIGITAL SYSTEM:
Basic components of a computer, specifications, architecture of a simple computer system, design of ALU, memory unit, design implementation using CPLDs and FPGAs.

Reference Books:
COURSE OUTCOMES:

- The students will have an ability to describe, design, simulates, and synthesizes computer hardware systems using the Verilog hardware description language.
- The students will have an ability to rapidly design combinational and sequential logic that works.
- The students will be able to implement state machines using Field-Programmable Gate Arrays.

NOTE:
In the Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, atleast one from each unit. All questions carry equal marks.
COURSE OBJECTIVES

- The course introduces the students to the physical, electrical, and optical properties of semiconductor materials and their use in microelectronic circuits.
- To provide a relation between atomic and physical properties of semiconductor materials and circuit performance issues.
- To develop an understanding of the connection between device-level and circuit-level performance of microelectronic systems.

UNIT I

CRYSTAL GROWTH AND WAFER PREPARATION:
Clean room concept, safety requirements, crystal growth techniques: czochralski and gradient freeze techniques, physics involved in CZ growth, Energy flow balance, pull rate considerations, problems and solutions, defects involved in CZ method, effects due to carbon and oxygen impurities, modeling of dopant incorporation, float zone growth for high purity silicon, liquid encapsulated growth for GaAs, material characterization-wafer shaping, crystal characterization, wafer cleaning.

CURRENT ELEMENT CHARACTERISTICS:
Growth mechanism and kinetic oxidation, thin oxides, oxidation techniques and systems, oxide properties, characterization of oxide films, growth and properties of dry and wet oxidation, charge distribution during oxidation, oxide characterization, anomalies with thin oxide regime.

UNIT II

DIFFUSION:

ION IMPLANTATION:
Introduction, physics of implantation, range theory, projected range, ion stopping mechanisms-channeling, nuclear stopping, electronic stopping, implantation damage, implantation equipment, annealing, shallow junction, application to silicon and gallium arsenide, RTA mechanism.

UNIT III

LITHOGRAPHY:
Pattern generation and mask making, exposure sources, photolithography, photoresists, optical lithography, electron lithography, X-ray lithography, ion lithography, mask defects, atomic force microscopy based lithography system, dip pen lithography system.

DEPOSITION:
Need for film deposition, film deposition methods-physical and chemical, deposition processes, CVD techniques for deposition of polysilicon, silicon dioxide, silicon nitride and metal films, sputter deposition, sputter unit, Epitaxy-types, techniques, advantages, vapor phase epitaxy, molecular beam epitaxy.

UNIT IV

ETCHING:
Directionality and selectivity issues, wet chemical etching, wet etchants, dry physical etching, dry etchants, plasma etching, advantages and disadvantages, issues involved, dry etching systems, dry chemical etching, reactive ion etching, etching induced damage, cleaning.

METALLIZATION:
Introduction, metallization applications, metallization choices, physical vapor deposition, patterning, metallization problems.

Text Books:
1. S.M.Sze, "VLSI Technology" TMH
2. S.K.Gandhi, "VLSI Fabrication Principles"

Reference Books:
1. S.M.Sze, “Semiconductor Devices Physics and Technology”
COURSE OUTCOMES

- The students will have a complete knowledge of various techniques involved in designing microelectronic circuits.
- Upon successful completion of this course, students should be able to compute carrier concentrations for semiconductor materials under a variety of conditions.
- The students will be able to compute various current and voltage parameters of semiconductor materials under a variety of conditions.

NOTE:
In the Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, at least one from each unit. All questions carry equal marks.
COURSE OBJECTIVES:
- To introduce the basic concepts related to microcontrollers and interfacing with peripherals using assembly language programming.
- To introduce the students to various applications of embedded systems.
- To introduce the students to architecture of Real Time Operating Systems (RTOS)

UNIT I

INTRODUCTION OF EMBEDDED SYSTEMS:
Definition, ingredients of embedded system, requirements & challenges of embedded system design, different types of microcontrollers: Embedded microcontrollers, external memory microcontrollers etc., processor architectures: Harvard VS Princeton, CISC VS RISC, microcontrollers memory types, microcontrollers features: clocking, i/o pins, interrupts, timers, and peripherals.

SOFTWARE FOR EMBEDDED SYSTEM DESIGN:
Development tools/ environments, Assembly language programming style, Interpreters, High level languages, Intel hex format object files, Debugging.

UNIT II

8051 MICROCONTROLLER:
Pin diagram explanation, internal diagram 8051, Instruction Set, Addressing mode, data transfer instruction, logical, arithmetic instruction, bit instruction, branching instruction.

TIMERS, SERIAL INTERFACE & INTERRUPTS OF 8051 MICROCONTROLLER:

UNIT III

PIC MICROCONTROLLER:
Introduction to PIC microcontrollers, features of PIC family microcontrollers, architecture and pipelining, program memory considerations, addressing modes, CPU registers, Instruction set, and simple operations.

FEATURES OF PIC MICROCONTROLLER:

UNIT IV

APPLICATIONS BASED ON 8051 MICROCONTROLLER:
Interfacing of memory, intelligent LCD, 8255, ADC, DAC, LED display, Memory Card, Bio-metric system.

APPLICATION BASED ON PIC MICROCONTROLLERS:
Interfacing of Graphical Display, Memory Card, Bio-metric system Music box, Applications like Mouse wheel turning, PWM motor control, ultra sonic distance measuring, Temperature Sensor, Pressure Sensor, Magnetic Field Sensor.

Reference Books:
1. 8051, Scott Mackenzie, PHI, Englewood Cliffs, New Jersey.

COURSE OUTCOMES:
- Students will be able to understand embedded systems and controllers used for embedded applications.
- Students will be able to differentiate between microprocessor and microcontroller, develop microcontroller programming, design hardware and software for minimum microcontroller based system.
- State Students will aware of application of ES in various fields, difference between general OS and RTOS, functions of kernel.

NOTE:
In the Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, at least one from each unit. All questions carry equal marks.
ECE322B                                      MICROWAVE AND RADAR ENGINEERING LAB
B. Tech Semester -VI (ECE, EEE)

Credits

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<th>Credits</th>
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<td>Practicals</td>
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COURSE OBJECTIVES:
- The goal of this course is to introduce students the various microwave components.
- To provide understanding about the operation of different types of Microwave devices.
- To provide various methods of measurement for measuring variable parameters of microwave devices.

LIST OF EXPERIMENTS:

1. To study of Wave guide Components.
2. Generation of Microwave Power & Basic set-up.
3. To Study the characteristic of reflex klystron.
4. To measure frequency of Microwave source and demonstrate relationship among frequency, free space wavelength and guide wave length.
5. To measure VSWR of an unknown load.
6. To measure large standing wave ratio of a unmatched load.
7. To match impedance for maximum power transfer using slide screw tuner.
8. To measure VSWR, insertion loss and attenuation of a fixed and variable attenuator.
9. To measure coupling factor and directivity of Directional coupler.
10. To determine the insertion loss, isolation of three port circulator
11. To determine the insertion loss, isolation of a isolator.
12. To study the characteristics of Gunn Diode.

COURSE OUTCOMES:
- The students will have complete knowledge about all the microwave devices and their operational mechanism.
- The students will become proficient in measuring various parameters related to microwave devices.
- The students will be able to plot various voltage and power characteristic curves required for better understanding of the device.

NOTE:-
1. Total ten experiments are to be performed in the semester.
2. At least seven experiments should be performed from the above list. Remaining three experiments should be performed as designed and set by the concerned institution as per the scope of the syllabus.
COURSE OBJECTIVES:

- To provide a platform for verifying the theoretical aspects of Control systems and feedbacks.
- To introduce students to MATLAB simulink for control system designing.
- To aid the students in developing various control structures and analyzing them for improving their performances.

LIST OF EXPERIMENTS:

1. To study A.C. servo motor and to plot its torque-speed characteristics.
2. To study D.C. servo motor and to plot its torque speed characteristics.
3. To study the magnetic amplifier and to plot its load current v/s control current characteristics for:
   (a) series connected mode
   (b) parallel connected mode.
4. To plot the load current v/s control current characteristics for self exited mode of the magnetic amplifier.
5. To study the synchro & to:
   (a) Use the synchro pair (synchro transmitter & control transformer) as an error detector.
   (b) Plot stator voltage v/ rotor angle for synchro transmitter i.e. to use the synchro transmitter as position transducer.
6. To use the synchro pair (synchro transmitter & synchro motor) as a torque transmitter.
7. (a) To demonstrate simple motor-driven closed-loop position control system.
   (b) To study and demonstrate simple closed-loop speed control system.
8. To study the lead, lag, lead-lag compensators and to draw their magnitude and phase plots.
9. To study a stepper motor & to execute microprocessor or computer-based control of the same by changing number of steps, direction of rotation & speed.
10. To implement a PID controller for level control of a pilot plant.
11. To implement a PID controller for temperature control of a pilot plant.
12. To study the MATLAB package for simulation of control system design.

COURSE OUTCOMES:

- The students will be able to design various control systems using MATLAB simulink.
- The students will be able to analyze steady state analysis of control systems.
- The student can generate new control system scenarios and can evaluate their performances.

NOTE:-

1. Total ten experiments are to be performed in the semester.
2. At least seven experiments should be performed from the above list. Remaining three experiments should be performed as designed and set by the concerned institution as per the scope of the syllabus.
ECE326B
HDL BASED SYSTEM DESIGN LAB
B. Tech Semester –VI (ECE, AEI)

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Class Work: 20 Marks
Practical: 30 Marks
Total: 50 Marks
Duration of Exam.: 3 Hrs.

COURSE OBJECTIVES:
- To introduce the students to VHDL programming.
- To provide hardware implementation of digital systems on FPGA devices.
- To make students comfortable in designing any digital, logical device using VHDL.

LIST OF EXPERIMENTS:
1. Design all Basic gates using HDL.
2. Design Universal gates using HDL.
3. Write VHDL programs for half adder and full adder circuits, check the wave forms and the hardware generated.
4. Write VHDL programs for multiplexer & demultiplexer circuits, check the wave forms and the hardware generated.
5. Write VHDL programs for the following circuits, check the wave forms and the hardware generated
   a. decoder
   b. encode
6. Write a VHDL program for a comparator and check the wave forms and the hardware generated.
7. Write a VHDL program for a code converter and check the wave forms and the hardware generated.
8. Write a VHDL program for a FLIP-FLOP and check the wave forms and the hardware generated.
9. Write a VHDL program for a counter and check the wave forms and the hardware generated.
10. Write VHDL programs for the following circuits, check the wave forms and the hardware generated
    (a) Register
    (b) Shift register
11. Implement any three (given above) on FPGA kit.
12. Implement any three (given above) on CPLD kit.

