ACADEMIC REGULATIONS
COURSE STRUCTURE
AND
DETAILED SYLLABUS

CHOICE BASED CREDIT SYSTEM

MLR17

ELECTRICAL AND ELECTRONICS ENGINEERING

for

Bachelor of Technology (B.Tech)

B. Tech. - Regular Four Year Degree Course
(For batches admitted from the academic year 2017 - 2018)
&
B. Tech. - Lateral Entry Scheme
(For batches admitted from the academic year 2018 - 2019)

MARRI LAXMAN REDDY
GROUP OF INSTITUTIONS

MLR Institute of Technology

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FOREWORD

The autonomy is conferred on MLR Institute of Technology by UGC, based on its performance as well as future commitment and competency to impart quality education. It is a mark of its ability to function independently in accordance with the set norms of the monitoring bodies like UGC and AICTE. It reflects the confidence of the UGC in the autonomous institution to uphold and maintain standards it expects to deliver on its own behalf and thus awards degrees on behalf of the college. Thus, an autonomous institution is given the freedom to have its own **curriculum, examination system and monitoring mechanism**, independent of the affiliating University but under its observance.

MLR Institute of Technology is proud to win the credence of all the above bodies monitoring the quality in education and has gladly accepted the responsibility of sustaining, if not improving upon the standards and ethics for which it has been striving for more than a decade in reaching its present standing in the arena of contemporary technical education. As a follow up, statutory bodies like Academic Council and Boards of Studies are constituted with the guidance of the Governing Body of the College and recommendations of the JNTU Hyderabad to frame the regulations, course structure and syllabi under autonomous status.

The autonomous regulations, course structure and syllabi have been prepared after prolonged and detailed interaction with several expertise solicited from academics, industry and research, in accordance with the vision and mission of the college in order to produce quality engineering graduates to the society.

All the faculty, parents and students are requested to go through all the rules and regulations carefully. Any clarifications, if needed, are to be sought, at appropriate time with principal of the college, without presumptions, to avoid unwanted subsequent inconveniences and embarrassments. The Cooperation of all the stake holders is sought for the successful implementation of the autonomous system in the larger interests of the college and brighter prospects of engineering graduates.

PRINCIPAL

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B. Tech. - Regular Four Year Degree Program
(For batches admitted from the academic year 2016 - 17)
&
B. Tech. - Lateral Entry Scheme
(For batches admitted from the academic year 2017 - 18)

For pursuing four year under graduate Bachelor Degree Programme of study in Engineering (B.Tech) offered by MLR Institute of Technology under Autonomous status is herein referred to as MLRIT (Autonomous):

All the rules specified herein approved by the Academic Council will be in force and applicable to students admitted from the Academic Year 2016-17 onwards. Any reference to "Institute" or "College" in these rules and regulations shall stand for M L R Institute of Technology (Autonomous).

All the rules and regulations, specified hereafter shall be read as a whole for the purpose of interpretation as and when a doubt arises, the interpretation of the Chairman, Academic Council is final. As per the requirements of statutory bodies, the Principal, M L R Institute of Technology shall be the chairman Academic Council.

1. ADMISSION

1.1. Admission into first year of four year B. Tech. degree Program of study in Engineering:

1.1.1. Eligibility:

A candidate seeking admission into the first year of four year B. Tech. degree Program should have:

(i) Passed either Intermediate Public Examination (I.P.E) conducted by the Board of Intermediate Education, Telangana, with Mathematics, Physics and Chemistry as optional subjects or any equivalent examination recognized by Board of Intermediate Education, Telangana or a Diploma in Engineering in the relevant branch conducted by the Board of Technical Education, Telangana or equivalent Diploma recognized by Board of Technical Education for admission as per guidelines defined by the Regulatory bodies of Telangana State Council for Higher Education (TSCHE) and AICTE.

(ii) Secured a rank in the EAMCET examination conducted by TSCHE for allotment of a seat by the Convener, EAMCET, for admission.

1.1.2. Admission Procedure:

Admissions are made into the first year of four year B. Tech. Degree Program as per the stipulations of the TSCHE.