COURSE OUTCOMES:
- The students will be able to model test bench simulation and verification of designs with Verilog HDL.
- The students will be able to design Industrial-standard software for coding, synthesis and simulation of digital systems.
- The students will be able to perform hardware implementation of digital systems on FPGA devices or CPLD kits.

NOTE:-
1. Total ten experiments are to be performed in the semester.
2. At least seven experiments should be performed from the above list. Remaining three experiments should be performed as designed and set by the concerned institution as per the scope of the syllabus.
COURSE OBJECTIVES:

- To introduce students to the basics of microcontrollers.
- To make students proficient in programming using assembly language.
- To make students develop new applications of microcontroller based systems.

LIST OF EXPERIMENTS:

2. (a) Write an assembly language program to add eight 8-bit numbers.
   (b) Write an assembly language program to find average of eight 8-bit numbers.
3. (a) Write an assembly language program to find a maximum number from a given 8-bit ten numbers.
   (b) Write an assembly language program to find a minimum number from a given 8-bit ten numbers.
4. Arrange the given ten 8-bit numbers in ascending order.
5. Generate a square wave of 10kHz at P1.0 Crystal frequency is XXXX.
6. Write a program to transfer data from given memory block B1 to block B2.
7. Interface LED and switch with microcontroller 8051 or PIC.
8. Interface seven segment display with microcontroller 8051 or PIC.
9. Interface LCD with microcontroller 8051 or PIC.
10. Write an assembly language program for External program and test on hardware.
11. Interface stepper motor with microcontroller 8051 or PIC.
12. Interface DC motor with microcontroller 8051 or PIC and control speed using PWM.
13. Write an assembly language program to transfer message serially.
14. Write an assembly language program using interrupts to simultaneously create 7kHz and 500kHz square wave on P1.0 and P1.1 respectively.
15. Design a mini project based on microcontroller.

COURSE OUTCOMES:

- The students will be able to efficient programs using assembly language.
- The students will be able to design new programs for generating new applications in field of microcontrollers.
- Students will be able to design complex projects based on microcontrollers.

NOTE:-

1. Total ten experiments are to be performed in the semester.
2. At least seven experiments should be performed from the above list. Remaining three experiments should be performed as designed and set by the concerned institution as per the scope of the syllabus.
COURSE OBJECTIVES:

- The purpose of this course is to inculcate a sense of professionalism in a student.
- The course aims at personality development of students in terms of quality such as receiving, responding, temperament, attitude and outlook.
- The course aims at overall development of students.

The purpose of this course is to inculcate a sense of professionalism in a student along with personality development in terms of quality such as receiving, responding, temperament, attitude and outlook. The student efforts will be evaluated on the basis of his/her performance/achievements in different walks of life.

A Faculty Counselor will be attached to a group of students which will remain associated with him/her during the entire period of the degree program in the University. Each faculty member will serve as a faculty counselor. They will act like a local guardian for the students associated with him/her and will help them in terms of career guidance, personal difficulties.

A. The student will present a written report before the committee with following in view:

The student will present before the committee his/her achievements during the current academic session in the form of a written report highlighting followings:

I. Academic Performance
II. Extra Curricular Activities / Community Service, Hostel Activities (8 Marks)
III. Technical Activities / Industrial, Educational tour (8 Marks)
IV. Sports/games (14 Marks)
V. Moral values & Ethics (15 Marks)

NOTE: Report submitted by the students should be typed on both sides of the paper.

B. A student will support his/her achievement and verbal & communicative skill through presentation before the committee. (30 Marks)

C. Moral values & Ethics

Syllabus - A few topics from the below mentioned books


A minor test/Quiz will be conducted during the semester and it will be the duty of the concerned teacher assigned to teach Moral values & Ethics to submit the awards to respective chairman of the department/Director/Principal.

The evaluation of this course will be made by the following Committee.

University Departments:
1. Chairperson of the Department
2. Senior Most Faculty Counselor
3. Vice-Chancellor’s Nominee

Affiliated Colleges:
1. Director/Principal
2. Head of the Department/Sr. Faculty
3. External Examiner to be appointed by the University

COURSE OUTCOMES:

- After completion of course the student will feel more confident in his/her approach toward others.
- The students will attain a professional outlook towards work.
- The students will have a more moral approach in life.

NOTE: Remuneration will be paid to the external examiner only (at par with the other practical examinations).
HUM304B ORAL PRESENTATION SKILLS
B. Tech. Semester – VI (Common for all branches)

L T P Credits Class Work : 20 Marks
1 - - 1 Theory : 30 Marks

Total : 50 Marks
Duration of Exam. : 2Hrs.

COURSE OBJECTIVES:
- To enhance the oral proficiency of students.
- To make students more confident while presenting themselves.
- To prepare them to face professional environment with confidence.

Oral Presentations:
Group Discussion; Mock interviews

NOTE for the Teacher:
The teacher concerned, by devising her/his method, must preview and review the student’s spoken proficiency at the beginning and end of the semester respectively to find the efficacy of the course and degree of improvement in the student.

Recommended Reading:

SCHEME OF END SEMESTER EXAMINATION (Practical)
An external Practical exam of 30 marks of 2 hour duration for the course will be conducted by an external examiner appointed by the university’s Controller of Exams.

COURSE OUTCOMES:
- The students will have improved oral communicative skills.
- The students will be able to present themselves with more confidence.
- The students will have improved vocabulary.

NOTE:
Students will be tested for their oral communication competence making them participate in Group discussion, mock situations for interview. Students may also be evaluated through a viva conducted by an external examiner.
COURSE OBJECTIVES:

- The course offers a detailed study of process control with emphasis on different types of controllers and their principles, characteristics, implementation, quality, stability and tuning, which is quite essential for an instrumentation engineer to work in any process industries.
- The course provides a fundamental knowledge to instrumentation engineer regarding the implementation of controller techniques in the process industries. The course also provides a basic knowledge about process & instrumentation drawing symbols and diagrams

UNIT I

Introduction:
Instruments for measurements of voltage, current and other circuit parameters, digital meters.
Pressure measurements:
Introduction, Basic Terms, Pressure measurements, Pressure Formulas, Measuring Instruments, Application considerations.

UNIT II

Level Measurements:
Introduction, Level Formulas, Level sensing devices, Application considerations.
Flow Measurements:
Introduction, Basic Terms, Flow Formulas, Flow measurement Instruments, Application considerations.

UNIT III

Temperature and Heat Measurements:
Introduction, Basic Terms, Temperature and Heat Formulas, Temperature measuring devices, Application considerations.
Humidity, Density and Specific Gravity Measurements:
Viscosity and pH measurements: Basic Terms, Measuring devices, application considerations.

UNIT IV

Actuators and control:
Pressure controllers, Flow control actuators, power controls
Automatic Process Control Systems and Controllers:
Introduction, automatic controllers, classification of controllers, introduction to computer aided measurement and control system, Introduction to programmable logic controllers.

Text Books :
1. Principles of Industrial Instrumentation by D. Patranabis  TMH
2. Industrial Instrumentation and Control by S.K.Singh  TMH

Reference Books:
1. Elements of Electronic Instrumentation and Measurement by Joseph c. Carr  Pearson

COURSE OUTCOMES:

- At the end of this course an instrumentation technology student will become familiar with process control tools and he/she will be in a position to measure, acquire and control the process parameters in process industries.
- Define & understand the process characteristics

NOTE: In the Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, atleast one from each unit. All questions carry equal marks.
ECE403B  
DIGITAL SIGNAL PROCESSING  
B. Tech Semester –VII (ECE, AEI)

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<td>25 Marks</td>
<td>75 Marks</td>
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<td>3 Hrs.</td>
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COURSE OBJECTIVE:
• To study DFT and its computation
• To study the design techniques for digital IIR and FIR filters

UNIT I
Discrete Fourier Transform (DFT):
Frequency Domain Sampling and Reconstruction of Discrete –Time signals, Discrete Fourier Transform, DFT as a Linear Transformation, Relationship of the DFT to other transforms, Properties of DFT, Use of DFT in Linear filtering methods: linear filtering, Filtering of long data sequences.

Fast Fourier Transform (FFT):
Efficient computation of the DFT: Fast Fourier Transform Algorithms, Radix-2 FFT Algorithms, Applications of FFT Algorithms: Efficient Computation of the DFT of Two Real Sequences, Efficient Computation of the DFT of a 2N –Point Real Sequence, Quantization effects in the computation of the DFT.

UNIT II
Structures for FIR Systems:
Direct –Form Structures, Cascade –Form Structures, Frequency Sampling Structures, Lattice Structure.

Structures for IIR Systems:
Direct –Form Structures, Signal Flow graphs & Transposed Structures, Cascade –Form Structures, Parallel –Form Structures; Lattice & Lattice-Ladder Structures for IIR Systems, Comparison of Different structures.

UNIT III
Frequency Domain Characterization of LTI Systems:
Response to Complex Exponential & Sinusoidal Signals, Steady –state and Transient response with Input as a sinusoidal signal, Steady state response to periodic input signals, response to Aperiodic Input Signals, magnitude and phase response from pole & zeros, measuring the impulse response of an unknown system by correlation.

Frequency Selective Filters
Ideal Filters: lowpass, Highpass, Bandpass, Digital Resonators, Notch, Comb, All-pass filters, Digital Sinusoidal Oscillators pole –zero pattern for lowpass and highpass filters, lowpass to highpass filter transformation, Invertibility of systems & Deconvolution: LTI systems invertibility, maximum, minimum phase, and mixed phase systems; System identification through Crosscorrelation, Spectrum.

UNIT IV
Considerations for Practical Realization, Comparison of FIR & IIR, FIR Filter Design:

IIR Filter Design

Text Books :

Reference Books:

COURSE OUTCOMES:
• At the end of this course, the students will be able to understand the Structures of Discrete time signals and systems

NOTE: In the Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, atleast one from each unit. All questions carry equal marks.
COURSE OBJECTIVES:
• To introduce the fundamental concept in the field of satellite communications.
• To enable the students know how to place a satellite in an orbit.

UNIT I
FUNDAMENTALS OF SATELLITE COMMUNICATION:
Basic principles of Satellite Communication, Evolution of Satellite Communications, Basic Concepts of Satellite Communications, Type of satellites, Frequency allocations for Satellite Services, Comparison of Satellite communication over other modes of communication, Satellite applications, Future Trends of Satellite Communications.