(a) Category A seats are filled by the Convener, EAMCET.

(b) Category B seats are filled by the Management.

1.2. Admission into the second year of four year B. Tech. degree Program in Engineering

1.2.1 Eligibility:

A candidate seeking admission under lateral entry into the II year I Semester B. Tech. degree Program should have passed the qualifying exam (B.Sc. Mathematics or Diploma in concerned course) and based on the rank secured by the candidate at Engineering Common Entrance Test ECET (FDH) in accordance with the instructions received from the Convener, ECET and Government of Telangana.

1.2.2 Admission Procedure:

Admissions are made into the II year of four year B. Tech. degree Program through Convener, ECET (FDH) against the sanctioned strength in each Program of study as lateral entry students.

2. PROGRAMS OFFERED

MLR Institute of Technology, an autonomous college affiliated to JNTUH, offers the following B. Tech. Programs of study leading to the award of B. Tech. degree under the autonomous scheme.

1) B.Tech.- Aeronautical Engineering
2) B.Tech. - Computer Science and Engineering
3) B.Tech. - Electronics and Communication Engineering
4) B.Tech. - Information Technology
5) B.Tech. - Mechanical Engineering

3. DURATION OF THE PROGRAMS

3.1 Normal Duration

3.1.1 B. Tech. degree program extends over a period of four academic years leading to the Degree of Bachelor of Technology (B.Tech.) of the Jawaharlal Nehru Technological University Hyderabad.

3.1.2 For students admitted under lateral entry scheme, B. Tech. degree program extends over a period of three academic years leading to the Degree of Bachelor of Technology (B. Tech.) of the Jawaharlal Nehru Technological University Hyderabad.

3.2 Maximum Duration

3.2.1 The maximum period within which a student must complete a full-time academic program is 8 years for B. Tech. If a student fails to complete the academic program within the maximum duration as specified above, he shall forfeit the seat in B.Tech and his admission shall stand cancelled.

3.2.2 For students admitted under lateral entry scheme in B. Tech. degree program, the maximum period within which a student must complete a full-time academic program is 6 years. If a student fails to complete the academic program within the maximum duration as specified above, he shall forfeit the seat in B.Tech and his admission shall stand cancelled.

3.2.3 The period is reckoned from the academic year in which the student is admitted first time into the degree Program.

4. AWARD OF B.Tech. DEGREE

A student will be declared eligible for the award of the B. Tech. degree if he/she fulfils the following academic regulations:

4.1 The candidate shall pursue a course of study for not less than four academic years and not more than eight years.

4.2 The candidate shall register for 176 credits and secure 176 credits.

5. PROGRAMME STRUCTURE

5.1 UGC/AICTE specified Definitions/ Descriptions are adopted appropriately for various terms and abbreviations used in these Academic Regulations/ Norms, which are listed below.

Semester Scheme:

Each UGP is of 4 Academic Years (8 Semesters), each year divided into two semesters of 23 weeks (≥90 working days), each Semester having - 'Continuous Internal Evaluation (CIE)' and 'Semester End Examination (SEE)'. Choice Based Credit System (CBCS) and Credit Based Semester System (CBSS) as denoted by UGC, and Curriculum/Course Structure as suggested by AICTE are followed.

5.1.2 The B.Tech. Programmes of MLR Institute of Technology are of semester pattern, with 8 Semesters constituting 4 Academic Years, each Academic Year having TWO Semesters (First/Odd and Second/Even Semesters). Each Semester shall be of 22 Weeks duration (inclusive of Examinations), with a minimum of 90 Instructional Days per Semester.

5.1.3 Credit Courses:

a) All Subjects/ Courses are to be registered by a student in a Semester to earn Credits. Credits shall be assigned to each Subject/ Course in a L: T: P: C (Lecture Periods: Tutorial Periods: Practical Periods : Credits) Structure, based on the following general pattern ..

- One Credit - for One hour/Week/Semester for Theory/Lecture (L) Courses; and
- One Credit - for Two hours/Week/Semester for Laboratory/Practical (P) Courses, Mini Project...