SATELLITE ORBITS:
Kepler’s Laws, equation of orbit, Types of orbits, Locating the satellite in the orbit, locating the satellite with respect to the earth, Orbital parameters, Orbital perturbations, Orbit determination, Look Angle determination, Earth coverage and slant range, Mechanism of launching a satellite, Station keeping, Satellite stabilization, Orbital effects in communication systems performance.

UNIT II
SPACECRAFT AND ITS SUBSYSTEMS:
Attitude and orbit control system (AOCS), Telemetry, tracking, Command and monitoring, Power supply system, Communication subsystems - transponder, Satellite antenna subsystem.

SATELLITE LINK DESIGN:
General Link design equation, System noise temperature, C/N and G/T ratio, Design of down links, up link design, Effects of rain, complete link design, Interference effect on complete link design.

UNIT III
EARTH STATION TECHNOLOGY:
Classification of earth station, Earth station parameters, Earth station design requirements, Earth station antenna design, Earth station subsystem-transmitter, receiver, low noise amplifier, high power amplifier, antenna system, tracking systems, Terrestrial interface.

ANALOG and DIGITAL SATELLITE DIGITAL COMMUNICATION:
Elements of Digital Satellite Communication systems, Baseband Signals, Frequency Division Multiplexing technique, Time Division Multiplexing Digital Modulation Techniques-ASK, BPSK, QPSK, BFSK, MSK and QAM.

UNIT IV
MULTIPLE ACCES:
Introduction, Frequency division multiple access (FDMA), Time division Multiple Access (TDMA)-frame structure, burst structure, frame efficiency, super frame, burst time plan, Satellite Switched TDMA, SPADE system, Code Division Multiple access (CDMA), Spread spectrum transmission and reception.

SPECIAL PURPOSE COMMUNICATION SATELLITE:
Satellite for earth observation, Satellite for weather forecast, Satellite for scientific studies, Satellite for military applications, Satellite television, telephone services via satellite, Data communication services, Very small aperture terminal (VSAT), RADARSET, Mobile satellite communication system (MSAT), GPS systems, Satellite signal acquisition, GPS Navigation Message, GPS signal levels, GPS receiver operation, Differential GPS.

Text Books:
1. Satellite Communications : Dennis Roddy, TMH
2. Satellite Communication : Monojit Mitra, PHI

Reference Books:
1. Satellite Communication: T. Pratt and C.W. Boston, John Willey and sons
2. Introduction to Satellite Communication: Bruce R. Elbert, Artech House
3. Fundamentals of satellite Communication: K.N. Raja Rao, PHI

COURSE OUTCOMES:
• At the end of this course students will gain knowledge in topics such as Orbital aspects involved in satellite communication.

NOTE: In the Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, atleast one from each unit. All questions carry equal marks.
COURSE OBJECTIVES:

- To understand the steps involved in IC fabrication
- To study basic electrical properties of MOS & BIOS circuits.
- To understand VLSI circuit design processes representations of stick diagram & layout diagram.

UNIT I

INTRODUCTION:
Evolution of VLSI, Moore’s Law, MOS transistor theory – MOS structure, enhancement & depletion transistor, Threshold voltage, MOS device design equations, Body Effect, Channel length modulation, Mos Transistor Trans conductance and output conductance.

MOS FABRICATION:
Crystal Growth, wafer preparation, epitaxy, oxidation, lithography, etching, diffusion, deposition, ion-implantation, metallization, Fabrication Process: nMOS, CMOS (n-well, p-well, twin-tub, silicon on insulator, 3-D CMOS, MOS capacitance dynamic behavior, sub-micron MOS transistors-related effects.

UNIT II

MOS INVERTER:
Introduction, nMOS inverter: resistive load, enhancement load, depletion load, determination of pull-up to pull-down ratio for an nMOS inverter driven by another nMOS inverter. CMOS inverter: DC characteristics, circuit model, latch up.

CMOS DESIGN:
Gate Logic: inverter, nand gate, nor gate. Ratioced logic, pseudo NMOS logic, DCVSL Logic, Switch Logic: pass transistor and transmission gate, dynamic logic, charge sharing logic, domino logic. Combination logic: Parity generator, multiplexer. Sequential logic: two phase clocking, memory-latches and registers, setup and hold time violations, causes, effects and remedies.

UNIT III

MOS circuit Design:
MOS layer, stick diagram: nMOS Design style, CMOS design style, design rules and layout: lambda based design rule, layer representation, contact cuts, double metal MOS process rules, CMOS lambda based design rules.

SCALING OF MOS CIRCUITS:
Scaling models and scaling factors for device parameters, limitations of scaling: substrate doping, limits of miniaturization, limit of interconnect and contact resistance.

UNIT IV

CIRCUIT CHARACTERIZATION AND PERFORMANCE ESTIMATION:
Sheet resistance, resistance estimation, capacitance estimation, inductance, switching characteristic, propagation delays, CMOS gate transistor sizing, power dissipation: static and dynamics.

SUB-DESIGN PROCESS:

Text Books:

Reference Books:

COURSE OUTCOMES:
- Ability to calculate electrical properties of MOS circuits
- Ability to design various gates, adders, Multipliers, Memories, using stick diagrams, layouts.

NOTE: In the Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, atleast one from each unit. All questions carry equal marks.
COURSE OBJECTIVES:

- To Study about various PLC Based Applications & Implementation of each application with the help of Ladder Programming.

LIST OF EXPERIMENTS:

1. To study of PLC based Process control systems in a semi-automatic Bottling plant.
2. To study of PLC based Process control systems in a fully-automatic Bottling plant.
3. To Study of PLC based car parking.
4. To study of PLC based tank level control (high level, medium level, low level, empty level)
5. To study of PLC based step sequence (use of time at different time interval)
6. How to create delay in PLC system (off delays, pulse, extended pulse)
7. To study of PLC based light intensity variation (intensity variation with help of digital processing)
8. To study of PLC based motor control (stepper motor clockwise, anticlockwise directional control)
9. To study of PLC based digital electronic design (combinational, sequential and control logic ckt.)
10. To study of PLC based traffic light interface.

COURSE OUTCOMES:

- After completed this course, Student will able to understand design PLC based Application with the help of Ladder Programming Language.

Note:-

1. Total ten experiments are to be performed in the semester
2. At least seven experiments should be performed from the above list. Remaining three experiments should be performed as designed and set by the concerned institution as per the scope of the syllabus.
COURSE OBJECTIVES:
- Use the Fast Fourier Transform in a variety of applications including: signal analysis, fast convolution, spectral and temporal interpolation, and filtering.
- Quickly choose and design digital filters
- Estimate power spectral densities using a variety of techniques

LIST OF EXPERIMENTS:
1. Introduction to MatLab.
4. To find Eigen value of matrix.
5. To find statistical properties :- Mean, Median, Standard Deviation and energy of a set of signals.
   - Plotting.
   - Single signal in a single graph.
   - Multiple signal in single graph.
   - Multiple signal in multiple graphs but in single window.
6. To sort a matrix.
   - Row wise – in reference to a particular row.
   - Column wise – in reference to a particular column.
7. To practice different kind of loop and conditional statement and to make a program using the same.
8. To save workspace variables in a file.
9. To make a simulink model of feedback system using second order transfer function and utility feedback.
10. To find the convolution of two number.
11. To represent basic signals (Unit step, unit impulse, ramp, exponential, sine and cosine).
12. To develop program for discrete convolution & discrete correlation.
13. To understand stability test.
14. To develop program for computing FFT & IDFT.
15. To design analog filter (low-pass, high pass, band-pass, band-stop).
16. To design digital IIR filters (low-pass, high pass, band-pass, band-stop).
17. To design FIR filters using windows technique.
18. To design a program to compare direct realization values of IIR digital filter
19. To develop a program for computing parallel realization values of IIR digital filter.
20. To develop a program for computing cascade realization values of IIR digital filter.
21. To develop a program for computing inverse Z-transform of a rational transfer function.
22. To design equiripple FIR filter for given specifications and plot its magnitude & Phase Response.
23. To plot pole zero diagram for given FIR and IIR system.

COURSE OUTCOMES:
- Analyze signals using the discrete Fourier transform (DFT).
- Understand circular convolution, its relationship to linear convolution, and how linear convolution can be achieved via the discrete Fourier transform.

Note:-
1. Total fifteen experiments are to be performed in the semester
2. At least Ten experiments should be performed from the above list. Remaining Five experiments should be performed as designed and set by the concerned institution as per the scope of the syllabus.
3. All above experiments should be performed using MATLAB.
ECE425B
SATELLITE COMMUNICATION LAB
B. Tech Semester – VII

L T P Credits
- - 2 1

Class Work : 20Marks
Practical : 30Marks
Total : 50Marks
Duration of Exam. : 3 Hrs.

COURSE OBJECTIVES:
- Analyze and Establish satellite communication link.
- Measurement and understanding of parameters to be measured in satellite communication link

LIST OF EXPERIMENTS:
1. To set up a active and passive satellite communication link and study their difference.
2. To measure the base-band analog (voice) signal parameters in the satellite link.
3. To measure C/N ratio.
4. To transmit and receive the function generator waveforms through a Sat.Com. link.
5. To measure the digital baseband signal parameters in Sat.Com. link.
6. To send telecommand and receive the telemetry data.
8. To measure the propagation delay of signal in a Sat. Com. Link.
9. To measure fading of a received signal.
10. To measure the parameters in an analog FM/FDM TV Sat.Com. link.
11. To measure the S/N ratio.
12. To calculate the figure of merit and FM deviation.

COURSE OUTCOMES:
- After completing this course, Student will able to understand the complete design link in satellite communication & measurement of its various parameter.

Note:-
1. Total ten experiments are to be performed in the semester
2. At least seven experiments should be performed from the above list. Remaining three experiments should be performed as designed and set by the concerned institution as per the scope of the syllabus.
COURSE OBJECTIVES:
To educate students with the knowledge of MOS transistor with their design, operation, characterization and design of combinational logic circuits

LIST OF EXPERIMENTS:
1. Design the schematic for CMOS inverter.
2. Design the schematic for CMOS nand gate.
3. Design the schematic for CMOS nor gate.
4. Design the schematic for a d-latch with clk time period =6ns using nand gates.
5. Design the schematic for a half adder using nand gates.
6. Design a full adder using half adder designed above.
7. Design the layout for PMOS in layout editor.
8. Design the layout for NMOS in layout editor.
9. Design the layout for CMOS inverter with equal rise and fall time in layout editor.
10. Design the layout for 2-Input and 3-Input NAND gate.
11. Design the layout for 2-Input and 3-Input NOR gate.
12. Design the layout for clocked S-R flip-flop.