Mandatory Courses like Technical seminars/Micro Project/EPICS/Certification Courses, Computational Mathematics (FOSS), Study Tour, Guest Lecture, Tutorials, etc., will not carry any Credits

b) Contact Hours: Every student has to register for a set of course (subject) in each semester, with the total number of credits being limited by considering the permissible weekly contact hours - typically equal to 33 hours per week or equal to 40 periods per week (i.e. 1 hour = 60 Minutes & 1 period = 50 Minutes); for this an average course load of 22 credits per semester including Mandatory Non-Credit courses also in some semester.

5.1.4 **Subject/ Course Classification:**

All Subjects/ Courses offered for the UGP are broadly classified as: (a) Foundation Courses (FnC), (b) Core Courses (CoC), and (c) Elective Courses (EℓC).

- Foundation Courses (FnC) are further categorized as: (i) H&S (Humanities and Social Sciences), (ii) BS (Basic Sciences), and (iii) ES (Engineering Sciences);
- Core Courses (CoC) and Elective Courses (EℓC) are categorized as PS (Professional Subjects), which are further subdivided as – (i) PC (Professional / Departmental Core) Subjects, (ii) PE (Professional/ Departmental Electives), (iii) OE (Open Electives); and (iv) Project Works (PW);
- Minor Courses (1 or 2 Credit Courses, belonging to HS/BS/ES/PC as per relevance); and Mandatory Courses (MC - non-credit oriented).

5.1.5 **Course Nomenclature:**

The Curriculum Nomenclature or Course-Structure Grouping for the each of the UGP E&T (B.Tech. Degree Programmes), is as listed below (along with AICTE specified % Range of Total Credits).

S. No.	Broad Course Classification	Course Group/ Category	Course Description	Range of Credits
1)	Foundation Courses (FnC)	BS – Basic Sciences	Includes - Mathematics, Physics and Chemistry Subjects	**15%-20%**
2)		ES - Engineering Sciences	Includes fundamental engineering subjects.	**15%-20%**
3)		HS – Humanities and Social Sciences	Includes subjects related to Humanities, Social Sciences and Management.	**5%-10%**
4)	Core Courses (CoC)	PC – Professional Core	Includes core subjects related to the Parent Discipline/ Department/ Branch of Engg.	**30%-40%**
5)	Elective Courses (EℓC)	PE – Professional Electives	Includes Elective subjects related to the Parent Discipline / Department / Branch of Engg.	**10%-15%**
6)		OE – Open Electives	Elective subjects which include inter-disciplinary subjects or subjects in an area outside the Parent Discipline/ Department / Branch of Engg.	**5%-10%**
7)	Core Courses	Project Work	B.Tech. Project or UG Project or UG Major Project.	**10%-15%**
8)		Industrial Training/ Mini-Project	Industrial Training/ Internship/ UG Mini-Project/ Mini-Project.	
9)		Seminar	Seminar / Colloquium based on core contents related to Parent Discipline/ Department/ Branch of Engg.	
10)		Minor Courses	1 or 2 Credit Courses (subset of HS)	**Included**
11)		Mandatory Courses (MC)	Mandatory Courses (non-credit)	**-**
Total Credits for UGP (B. Tech.)Programme				**176 (100%)**

6. COURSE REGISTRATION

6.1 A 'Faculty Advisor or Counsellor' shall be assigned to each student, who advises him/her about the UGP, its Course Structure and Curriculum, Choice/Option for Subjects/Courses, based on his/her competence, progress, pre-requisites and interest.

6.2 Academic Section of the College invites 'Registration Forms' from students prior (before the beginning of the Semester), ensuring 'DATE and TIME Stamping'. The Registration Requests for any 'CURRENT SEMESTER' shall be completed BEFORE the commencement of SEEs (Semester End Examinations) of the 'PRECEDING SEMESTER'

A Student can apply for Registration, which includes approval from his faculty advisor, and then should be submitted to the College Academic Section through the Head of Department (a copy of the same being retained with Head of Department, Faculty Advisor and the Student).