COURSE OUTCOMES:
- Design Entry & simulation of multiplexer circuit with test bench & functional verification.
- Design Entry & simulation of D flip-flop circuit with test bench & functional verification.
- Synthesis, P&R and Post P&R simulation for Full adder, Concepts of FPGA floor plan, critical path, design gate count, I/O configuration and pin assignment to be discussed.

Note:
1. Total ten experiments are to be performed in the semester
2. At least seven experiments should be performed from the above list. Remaining three experiments should be performed as designed and set by the concerned institution as per the scope of the syllabus.
COURSE OBJECTIVES:

- The objective of this course is to increase student’s leadership skills, Practical skills and presentation skills so that students can get exposure of industrial work.

The project started in VII Semester will be completed in VIII Semester and will be evaluated through a panel of examiners consisting of the following:

- Head/ Chairperson of Department : Chairperson
- Project coordinator : Member
- External examiner : To be appointed by the University

The student will be required to submit two copies of his/her project report to the department for record (one copy each for the department and participating teacher).

Project coordinator will be assigned the project load of, maximum of 2 hrs. per week including his own guiding load of one hr. However, the guiding teacher will be assigned maximum of one period of teaching load irrespective of number of students/groups under him/her.

The format of the cover page and the organization of the body of the report for all the B.Tech. will be finalized and circulated by the Dean, Faculty of Engineering and Technology.

COURSE OUTCOMES:

- After completing this course, the student will have Practical Exposure of Industrial Projects Skills.
ECE435B

PROFESSIONAL TRAINING – II

B. Tech Semester – VII

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<td>Total</td>
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COURSE OBJECTIVES:

- To provide an exposure of industrial Technical Requirement and work experience.
- To acquire the Technical and profession skills as per industry standard.

At the end of 6th semester each student would undergo four weeks Professional Training in an Industry/ Institute/ Professional / Organization/ Research Laboratory etc. with the prior approval of the Training and Placement Officer of the University and submit in the department a typed report along with a certificate from the organization.

The typed report should be in a prescribed format.

The report will be evaluated in the VII Semester by a Committee consisting of three teachers from different specialization to be constituted by the Chairperson of the department. The basis of evaluation will primarily be the knowledge and exposure of the student towards different processes and the functioning of the organization.

The student will interact with the committee through presentation to demonstrate his/her learning.

Teachers associated with evaluation work will be assigned 2 periods per week load.

COURSE OUTCOMES:

- After completing this course, student will have all Professional and Technical skills required by industry in Real world.
COURSE OBJECTIVES:

- To identify and apply the elements of entrepreneurship and to entrepreneurial processes;
- To recognize the importance of entrepreneurship and identify the profile of entrepreneurs and their role in economic growth;
- To use the entrepreneurial mind-set and behave responsibly and ethically in their roles as entrepreneurs.

UNIT I


UNIT II


UNIT III

ENTREPRENEURSHIP DEVELOPMENT AND GOVERNMENT: Role of Central Government and State Government in promoting Entrepreneurship - Introduction to various incentives, subsidies and grants - Export Oriented Units - Fiscal and Tax concessions available; Role of Central/State agencies in the Entrepreneurship Development - District Industries Centers (DIC), Small Industries Service Institute (SISI), Entrepreneurship Development Institute of India (EDII), National Institute of Entrepreneurship & Small Business Development (NIESBUD), National Entrepreneurship Development Board (NEDB).

UNIT IV


Text & Reference Books:
3. The Culture of Entrepreneurship - Brigitte Berger.
5. Dynamics of Entrepreneurship Development - Vasant Desai.
7. Thought Leaders - ShrinivasPandit.
8. Entrepreneurship, 3rd Ed. - Steven Brandt.
10. The Entrepreneurial Connection - GurmitNarula.

COURSE OUTCOMES

- The candidate is able to combine and apply her/his understanding of new knowledge or new technology with her/his insights from business.
- The candidate has gained an up to date understanding of the field in regard to the process of assessing the commercial potential of new technology and markets.

NOTE:
In the Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, atleast one from each unit. All questions carry equal marks.
BME451B  MEDICAL INSTRUMENTATION

B. Tech Semester – VII (Open Elective)

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Class Work : 25 Marks  
Theory : 75 Marks  
Total : 100 Marks  
Duration of Exam. : 3 Hrs.

COURSE OBJECTIVES:

- Explain the importance and objectives of medical sensors in modern day medicine and identify the underlying physics principles and relate them to mechanisms of a number of biomedical sensors.
- Apply basic sensors principles to real world problems in clinical engineering, medical device design, and troubleshoot basic medical instrumentation.

UNIT I


UNIT II


UNIT III


UNIT IV


Text Books:

Reference Books:
3. Biomedical Telemetry – Mackay, Stuart R., John Wiley,

COURSE OUTCOMES:

- You can apply mathematical, computational and experimental methods in solving physical problems. You will be able to evaluate quality of information gathered from varied sources.
- You will be capable of translating scientific knowledge and methods into innovations in materials science, medicine, economics and finance.

NOTE: In the Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, at least one from each unit. All questions carry equal marks.
COURSE OBJECTIVES:
- To understand working principles of various electronic gadgets and consumer products.
- To identify the blocks in the consumer products and operations
- To study the various technical specifications and facilities of the consumer products

UNIT I

Monochrome TV (Picture and Camera Tubes): Monochrome picture tube, beam reflection, Beam focussing, Screen Phosphor, Faceplate, Picture tube characteristics, picture tube circuit controls, Monochrome Camera Tubes: Basic principle, Image Orthicon, Vidicon, Plumbicon

UNIT II
Colour TV Essentials: Compatibility, Colour perception, Three Colour theory, Luminance, Hue and Saturation, Dispersion and Recombination of light, Primary and secondary colours, Luminance signal, Chrominance Signal, Colour picture tube, colour TV Camera, Colour TV display Tubes, colour Signal Transmission, Bandwidth for colour signal transmission, Colour TV controls. Cable TV, Block Diagram and principle of working of cable TV.


UNIT III
LED and DMD: Introduction to LED Television, comparison with LCD and Plasma TV's, schematic of DMD, introduction to Digital MicroMirror device, Diagram of DMD, principle of working, emerging applications of DMD.

Microwave Ovens and Air Conditioners: Microwaves, Transit Time, Magnetron, Waveguides, Microwave Oven, Microwave Cooking. Air conditioning, Components of air conditioning systems, all water Air conditioning systems, all air air conditioning Systems, Split air conditioner.

UNIT IV
Microphones: Introduction, characteristics of microphones, types of microphone: carbon, moving coil, wireless, crystal, introduction to tape recorder.

Loudspeaker: Introduction to ideal and basic loudspeaker, loudspeaker construction types of loudspeaker: Dynamic and permanent magnet, woofers, tweeters, brief introduction to baffles, equalisers.

Text Books:
1. Consumer Electronics by S. P. Bali (Pearson Education)
2. Complete Satellite and Cable TV by R. R. Gulati (New Age International Publishers)

Reference Books:
1. Monochrome and Colour Television by R. R. Gulati

COURSE OUTCOMES:
Students will be familiar with blocks, applications and operation of monochrome TV, colour TV.

NOTE:
In the Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, at least one from each unit. All questions carry equal marks.
EE451B  ENERGY AUDIT

B. Tech Semester – VII (Open Elective)

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Class Work : 25 Marks
Theory : 75 Marks
Total : 100 Marks
Duration of Exam. : 3 Hrs.

COURSE OBJECTIVES:
- Assessing present pattern of energy consumption in different cost centres of operations.
- Relating energy inputs and production output.
- Identifying potential areas of thermal and electrical energy economy.

UNIT I

INTRODUCTION TO THE POWER DISTRIBUTION SYSTEM: Description of the power distribution system - voltage levels, Components of the distribution system - Substation, Transformer, feeders, distribution system planning, operation & maintenance objectives, activities involved in O&M, grid management, load scheduling & dispatch, load balancing, 66-33/11 KV substation equipment, 11/0.4 KV substation equipment, Distribution transformers- reasons for DT failures.

UNIT II

ENERGY ACCOUNTING & ENERGY AUDIT: Need for energy accounting, objectives & functions of energy accounting, Energy flow diagram in power distribution system, energy accounting procedure - Energy measurement, and problems in energy accounting & overcoming these problems in energy accounting, Definition, need and types of energy audit, energy audit instruments, procedure for conducting an energy audit.

UNIT III


UNIT IV

DEMAND SIDE MANAGEMENT: An introduction, Why DSM?, Benefits of DSM, DSM in power systems: load management, DSM techniques and emerging trends, EC Act 2001, DSM on consumer side – the industrial sector, the agricultural sector, the domestic & commercial sectors, ESCO-a route for DSM.

Text Books:

Reference Books:

COURSE OUTCOMES:
- Energy audit increases awareness of energy issues among plant personnel

NOTE:
In the Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, at least one from each unit. All questions carry equal marks.
COURSE OBJECTIVES:

- To study various types of conventional and non-conventional energy resources including solid, liquid and gaseous fuels.

UNIT I

ENERGY SOURCES & AVAILABILITY: World energy situation. Indian energy scenario. Comparative study of thermal, hydro, nuclear and gas power plants. Impact of thermal, gas, hydro and nuclear power stations on environment, air and water pollution, green house effect (global warming), Plasma confinement - magnetic confinement and inertial confinement, geothermal, hydrogen energy, fuel cells, Alkaline fuel cells (AFC), Solid oxide fuel cell (SOFC), Molten carbonate fuel cells (MCFC), thermo-electric power, MHD power generation OTEC & tidal waves.

UNIT II


UNIT III


UNIT IV


Text Books:

Reference Books:

COURSE OUTCOMES:

- Knowledge of solid, liquid and gaseous fuels
- Knowledge of characterization techniques for fuels

NOTE:
In the Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, atleast one from each unit. All questions carry equal marks.
COURSE OBJECTIVES:

- Prepare graduates who can integrate knowledge across biological and computer science disciplines for bioinformatics related careers;
- Develop graduates who are committed for life-long learning, capable of working effectively in teams, and who possess good communication skills;

UNIT I

INTRODUCTION: Internet, intranet and extranet, networking, protocols, genomic data, organization, representation, data base management systems.

SEQUENCING DATA BANK: Introduction, collecting and storing sequence in laboratory, Nucleic acid data bank – Gen Bank, EMBL, AIDS and RNA, protein data bank (PDB), Cambridge Structural Database CSD, genome data bank, hybridoma data bank structure and others.

UNIT II

SEQUENCE ANALYSIS: Analysis tools for sequence data banks, Pair wise alignment: NEEDLEMAN and WUNSCH algorithms, Smith Waterman, Multiple alignment – CLUSTAL-W, BLAST, FASTA, sequence patterns and motifs and profiles.

PREDICTIONS: Secondary and tertiary structure: algorithms Chao-Fasman algorithm, hidden Markov model, neural networking, protein classification, fold libraries, fold recognition (threading), homology detection, SRS-access to biological data banks.

UNIT III

PHYLOGENETIC ANALYSIS: Basic concepts in systematics, taxonomy and phylogeny, phylogenetic trees - various types and their construction, tree building methods, distance methods, multiple alignment character based method, phylogenetic software.

MANAGING SCIENTIFIC DATA: Introduction, challenges faced in integration of biological information, SRS, Kleisli Query System TAMBIS, P/FDM mediator for a bioinformatics database, federation, discovery link and data management.

UNIT IV


Text & Reference Books:

2. Bioinformatics, ed. David W. Mount

COURSE OUTCOMES:

- Integrate and manage data from different genomic and proteomic research
- Develop computational techniques and diversified bioinformatics tools for processing data, including statistical, machine learning and data mining techniques

NOTE:

In the Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, atleast one from each unit. All questions carry equal marks.
COURSE OBJECTIVES:
• Course is designed for emergency services personnel.
• Delegates will be aware of modern vehicle construction, modern materials used in manufacture and active and passive safety systems found in modern vehicles.

UNIT I

UNIT II

UNIT III
NOISE & POLLUTION: Reduction of noise – Internal & external pollution control through alternate fuels / power plants – Catalytic converters and filters for particulate emission.

UNIT IV
VEHICLE OPERATION AND CONTROL: Computer control for pollution and noise control and for fuel economy – Transducers and actuators – Information technology for receiving proper information and operation of the vehicle like optimum speed and direction.


Text Books:

Reference Books:

COURSE OUTCOMES:
• Describe construction, functions and applications of various sensors and actuators used in modern vehicle
• Explain modern Ignition systems of S.I. and C.I Engines
• Explain latest advancement in Engine technology

NOTE:
In the Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, atleast one from each unit. All questions carry equal marks.
CE451B POLLUTION & CONTROL
B. Tech Semester – VII (Open Elective)

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Class Work : 25 Marks
Theory : 75 Marks
Total : 100 Marks
Duration of Exam. : 3 Hrs.

COURSE OBJECTIVES:
- To ensure that the mining entrepreneur will manage the effects of his activity on the environment in such a way that it will mitigate these effects and eventually, when mining ceases, or is suspended for any reason, the area will be left in a state that will satisfy the regulating

UNIT I
WATER POLLUTION: Classification of water pollutants, water characteristics, effluent standards, primary treatment, secondary treatment – aerobic (activated sludge, aerated lagoons, trickling filter, roughing filter, rotating biological contactor) anaerobic (contact process, UASB).

UNIT II
AIR POLLUTION: Classification of air pollutants, Particulates: Physical characteristics, mode of formation, settling properties, Control measures.

UNIT III
SOLID WASTE: Types, sources and properties of solid waste, methods of solid waste treatment and disposal.
SOLID WASTE MANAGEMENT: Generation, Collection and techniques for ultimate disposal, Elementary discussion on resource and energy recovery.

UNIT IV
Elementary treatment of nuclear pollution, metal pollution, noise pollution their effects & control.
TRACE ELEMENT: Mechanism of distribution, essential and non essential elements, trace of element in marin environment, its ecological effects and biological effects.

Text & Reference Books:
2. Metacaf – EDDY – Waste-water engineering revised by George Teholonobus (TMH)

COURSE OUTCOMES:
- Identify sources, types and quantities of pollutants and determine their impact on the environment .
- Recognize and interpret quality parameters of water and air.
- Analyse pollutant transport issues in the environment.

NOTE:
In the Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, at least one from each unit. All questions carry equal marks.
COURSE OBJECTIVES:

- MIS is helpful in controlling costs by giving information about idle time, labour turnover, wastages and losses and surplus capacity.
- By making comparison of actual performance with the standard and budgeted performance, variances are brought to the notice of the management by MIS which can be corrected by taking remedial steps.

UNIT I

FOUNDATIONS:
INFORMATION SYSTEM: Introduction to Information System and MIS, Decision support and decision making systems, systems approach, the systems view of business, Managing the digital firm, Electronic Commerce and Electronic business, DBMS, RDBMS, introduction to Telecommunication and Networks.
I.T. INFRASTRUCTURE: Managing Hardware Assets, Managing Software Assets, Managing Data Resources. Internet and New I.T. Infrastructure.

UNIT II

CONCEPTUAL SYSTEM DESIGN: Define the problems, set systems objective, establish system constraints, determine information needs determine information sources, develop alternative conceptual design and select one document the system concept, and prepare the conceptual design report. Information Systems Security and Control, Ethical and Social Impact of Information Systems.

UNIT III

DETAILED SYSTEM DESIGN: Inform and involve the organization, aim of detailed design, project management of MIS detailed design, identify dominant and trade of criteria, define the sub systems, sketch the detailed operating sub systems and information flow, determine the degree of automation of each operation, inform and involve the organization again, inputs outputs and processing, early system testing, software, hardware and tools propose an organization to operate the system, documentation of detailed design.

UNIT IV

IMPLEMENTATION, EVALUATION AND MAINTENANCE OF THE MIS: Plan the implementation, acquire floor space and plan space layouts, organize for implementation, develop procedures for implementation, train the operating personnel, computer related acquisitions, develop forms for data collection and information dissemination, develop the files test the system, cut-over, document the system, evaluate the MIS control and maintain the system. Pitfalls in MIS development, Redesigning the organization with Information systems, Managing Knowledge Work.

Text Books:

Reference Books:
1. Management Information System; O Brian; TMH
2. Management Information System by Davis Olson Mac Graw Hill

COURSE OUTCOMES:
Students will meet the following learning outcomes.
- Understand and apply core knowledge in Management Information Systems (MIS)
- Identify and analyze requirements for information systems

NOTE:
In the Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, at least one from each unit. All questions carry equal marks.
The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.
IT413B CYBER SECURITY
B. Tech Semester – VII (Open Elective)

L T P Credits
4 - - 4

Class Work : 25 Marks
Theory : 75 Marks
Total : 100 Marks
Duration of Exam. : 3 Hrs.

COURSE OBJECTIVES:

- To guarantee citizens’ operations in cyberspace
- To protect government ICT infrastructures
- To protect the ICT aspect of critical infrastructures

UNIT I


UNIT II


UNIT III

ENTREPRENEURSHIP DEVELOPMENT AND GOVERNMENT: Role of Central Government and State Government in promoting Entrepreneurship - Introduction to various incentives, subsidies and grants - Export Oriented Units - Fiscal and Tax concessions available; Role of Central/State agencies in the Entrepreneurship Development - District Industries Centers (DIC), Small Industries Service Institute (SISI), Entrepreneurship Development Institute of India (EDII), National Institute of Entrepreneurship & Small Business Development (NIESBUD), National Entrepreneurship Development Board (NEDB).

UNIT IV


Text Books:

COURSE OUTCOMES:

- Manage multiple operating systems, systems software, network services and security. Evaluate and compare systems software and emerging technologies.
- Develop solutions for networking and security problems, balancing business concerns, technical issues and security.

NOTE:
In the Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, atleast one from each unit. All questions carry equal marks.
### DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

**DEPARTMENT ELECTIVE I**

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<th>Sr. No</th>
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<th>Course Title</th>
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<tr>
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<td>ECE406B</td>
<td>NEURAL NETWORK &amp; FUZZY LOGIC</td>
<td>3</td>
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<td>2</td>
<td>ECE408B</td>
<td>ELECTRONIC MATERIALS AND NANO TECHNOLOGY</td>
<td>3</td>
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<td>3</td>
<td>ECE410B</td>
<td>BIOMEDICAL ELECTRONICS</td>
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<td>ECE412B</td>
<td>OPTICAL COMMUNICATION</td>
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<td>ECE414B</td>
<td>RADAR AND SONAR ENGINEERING</td>
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**DEPARTMENT ELECTIVE II**

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<td>ECE416B</td>
<td>DIGITAL IMAGE PROCESSING</td>
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<td>2</td>
<td>ECE418B</td>
<td>RELIABILITY ENGINEERING</td>
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<td>ECE420B</td>
<td>TELECOMMUNICATION SWITCHING SYSTEMS</td>
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<td>ECE426B</td>
<td>EMBEDDED SYSTEM DESIGN</td>
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<td>ECE428B</td>
<td>POWER SYSTEM STABILITY AND FACTS</td>
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**Note:**

1. Every student has to participate in the sports activities. Minimum one hour is fixed for sports activities either in the morning or evening. Weightage of Sports is given in General Proficiency Syllabus.
2. The students will be allowed to use non-Programmable Scientific Calculator. However, sharing/exchange of calculator is prohibited in the examination.
3. Electronic Gadgets including Cellular Phones are not allowed in the examination.
4. Project coordinator will be assigned the project (ECE436B) load of, maximum of 2 hrs. per week including his own guiding load of one hr. However, the guiding teacher will be assigned maximum of one period of teaching load irrespective of number of students/groups under him/her. Project involving design, fabrication, testing, computer simulation, case studies etc., which has been commenced by students in VII semester will be completed in VIII semester.
5. For the course ECE438B (Seminar), a student will select a topic from emerging areas of Engineering & Technology and study it independently. Student will give a seminar / talk on the topic.
6. The evaluation of the student for his / her General Fitness for Profession shall be carried out by a team consisting of Dean Faculty of Engineering & Technology, Chairperson of concerned department and external examiner appointed by University.
7. The minimum strength of the students should be 20 to run an elective course.
ECE402B WIRELESS COMMUNICATION SYSTEMS
B. Tech Semester –VIII

L T P Credits
3 1 - 4

Class Work : 25 Marks
Theory : 75 Marks
Total : 100 Marks
Duration of Exam. : 3 Hrs.

COURSE OBJECTIVES:
• To gain an understanding of the principles behind the design of wireless communication systems and technologies.

UNIT I
Introduction to Wireless Communication Systems:
The Cellular Concept-System Design Fundamentals

UNIT II
Mobile Radio Propagation: Large Scale Path Loss :
Mobile Radio Propagation: Small Scale Fading and Multipath:
Small Scale Multipath Propagation, Impulse Response Model of a Multipath Channel, Small Scale Multipath Measurements, Parameters of Mobile Multipath Channels ,Types of Small Scale Fading, Rayleigh and Ricean Distributions.