6.4 A Student may be permitted to Register for his/her Subjects/Course of CHOICE with a typical total of 22 Credits per Semester (Minimum being 19C and Maximum being 25C, permitted deviation being± 17%), based on his PROGRESS and SGPA/CGPA, and completion of the 'PRE-REQUISITES' as indicated for various Subjects/Courses, in the Department Course Structure and Syllabus contents.

6.5 Choice for 'additional Subjects/Courses' to reach the Maximum Permissible Limit of 25 Credits (above the typical 22 Credit norm) must be clearly indicated, which needs the specific approval and signature of the Faculty Advisor/Counsellor.

6.6 If the Student submits ambiguous choices or multiple options or erroneous (incorrect) entries during Registration for the Subject(s)/Course(s) under a given/specified Course Group/ Category as listed in

the Course Structure, only the first mentioned Subject/Course in that Category will be taken into consideration.

6.7 Dropping of Subjects/Courses or changing of options may be permitted, ONLY AFTER obtaining prior approval from the Faculty Advisor (subject to retaining a minimum of 19 C), 'within 15 Days of Time' from the commencement of that Semester. Subject/Course Options exercised through Registration are final and CAN NOT be changed, and CAN NOT be inter-changed; further, alternate choices will also not be considered. However, if the Subject/ Course that has already been listed for Registration (by the Head of Department) in a Semester could not be offered due to any unforeseen or unexpected reasons, then the Student shall be allowed to have alternate choice - either for a new Subject (subject to offering of such a Subject), or for another existing Subject (subject to availability of seats), which may be considered. Such alternate arrangements will be made by the Head of Department, with due notification and time-framed schedule, within the FIRST WEEK from the commencement of Class-work for that Semester.

7. SUBJECTS/ COURSES TO BE OFFERED

7.1 A Subject/Course may be offered to the Students, IF ONLY a Minimum of 1/3 of Students register to the course.

7.2 More than ONE TEACHER may offer the SAME SUBJECT (Lab/Practical's may be included with the corresponding Theory Subject in the same Semester) in any Semester. However, selection choice for students will be based on - 'CGPA Basis Criterion' (i.e., the first focus shall be on early Registration in that Semester, and the second focus, if needed, will be on CGPA of the student).

7.3 If more entries for Registration of a Subject come into picture, then the concerned Head of the Department shall take necessary decision, whether to offer such a Subject/Course for TWO (or multiple) SECTIONS or NOT .

7.4 OPEN ELECTIVES will be offered by a department to the students of other departments.

8. ATTENDANCE REQUIREMENTS

a. A student will be eligible to appear for the End Semester Examinations, if he acquires a minimum of 75% of attendance in aggregate of all the Subjects/Courses (excluding Mandatory or Non-Credit Courses) for that Semester.
b. Condoning of shortage of attendance in aggregate up to 10% (65% and above, and below 75%) in each Semester may be granted by the College Academic Committee on genuine and valid grounds, based on the student's representation with supporting evidence by following the govt. rules in vogue.
c. A stipulated fee shall be payable towards condoning of shortage of attendance.
d. Shortage of Attendance below 65% in aggregate shall in NO case be condoned.
e. A student shall not be promoted to the next semester unless he/she satisfies the attendance requirements of the current semester. The student may seek readmission for the semester when offered next. He / She shall not be allowed to register for the subjects of the semester while he/she is in detention. A student detained due to shortage of attendance, will have to repeat that semester when offered next.
f. Students whose attendance is less than 75% are not entitled to get the scholarship / fee reimbursement in any case as per the TS Govt. Rules in force.

9. ACADEMIC REQUIREMENTS FOR PROMOTION / COMPLETION OF REGULAR B.TECH PROGRAM COURSE STUDY

9.1 A student shall be deemed to have satisfied the Academic Requirements and earned the Credits allotted to each Subject/Course, if he secures not less than 35% marks in the End Semester Examination, and a minimum of 40% of marks in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together; in terms of Letter Grades, this implies securing P Grade or above in that Subject/Course.

9.2 A student shall be deemed to have satisfied the Academic Requirements and earned the Credits allotted to - Industry oriented Mini-Project/Seminar, if he/she secures not less than 40% of the total marks (50 marks) to be awarded for each. The student would be treated as failed, if he/she - (i) does not submit a report on his Industry oriented Mini-Project, or does not make a presentation of the same before the Evaluation Committee as per the schedule, or (ii) does not present the Seminar as required in the IV year I/II Semester, or (iii) secures less than 40% of marks in Industry oriented Mini-Project/Seminar evaluations. He may reappear once for each of the above evaluations, when they are

scheduled again; if he fails in such 'one reappearance' evaluation also, he has to reappear for the same in the next subsequent Semester, as per the schedule.

9.3 A Student will not be promoted from I Year to II Year, unless he/she fulfils the Attendance requirements.

9.4 A Student will not be promoted from II Year to III Year, unless he/she fulfils the Attendance and Academic Requirements and (i) secures a total of **44 Credits out of 88 Credits** up to II Year II Semester from all the relevant regular and supplementary examinations.

9.5 A Student will not be promoted from III Year to IV Year, unless he/she fulfils the Attendance and Academic Requirements and (i) secures a **total of 66 Credits out of 132 Credits** up to III Year II Semester, from all the regular and supplementary examinations.

9.6 After securing the necessary 176 Credits as specified for the successful completion of the entire UGP, resulting in 176 Credits for UGP performance evaluation, i.e., the performance of the Student in these 176 Credits shall alone be taken into account for the calculation of 'the final CGPA.

If a Student registers for some more 'extra Subjects' (in the parent Department or other Departments/Branches of Engg.) other than those listed Subjects totalling to 176 Credits as specified in the Course Structure of his Department, the performances in those 'extra Subjects' (although evaluated and graded using the same procedure as that of the required 176 Credits) will not be taken into account while calculating the SGPA and CGPA. For such 'extra Subjects' registered, % marks and Letter Grade alone will be indicated in the Grade Card, as a performance measure, subject to completion of the Attendance and Academic Requirements as stated in items 8 and 9.1-9.7.

9.7 Students who fail to earn minimum of 176 Credits as per the Course Structure, and as indicated above, within 8 Academic Years from the Date of Commencement of their I Year shall forfeit their seats in B.Tech Programme and their admissions shall stand cancelled.

When a Student is detained due to shortage of attendance/lack of credits in any Semester, he may be re-admitted into that Semester, as and when offered. However the regulations at the time of admissions hold good.

10. EVALUATION - DISTRIBUTION AND WEIGHTAGE OF MARKS

10.1 The performance of a student in each Semester shall be evaluated Subject-wise (irrespective of Credits assigned) with a maximum of 100 marks for Theory. The B.Tech Project Work (Major Project) will be evaluated for 200 Marks. These evaluations shall be based on 25% CIE (Continuous Internal Evaluation) and 75% SEE (Semester End Examination), and a Letter Grade corresponding to the % marks obtained shall be given.

10.2 For all Theory Subjects/Courses as mentioned above, the distribution shall be 25 marks for CIE, and 75 marks for the SEE.

10.3 a) For Theory Subjects (inclusive of Minor Courses), during the Semester, there shall be 2 mid-term examinations for 25 marks each. Each mid-term examination consists of one subjective paper for 20 marks, and assignment for 5 marks for each subject.

Question paper contains 2 Parts (Part-A and Part-B.) The distribution of marks for PART-A and PART-B will be 5 marks & 15 marks respectively for UG programs.

Pattern of the question paper is as follows:

PART–A

Consists of ***one compulsory question*** with five sub questions each carrying one mark. For the I-Mid examinations the sub question would be from first 2 ½ units and for the II-Mid examination the sub question would be from the remaining 2 ½ units.

PART-B

Consists of five questions (out of which students have to answer three questions) carrying five marks each. Each question there will be an "either" "or" choice (that means there will be two questions from each unit and the student should answer any one question). The questions can consist of sub questions also.

b) The first mid-term examination shall be conducted for the first 50% of the syllabus, and the second mid-term examination shall be conducted for the remaining 50% of the syllabus.

c) First Assignment should be submitted before the commencement of the first mid-term examinations, and the Second Assignment should be submitted before the commencement of the second mid-term examinations. The assignments shall be specified/given by the concerned subject teacher.

d) If any candidate is absent for the MID term examination or those who want to improve their internal marks in any subject can opt for Computer Based Test (CBT) as and when offered. The CBT is a 45 minutes duration ONLINE exam

consisting of 25 objective questions from the entire syllabus of the subject. The CBT can be taken after the payment of prescribed fee.