UNIT III
Equalization and Diversity :
Fundamentals of Equalization, Equalizer in a Communication Receiver, Linear Equalizer, Non Linear Equalization, Diversity Techniques, Rake Receiver, Interleaving
Multiple Access Techniques for Wireless Communication :
Introduction, Frequency Division Multiple Access (FDMA), Time Division Multiple Access (TDMA), Spread Spectrum Multiple Access, Space Division Multiple Access (SDMA), Capacity of Cellular System.

UNIT IV
Wireless Networking :
Introduction to Wireless Networks, Development of Wireless Networks, Traffic Routing in Wireless Networks, Wireless Data Services, Common Channel Signaling, Integrated Services Digital Network (ISDN), Signalling System No.7( SS 7), Personal Communication Services/Networks (PCS/PCN)
Wireless Systems and Standards:
Global System for Mobile (GSM), Gdma Digital Cellular Standard(IS-95), GPRS, EDGE, W-Cdma,Cdma2000

Text Books :

Reference Books:
2. Dr. KamiloFeher "Wireless and Digital Communication," PHI

COURSE OUTCOMES:
A student who successfully completes Wireless Communications will
• Understand the basics of propagation of radio signals
• Understand how radio signals can be used to carry digital information in a spectrally efficient manner.
• Understand how radio signals can be used to carry digital information in a power efficient manner.

NOTE:
In the Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, atleast one from each unit. All questions carry equal marks.
COURSE OBJECTIVES:

- To gain an understanding of communication networks, data transmission, type of data, encoding, signaling, switching and decoding

UNIT I

Data Communication and Networks:
Components, Data Representation, Data Flow, Guided and Unguided Media, Distributed Processing, Network Criteria, Physical Structure, Network Models, Category of Networks

Data and Signals:
Analog and Digital Data, Analog and Digital Signals, Periodic and Non-Periodic Signals, Transmission Impairments - Attenuation, Distortion, Noise, Performance bandwidth, Throughput, Latency, Bandwidth-Delay Product, Jitter

UNIT II

Digital Transmission:
Digital to digital Conversion - Line Coding, Line Coding Schemes, Block Coding, Scrambling, Transmission modes - Parallel Transmission and Serial Transmission

Multiplexing:
Frequency Division Multiplexing, Wavelength division Multiplexing, Synchronous Time division multiplexing, Statistical Time Division multiplexing

UNIT III

Switching:
Circuit Switched Networks - Three Phases, Efficiency Delay, Datagram Networks - Routing table, Efficiency delay, Virtual Circuit Networks - Addressing, Three Phases, Efficiency Delay in Virtual Circuit Networks

Data Link Control:
Framing - Fixed Size Framing, Variable Sized framing, Flow and Error Control - Flow Control, Error Control, Protocols; Noiseless Channels - Simplest protocol, Stop and Wait Protocol, Noisy Channels - Stop and Wait Automatic Repeat Request, Go Back n Automatic Repeat request, Selective Repeat Automatic Repeat request, Piggybacking

UNIT IV

Network Models:
Layered Tasks - Sender, receiver and Carrier, The OSI Model - Layered Architecture, Peer to peer processes, Encapsulation, Layers in the OSI Model - Physical Layer, data Link layer, Network layer, Transport layer, Session layer, Presentation layer, Application layer, Summary of layers, Introduction to TCP-IP and Internet Networking

Wired Lanes-Ethernet:
IEEE Standards - Data Link Layer, Physical layer, Standard Ethernet-Mac Sublayer, Physical layer, Changes in the standard bridged Ethernet, Switched Ethernet, full duplex Ethernet, fast Ethernet-Mac sublayer, Physical layer

Text Books:
1. Data Communication and Networking by Behrouz A. Forouzan (TMH Publication)

Reference Books:
1. Computer Networks by William Stallings

COURSE OUTCOMES:

- Able to describe communication protocols and layered network architectures.
- Able to explain conventional computer system interfacing standards and peer to peer data link communication protocols.
- Able to design basic network systems and various components in a data communication system.

NOTE:
In the Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, at least one from each unit. All questions carry equal marks.
COURSE OBJECTIVES:

- To gain practical knowledge and realize importance of Various network topologies in LAN
- To analyze multiplexing, modulation and interfacing techniques used in communication networks

LIST OF EXPERIMENTS:

1. To study different types of transmission media
2. To study Quadrature Phase Shift Keying Modulation.
3. To study Quadrature Amplitude Modulation.
4. To Study 16 Quadrature Amplitude Multiplexing.
6. To study the Parallel Interface Centronics and its applications.
7. To configure the modem of a computer.
8. To make inter-connections in cables for data communication in LAN.
9. To install LAN using Tree topology.
10. To install LAN using STAR topology.
11. To install LAN using Bus topology.
12. To install LAN using Token-Ring topology
13. To install WIN NT
14. To configure a HUB/Switch.

COURSE OUTCOMES:

- Able to Design and complete analysis of network topologies
- Able to Design Modulation format analysis and multiplexing implementation

Note:-

1. Total ten experiments are to be performed in the semester
2. At least seven experiments should be performed from the above list. Remaining three experiments should be performed as designed and set by the concerned institution as per the scope of the syllabus.
The project started in VII Semester will be completed in VIII Semester and will be evaluated through a panel of examiners consisting of the following:

- Head/ Chairperson of Department : Chairperson
- Project coordinator : Member
- External examiner : To be appointed by the University

The student will be required to submit two copies of his/her project report to the department for record (one copy each for the department and participating teacher).

Project coordinator will be assigned the project load of, maximum of 2 hrs. per week including his own guiding load of one hr. However, the guiding teacher will be assigned maximum of one period of teaching load irrespective of number of students/groups under him/her.

The format of the cover page and the organization of the body of the report for all the B.Tech. will be finalized and circulated by the Dean, Faculty of Engineering and Technology.
COURSE OBJECTIVES:

- To learn how to carry out literature search
- To learn the art of technical report writing
- To learn the art of verbal communication with the help of modern presentation techniques

A student will select a topic in emerging areas of Engineering & Technology and will carry out the task under the observation of a teacher assigned by the department.

He/She will give a seminar talk on the same before a committee constituted by the chairperson the department. The committee should comprise of three faculty members from different specializations. The teacher associated in the committee will be assigned 2 hours teaching load per week.

However, guiding students' seminar will not be considered towards teaching load.

The format of the cover page and the organization of the body of the seminar report for all the undergraduate programs will be finalized and circulated by the Dean, Faculty of Engineering and Technology.

COURSE OUTCOMES:

- After completing the course, Student will able to enhance their communication skills and presentation skills which increase their soft skills.
The purpose of this course is to inculcate a sense of professionalism in a student along with personality development in terms of quality such as receiving, responding, temperament, attitude and outlook. The student efforts will be evaluated on the basis of his/her performance / achievements in different walks of life.

The evaluation will be made by the committee of examiners constituted as under:

1. Dean, Faculty of Engineering & Technology/ Director /Principal of affiliated college: Chairperson
2. Chairperson of the department: Member
3. External expert: Appointed by the university

A. The student will present a written report before the committee with following in view:

The student will present before the committee his/her achievements during the current academic session in the form of a written report highlighting followings:

I. Academic Performance
II. Extra Curricular Activities / Community Service, Hostel Activities (12 Marks)
III. Technical Activities / Industrial, Educational tour (12 Marks)
IV. Sports/games (16 Marks)

Note: Report submitted by the students should be typed on both sides of the paper.

B. A student will support his/her achievement and verbal & communicative skill through presentation before the examiners. (40 Marks)

C. Faculty Counselor Assignment (20 Marks)

It will be the duty of the student to get evaluated by respective faculty counselor and to submit the counselor assessment marks in a sealed envelope to the committee.

A counselor will assess the student which reflects his/her learning graph including followings:
1. Discipline throughout the year
2. Sincerity towards study
3. How quickly the student assimilates professional value system etc.
4. Moral values & Ethics- Syllabus (one lecture/week on the topics of Human values/Ethics is to be delivered)
COURSE OBJECTIVE:

- To cater the knowledge of Neural Networks and Fuzzy Logic Control and use
- These for controlling real time systems.

UNIT I
NEURO-FUZZY TECHNIQUES:
Neuro-fuzzy techniques, need of neuro-fuzzy techniques, Neural and fuzzy intelligence, fuzziness vs Multivalence: the dynamical systems to machine intelligence.

NEURAL NETWORKS:

UNIT II
NEURAL NETWORKS MODELS & RULES:
Feed forward network, feedback network, Supervised, Unsupervised, Re-enforcement learning. Knowledge, representation and acquisition. Basic Hop field model, Types of learning, Hebbian learning, Perception learning, Delta learning, Window–Hoff Learning correlation Learning, Winner-Take-all learning rule

ARTIFICIAL NEURAL NETWORKS & APPLICATIONS:
Radial basis function neural networks, Basic learning laws in RBF nets, Recurrent back propagation, Introduction to counter propagation networks, ART networks, Associative Memories, Applications such as pattern recognition, speech and decision-making.

UNIT III
FUZZY LOGIC:

FUZZY SYSTEM:
Fuzzy system, Fuzzy Inference System, De-Fuzzification.

UNIT IV
APPLICATIONS OF FUZZY LOGIC:
Application of Fuzzy logic: Industrial automation, energy saving AC control, washing machines, automatic target tracking, ABS system, Traffic light controller.

NEURO-FUZZY SYSTEM:
Introduction, combining fuzzy system with neural network, properties of Neuro-Fuzzy system, Neuro-Fuzzy architecture, applications.

Reference Books:
1. B. Yegnanarayana, "Artificial Neural Networks" PHI
3. ROSS J.T., "Fuzzy logic with engineering application", TMH
4. Simon Haykin, "Neural Networks", PHI
5. Ahmad M.Ibrahim, "Introduction to applied Fuzzy Electronics", (PHI)

COURSE OUTCOMES:

- To expose the students to the concepts of feed forward neural networks.
- To provide adequate knowledge about feedback neural networks.
- To teach about the concept of fuzziness involved in various systems.

NOTE:
In the Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, at least one from each unit. All questions carry equal marks.
ECE408B  ELECTRONIC MATERIALS AND NANOTECHNOLOGY
B. Tech Semester –VIII (Elective I)

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<td>25Marks</td>
<td>75Marks</td>
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COURSE OBJECTIVE:

- The course is intended to cover the two groups of synthesis of nanostructure namely top-down and bottom-up approach various synthesis methods, including biological methods, advantages and disadvantages etc..

UNIT I

INTRODUCTION TO ELECTRONIC MATERIALS:
Thermodynamics of Materials; Mechanical Properties of Materials; Bonding, Structure and Crystallography; Advanced Fluid-Solid Reaction Engineering; Microstructural and Microchemical Characterization of Materials.

MATERIAL BASICS:
Ohms Law and Materials Properties; The Hall Effect; Conductors – Metals, Alloys, Non-metallic Conductors; Contacts, Resistors and Heating; Thermionic Emission, Tunneling, Thermoelectric Effects; Ionic conductors: Debye Length, Nernst Equation.

UNIT II

INTRODUCTION TO DIELECTRICS:
Dielectrics – Mechanisms of Polarization; Frequency dependence of Dielectric constants; Dielectric Losses; Mechanisms of Electrical Breakdown; Piezo-electricity; Ferro-electricity; Dielectrics and Optics.

BASICS OF MAGNETICS:
Magnetics – Origin of Magnetic dipoles; Types of Magnetisms: Diamagnetism, Para-magnetism and Ferro-magnetism; Magnetic data storage.

UNIT III

ADVANCED MATERIALS:
MEMS; NEMS; CNTS; Novel semiconductors; Photovoltaic materials.

MATERIALS FOR IC FABRICATION:
Materials and Processes for Silicon Technology; Si Oxide, LOCOS Process; Chemical Vapor Deposition: Silicon Epitaxy, Oxide CVD, CVD for Poly-Silicon, Silicon Nitride and Miscellaneous Materials; Etching Techniques: Chemical Etching, Plasma Etching; Lithography: Basic Lithography Techniques, Resist and Steppers; Electrochemistry of Silicon.

UNIT IV

ELECTRONIC DEVICES:
Electronic Device Components: Wires & Cables, Semiconductors, Capacitors, PCBs, MEMS, Battery, CD-R, EMI/RFI, ITO, Electro-wetting, LCD & LED, CDs and DVDs.

NANOTECHNOLOGY IN ELECTRONICS:
Nanotechnology in Electronics: Magnetoresistive Random Access Memory (MRAM); Self-assembled nanostructures; Nano-photonics; Nano-ions; Molecular electronics; Nanomaterials electronics; Nanofabrication.

Reference Books:

COURSE OUTCOMES:
- The students will be exposed to various structure specific synthesis methods, their advantages etc.
- To know Top-down to Bottom up approach techniques
- To optimize the methods for specific material application

NOTE:
In the Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, at least one from each unit. All questions carry equal marks.
COURSE OBJECTIVES:

- Cardiovascular, respiratory, nervous system understanding through electronic circuits.

UNIT I

Electrodes, Sensors and Transducers:
Signal Acquisition, Transduction, Active v/s Passive sensors, Sensor error sources, sensor terminology, signal processing, electrodes for biophysical sensing, medical surface electrodes, microelectrodes, different types of transducers.

Electrocardiography:
Generation of electric currents in heart, ECG waveform, standard lead system, ECG preamplifier, ECG readout devices, ECG machines, ECG machine maintenance, faults and troubleshooting.

UNIT II

Cardiovascular Measurements and Devices:
Physiological pressure measurements, B.P. measurements, Oscilometric and Ultrasonic non-invasive pressure measurements, pressure transducers, pressure amplifiers, calibrations methods, detector circuits, dilution methods, blood flow measurements. Introduction to plethysmography, phonocardiograph, defibrillators, pacemakers, heart lung machine.

Respiratory System Measurements and Devices:
Human respiratory system, gas laws, internal respiration, external respiration, mechanics of breathing, parameters and regulations of respiration, respiratory transducers, medical gases, introduction to spirometer and artificial ventilators.

UNIT III

Nervous System Measurements and Devices:
Organization of Human nervous system, cerebral angiography, cranial X-rays, brain scans, system preamplifier and specifications of EEG, EEG electrodes, EEG telemetry system, typical EEG system artifacts, faults, trouble shooting and maintenance.

ICUs, CCUs and Operating Rooms (Ors):
ICU/CCU equipments, Bedside monitors, central monitoring consoles, ECG and physiological telemetry, types of surgery, OR personal, sterilization, OR equipments.

UNIT IV

Medical Laboratory Instrumentation:
Blood tests, Colorimeter, flame photometer, spectrophotometer, blood cell counters, pH and blood gas analyzers, auto analyzer, dialysis machine, Electrical safety precautions, typical faults.

Medical Imaging Equipments:
Basic Principles and working of various medical imaging modality: X-ray, CT Scan, MRI, PET Scan, Ultrasonography, color Doppler, Echocardiography, nuclear medical imaging.

Reference Books:
1. Introduction to Biomedical Equipments Technology by Carr& Brown, Pearson Education.
2. Biomedical Instrumentation and Measurements by Cromwell et al, Pearson Education.

COURSE OUTCOMES:

- Apply knowledge of engineering and science to understand the principle of biomedical electronic circuits. Understand how to apply, measure circuit performance, and solve problems in the areas of biomedical signals.
- Work in Multi-disciplinary teams: Learn to work and communicate effectively with peers on multi-disciplinary teams to attain a common goal

NOTE:
In the Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, at least one from each unit. All questions carry equal marks.
COURSE OBJECTIVES:
This course contributes to the following Program Learning Outcomes:

- In-depth understanding of specialist bodies of knowledge within the engineering discipline.
- Application of established engineering methods to complex engineering problem solving.
- Fluent application of engineering techniques, tools and resources

UNIT I
Introduction to Optical communication System:
Electromagnetic Spectrum used for optical communication, Block Diagram of optical Communication System, Basics of transmission of light rays, Advantages of optical fiber communication
Structure of Optical Fibers:
Step Index Fibers, Graded index Fibers, Single mode fibers (Cut off wavelength, Mode field Diameter, Effective Refractive index), MultiMode fibers

UNIT II
Attenuation:
Material losses in Silica Glass Fibers (Intrinsic and Extrinsic), Linear Scattering losses (Rayleigh Scattering, Mie scattering), Non Linear scattering losses (SBS, SRS), Fiber Bend loss
Dispersion:
Chromatic Dispersion (Material Dispersion, Waveguide Dispersion), InterModal Dispersion (MultiMode Step index fiber, MultiMode Graded Index fiber), Dispersion Modified single mode fibers (Dispersion Shifted and Dispersion Flattened Fibers)

UNIT III
Optical Fiber Connections:
Fiber alignment and joint loss (Multimode, Single mode), Fiber Splices (Fusion), fiber Couplers (Three and Four port Couplers)

Optical Sources (LED):
Introduction to absorption and Emission Of radiation, Characteristics of Optical sources, LED power and Efficiency, LED Structures (Surface and Edge Emitting), LED Characteristics (Optical O/P power, O/P Spectrum, Modulation Bandwidth)

UNIT IV
Optical Sources (LASER):
Optical Detectors:
Introduction, Quantum Efficiency, Responsivity, Long wavelength cut off, P-I-N photodiode, Avalanche Photodiode, Benefits and drawbacks of Avalanche photodiodes, Multiplication Factor

Text Books:
1. Fiber Communication By JOHN M. SENIOR (Pearson Education).

Reference Books:
1. Optical Communication By G. Keiser (Tata Mc Graw Hill)
2. Essentials of Modern optical Fiber Communication By REINHOLD NOE (Springer)
3. Fiber Optic Communication By Palais (Pearson)

COURSE OUTCOMES:
- Analyse the performance of both digital and analogue optical fibre systems.
- Calculate the system bandwidth, noise, probability of error and maximum usable bit rate of a digital fibresystem.
- Calculate the system link loss, distortion and dynamic range of an RF photonic link

NOTE:
In the Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, atleast one from each unit. All questions carry equal marks.
COURSE OBJECTIVE-

- The Course aims at developing core knowledge of RADAR AND SONAR engineering among students. The most important area i.e. different types of RADAR and their working will be explained.

UNIT I

INTRODUCTION TO RADAR:
Radar Block Diagram & operation, Radar Frequencies, Radar development, Application of Radar.

RADAR EQUATION:

UNIT II

CW & FREQUENCY MODULATED RADAR:
The Doppler effect, CW Radar, Frequency-modulated CW Radar, Multiple Frequency CW Radar.

MTI & PULSE DOPPLER RADAR:
Introduction, Delay Line Cancellors, Multiple or staggered, Pulse repetition frequencies, range-Gated Doppler Filters, Digital Signal Processing, Other MTI delay line, Limitation of MTI performance, Noncoherent MTI, Pulse Doppler Radar, MTI from a moving platform.

UNIT III

TRACKING RADAR:
Tracking with Radar, Sequential Lobbing, Conical Scan, Monopulse Tracking Radar, Tracking in range, Acquisition.

RECEIVERS, DISPLAYS & DUMPLEXERS:
Radar Receivers, Noise Figure, Mixer, Low-noise Front ends, Displays, Duplexer, Receiver protectors.

UNIT IV

INTRODUCTION TO SONAR:
History of sonar, underwater propagation: sound velocity profile, propagation mode, multipaths; Types of sonar system: active, generic active and passive.

SONAR PARAMETERS:
Basic Types of noise in sonar system, Detection of acoustic energy using sonar: detection criterion, sonar system performance, figure of merit; Sonar transducers.

Text Books:
1. Introduction to Radar Systems: Merrill I. Skolnik, ; MGH

Reference Books:
1. Electronic Communication Systems : Kennedy; TMH

COURSE OUTCOMES

- After the completion of the course student will be able to have in depth knowledge of all said technologies which will be utilized in later part of engineering education.

NOTE:
In the Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, at least one from each unit. All questions carry equal marks.
ECE416B

DIGITAL IMAGE PROCESSING

B. Tech Semester –VIII (Elective II)

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Class Work: 25 Marks
Theory: 75 Marks
Total: 100 Marks
Duration of Exam.: 3 Hrs.

COURSE OBJECTIVES:
- The fundamentals of digital image processing and algorithms that are used. Useful skill base that would allow them to carry out further study should they be interested and to work in the field

UNIT I

Introduction to Digital Image processing:
Development of Digital Image processing, Components of an Image Processing System, Fundamental steps in Image Processing, Different Levels of Processing, Lower Level Processing Techniques, Applications of Image Processing

Introduction to Image Acquisition:
Capturing Devices, Light and the Electromagnetic Spectrum, Image Sensing and Acquisition: Image Acquisition using a single sensor, Image Acquisition using sensor strips, Image Acquisition using sensor arrays, A simple Image formation model.

UNIT II

Elements of Visual Perception:
Structure of the Human Eye, Image Formation in Eye, Brightness Adaptation and Discrimination.