10.4 For Practical Subjects, there shall be a Continuous Internal Evaluation (CIE) during the Semester for 25 internal marks, and 50 marks are assigned for Lab/Practical End Semester Examination (SEE). Out of the 25 marks for internals, day-to-day work in the laboratory shall be evaluated for 15 marks; and for the remaining 10 marks - two internal practical tests (each of 10 marks) shall be conducted by the concerned laboratory teacher and the average of the two tests is taken into account. The SEE for Practical's shall be conducted at the end of the Semester by Two Examiners appointed by the Chief controller of examinations in consultation with the Head of the Department.

10.5 For the Subjects having Design and/or Drawing, (such as Engineering Graphics, Engineering Drawing, Machine Drawing, Production Drawing Practice, and Estimation), the distribution shall be 25 marks for CIE (10 marks for day-to-day work and 15 marks for internal tests) and 75 marks for SEE. There shall be two internal tests in a semester and the better of the two shall be considered for the award of marks for internal tests.

10.6 **Open Electives:** Students can choose One Open Elective (OE-I) during V Semester, one (OE-II) during VI Semester, and one (OE-III) in VII Semester, from the list of Open Electives given. However, Students cannot opt for an Open Elective Subject offered by their own (parent) Department, if it is already listed under any category of the Subjects offered by parent Department in any Semester.

10.7 There shall be an industry-oriented Mini-Project, in collaboration with an industry of their specialization, to be taken up during the vacation after III year II Semester (VII Semester) examination. However, the mini-project and its report shall be evaluated in VII Semester. The industry oriented mini-project shall be submitted in a report form and presented before the committee. It shall be evaluated for 50 marks. The committee consists of an external examiner, head of the department, the supervisor of the mini-project and a senior faculty member of the department. There shall be no internal marks for industry-oriented mini-project.

10.8 There shall be a Seminar Presentation in VIII Semester. For the Seminar, the student shall collect the information on a specialized topic, prepare a Technical Report and submit to the Department at the time of Seminar Presentation. The Seminar Presentation (along with the Technical Report) shall be evaluated for 50 marks for internal examinations. There shall be no SEE for seminar.

10.9 There shall be a Comprehensive Viva in VI & VIII Semester and will be conducted SEE by through a test or a committee consisting of One External Examiner, Head of the Department and two Senior faculty members of the Department. The comprehensive viva is intended to assess the student's understanding of the subjects he/she studied during the B.Tech course of study. The Comprehensive Viva-Voce is evaluated for 50 marks by the committee. There shall be no CIE for Comprehensive Viva.

10.11 Each Student shall start the Project Work during the VII Semester, as per the instructions of the Project Guide/Project Supervisor assigned by the Head of Department. Out of total 200 marks allotted for the Project Work 50 marks shall be for CIE (Continuous Internal Evaluation and 150 marks for the SEE (End Semester Viva-voce Examination).

10.12 In VIII semester a mid-course review is conducted by Head of the Department and the project supervisor 25 marks based on the student's progress. On completion of the project the second evaluation is conducted for award of internal marks for another 25 marks before the report is submitted making the total internal marks 50. The end semester examination shall be based on the report submitted and a viva-voce exam for 150 marks by committee comprising of the Head of the Department, project supervisor and an external examiner. A minimum of 40% of maximum marks shall be obtained to earn the corresponding credits.

10.13. **End semester examination:**

a) Question paper contains 2 Parts (Part-A and Part-B) having the questions distributed equally among all units.
b) The distribution of marks for PART-A and PART-B will be 25 marks & 50 marks respectively for UG programs. Pattern of the question paper is as follows:

PART–A

Consists of two questions which are compulsory. The first question consists of five sub-questions one from each unit and carry 3 marks each. Second question consists of five sub-questions one from each unit and carry 2 marks each.