Image Digitization and Pixels:
Basic Concepts in sampling and quantization, Representing Digital Images, Spatial and Intensity Resolution, Image Interpolation, Some Basic Relationships between pixels: Neighbours of a Pixel, Adjacency, Connectivity, Regions, and Boundaries, Distance Measures.

UNIT III

Image processing tools:

Image Transforms & Image Registration:
Unitary Transforms: Separable Unitary Transforms, Basis Images, Orthogonal Transforms, Basic Information Theory; Fourier Transform, Discrete Fourier Transform, Properties of Fourier Transform, Convolution & Correlation, Convolution in Frequency domain.


UNIT IV

Image Enhancement in Spatial Domain:
Pixel Grey Level Transformation: Linear & Nonlinear Transformations, Grey Level Slicing, Bit-Plane Slicing, Image Averaging; Mask Based Processing; Smoothing Linear filter, Geometric Mean Filter, Harmonic Mean Filter, Median Filter, Max & Min Filters, Sharpening Filters, Image blurring and deblurring; Histogram Processing: Histogram Equalization, Contrast Stretching.

Image Enhancement in Frequency Domain:

Text Books:

Reference Books:

COURSE OUTCOMES:
- To acquire the fundamental concepts of a digital image processing system
- To identify and exploit analogies between the mathematical tools used for 1D and 2D signal analysis and processing
- To analyze 2D signals in the frequency domain through the Fourier transform

NOTE:
In the Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, at least one from each unit. All questions carry equal marks.
COURSE OBJECTIVES:

- Apply engineering knowledge to reduce likelihood or frequency of failures
- Identify and correct causes of failures
- Analyzing reliability data

UNIT I

Introduction:

Reliability in Systems:

UNIT II

Reliability Prediction:
Objective of reliability Prediction, Classification, information sources for failure rate data, prediction methodologies, general requirement, role and limitations of reliability prediction.

Reliability Allocation:
Subsystems reliability improvement, Apportionment for new units, criticality.

UNIT III

Redundancy Techniques for reliability:
Forms of maintenance, measures of maintainability and availability, maintainability function, availability function, two unit parallel system with repair, Markov model for two unit systems, preventive maintenance, provisioning of spares.

Reliability Testing:
Kinds of testing, component reliability measurements parametric methods, confidence limits, accelerate testing, equipment acceptance testing.

UNIT IV

Economics of Reliability Engineering:
Reliability cost, effect of reliability on cost. Reliability achievement cost models, reliability utility cost models, replacement policies.

Integrated performance measures for communication systems:
Integration of reliability and capacity, Delay related reliability.

Text Books:

Reference Books:
1. KB Mishra: Reliability Prediction & Analysis: A Methodology oriented treatment, Elsevier, Netherlands
2. Ebeling, “Introduction to Reliability & Maintainability”, TMH

COURSE OUTCOMES:

- Summarize reliability engineering and its management throughout the product life cycle.
- Perform reliability engineering analysis.
- Compare the characteristics and differences in common Life Testing methodologies

NOTE:
In the Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, at least one from each unit. All questions carry equal marks.
ECE420B TELECOMMUNICATION SWITCHING SYSTEM
B. Tech Semester – VIII (Elective II)

L T P Credits
4 - - 4

Class Work : 25 Marks
Theory : 75 Marks
Total : 100 Marks
Duration of Exam. : 3 Hrs.

COURSE OBJECTIVES:
- To introduce to students the latest development of Telecommunication systems
- To provide an introduction to, and an understanding of the architecture and major design issues relating to switching systems.

UNIT I

EVOLUTION OF SWITCHING SYSTEM:

CROSSBAR SWITCHING SYSTEM:
Introduction, Principle of Common Control, Touch Tone Dial Telephone, Crossbar Switch Mechanism, Principle of Crossbar Switching, Crossbar Switch Configurations, Organisation of a Crossbar Telephone Switch, A General Trunking, Electronic Switching, Classification Crosspoint Technology

UNIT II

SPACE DIVISION SWITCHING:
Stored Program control, Centralised SPC, Distributed SPC, Software Architecture, Application software, Enhanced Services, Two Stage Networks, n-Stage Networks.

TIME DIVISION SWITCHING:
Introduction, Analog Time Division Switching, Digital Time Division Switching, A Digital Memory Switch, Time Stages in General, Two-Dimensional Switching, Multiple Stage Time and Space Switching

UNIT III

PACKET SWITCHING:
Statistical Multiplexing, Local area & wide area networks, Large Scale Networks, Broadband Networks

TELETRAFFIC ENGINEERING:

UNIT IV

CONTROL OF SWITCHING SYSTEMS:
Call Processing functions, common control, Reliability, Availability & Security.

SIGNALLING:
Customer Line Signalling, Audio frequency junctions & trunk circuits, FDM carrier Systems, PCM signalling, Inter – register signalling, Common channel Signalling Principles.

Text Books:
1. Thiagarajan Viswanathan, “Telecommunication Switching Systems and Networks”, PHI

Reference Books:

COURSE OUTCOMES:
After completing this course the students will have the ability to:
- Understand the need for switching systems and their evolution from analogue to digital.
- Understand the Public Switched Telephone Network

NOTE:
In the Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, atleast one from each unit. All questions carry equal marks.
COURSE OBJECTIVES:

- To teach students all aspects of the design and development of an embedded system, including hardware and embedded software development. The course utilizes and applies the skills and knowledge students have gained throughout their prior undergraduate curriculum. Individual (rather than team) lab assignments ensure that each student is able to apply engineering theory to real world designs.

UNIT I

INTRODUCTION OF EMBEDDED SYSTEMS DESIGN:

AVR MICROCONTROLLER:
Introduction to AVR microcontroller, features of AVR family microcontrollers, different types of AVR microcontroller, architecture, memory access and instruction execution, pipelining, program memory considerations, addressing modes, CPU registers, Instruction set, and simple operations.

UNIT II

FEATURES OF AVR MICROCONTROLLER:
Timer: Control Word, mode of timers, simple programming, generation of square wave, Interrupts: Introduction, Control word Simple Programming, generation of waveforms using interrupt, serial interface using interrupt.

SPECIAL FEATURES OF AVR MICROCONTROLLER:
Watch-dog timer, Power-down modes of AVR microcontroller, UART, SRAM.

UNIT III

APPLICATIONS BASED ON AVR MICROCONTROLLER:
Applications based on RF Card, Graphical LCD, Color LCD, Zigbee, DTMF, GSM, GPS, Smart Card, RF ID, Touch Screen, Bluetooth.

COMMUNICATION INTERFACE WITH AVR MICROCONTROLLER:
RS-232, RS-485, SPI, IIC, ISA, CAN.

UNIT IV

SOFTWARE REQUIREMENTS FOR EMBEDDED SYSTEMS DESIGN:
Assemblers, Compilers, Linkers, Loaders, Debuggers, Profilers and Test Coverage Tools Utilities like make, ranlib, obj copy and obj dump, Configuring and Building GNU Cross-Tool chain Building RTOS / EOS Image for Target Hardware.

OPERATING SYSTEM FOR EMBEDDED SYSTEM:
Embedded Operating Systems, Real Time Operating System (RTOS), Writing Time and Space Sensitive Programs, Writing Device Drivers, Interrupt Handling in C, Combining C with Assembly.

Text Books:

COURSE OUTCOMES:

- An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability

NOTE:
In the Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, at least one from each unit. All questions carry equal marks.
COURSE OBJECTIVES:
- The aim of this course is to give basic concepts for power system stability and control, and modeling of basic components of the system.
- To determine criteria for load-frequency and automatic generation control in power system.

UNIT I
POWER SYSTEM STABILITY PROBLEM:
Rotor angle stability, voltage stability, short term and long term stabilities, swing equation and its solution techniques.

SYNCHRONOUS MACHINES AND ITS MODELLING:
Power transformation, flux linkage equations, voltage equation, formulation using state-space equations, normalizing voltage and torque eqns., equivalent circuit of synchronous m/c, the flux linkage state-space model. Linearization of the flux linkage model, Simplified linear model block diagram, state-space representation of simplified model.

UNIT II
DYNAMIC STABILITY:
State-space representation, stability of a dynamic system, analysis of stability, Eigen properties of the state matrix, Small signal stability of a single m/c infinite bus system, Effect of excitation systems, power system stabilizer, system state matrix with armature winding.

TRANSIENT STABILITY:
An elementary view of transient stability, numerical integration methods, simulation of power system dynamic response.

UNIT III
VOLTAGE STABILITY:
Basic concept related o voltage stability, voltage collapse, voltage stability analysis, prevention of voltage collapse.

FLEXIBLE AC TRANSMISSION SYSTEM:
FACTS definitions, review of FACTS devices, series compensation in transmission systems, cascade connection of components-shunt and series compensation.

UNIT IV
SUB-SYNCHRONOUS OSCILLATORS:
Turbine generator torsional characteristics, characteristics of series capacitor compensated transmission system, Self excitation, torsional interaction, counter measure to SSR problems, ferro resonance.

FACTS DEVICES:
Series connected controllers- inter line power flow controller(IPFC), thyristor controlled series capacitor(TSSC), thyristor controlled series reactor(TCSR), thyristor switch series reactor(TSSR).Shunt connected controllers- static synchronous compensator(STATCOM), static synchronous generator(STATS), battery energy storage system(BESS), super conducting magnetic energy storage(SMES), static VAR compensator(SVC), thyristor controlled reactor(TCR), thyristor switched reactor(TSR), thyristor switched capacitor(TSC), static VAR generator or absorber, static VAR system(SVS), thyristor controlled braking resistor(TCBR),Combined series-shunt connected controllers- unified power flow controllers(UPFC), thyristor controlled phase shifting transformer(TCPST), interphase power controller(IPC),Combined series-series controllers.

Text Books:
1. Power System Stability and Control by Prabha Kumar: MGH
2. Power System Control and Stability by Anderson and Fouad: Galgotia Publications

Reference Books:
1. Extra high voltage AC Transmission Engg. By Rokosh Das Begamudre
2. Electrical energy theory: An Introduction by O.I. Elgerd: TMH

COURSE OUTCOMES:
- To learn power system stability and control concepts
- To model basic components of the power system

NOTE:
In the Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, atleast one from each unit. All questions carry equal marks.
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<th>Total number of contact hours</th>
<th>Total Number of credits</th>
<th>POs</th>
<th>PEOs</th>
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<td>PRINCIPLES OF ELECTRICAL ENGINEERING</td>
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<td>BASICS OF BIO TECHNOLOGY</td>
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The table above represents the course components, curriculum content, and their respective credits. The columns for PEs and PEOs indicate their relevance and focus areas.
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