PART-B

Consists of 5 questions carrying 10 marks each. Each of these questions is from one unit and may contain sub questions. Each question there will be an "either" "or" choice (that means there will be two questions from each unit and the student should answer any one question).

10.14 For Mandatory Non-Credit Courses offered like Technical Seminar, Micro Project, EPICS, Certification, Computational Mathematics in a Semester, after securing ≥ 65% attendance and has secured not less than 35% marks in the SEE, and a minimum of 40% of marks in the sum total of the CIE and SEE taken together in such a course, then the student is **PASS** and will be qualified for the award of the degree. No marks or Letter Grade shall be allotted for these courses/activities.However, for non credit courses '**Satisfactory'** or "**Unsatisfactory'** shall be indicated instead of the letter grade and this will not be counted for the computation of SGPA/CGPA.

11. AWARD OF DEGREE

After a student has satisfied the requirement prescribed for the completion of the Program and is eligible for the award of B. Tech. Degree he shall be placed in one of the following four classes Shown in Table.

Table: **Declaration of Class based on CGPA (Cumulative Grade Point Average)**

Class Awarded	Grade to be Secured
First Class with Distinction	CGPA ≥ 7.75
First Class	≥ 6.75 to < 7.75 CGPA
Second Class	≥ 5.75 to < 6.75 CGPA
Pass Class	≥ 5.00 to < 5.75 CGPA
FAIL	CGPA < 5

a) First Class with Distinction will be awarded to those students who clear all the subjects in single attempt during his/her regular course of study.

b) **Improvement of Grades and Completion of the Course**

i) Candidates who have passed in a theory paper in a semester are allowed to appear for improvement only once in the next immediate instant exam for only one subject of his choice.

ii) If candidate improves his/her grade, then his/her improved grade will be taken into consideration for the award of GPA only.

iii) The improved grade shall not be higher than A+. Such improved grade will not be counted for the award of prizes/medals, Rank and Distinction.

iv) If the candidate does not show improvement in the grade, his/her previous grade will be taken into consideration.

v) Candidates will not be allowed to improve grade in the Comprehensive viva, Laboratory, Seminars and Project Work. There is no improvement examination in VIII semester.

12. LETTER GRADE AND GRADE POINT

12.1 Marks will be awarded to indicate the performance of each student in each Theory Subject, or Lab/Practical's, or Seminar, or Project, or Mini-Project, Minor Course etc., based on the %marks obtained in CIE+SEE (Continuous Internal Evaluation + Semester End Examination, both taken together), and a corresponding Letter Grade shall be given.

12.2 As a measure of the student's performance, a 10-point Absolute Grading System using the following Letter Grades (UGC Guidelines) and corresponding percentage of marks shall be followed...

% of Marks Secured (Class Intervals)	*Letter Grade (UGC Guidelines)*	*Grade Points*
80% and above (≥ 80% , ≤ 100%)	O (Outstanding)	10
Below 80% but not less than 70% (≥ 70% , < 80%)	A^+ (Excellent)	9
Below 70% but not less than 60% (≥ 60% , < 70%)	A (Very Good)	8
Below 60% but not less than 55% (≥ 55% , < 60%)	B^+ (Good)	7
Below 55% but not less than 50% (≥ 50% , < 55%)	B (above Average)	6
Below 50% but not less than 45% (≥ 45% , < 50%)	C (Average)	5
Below 45% but not less than 40% (≥ 40% , < 45%)	P (Pass)	4
Below 40% (< 40%)	F (FAIL)	0

12.3 A student obtaining F Grade in any Subject shall be considered 'failed' and will be required to reappear as 'Supplementary Candidate' in the End Semester Examination (SEE), as and when offered. In such cases, his Internal Marks (CIE Marks) in those Subject(s) will remain same as those he obtained earlier.

12.4 A Letter Grade does not imply any specific % of Marks.

12.5 In general, a student shall not be permitted to repeat any Subject/Course (s) only for the sake of 'Grade Improvement' or 'SGPA/CGPA Improvement'. However, he has to repeat all the Subjects/Courses pertaining to that Semester, when he is detained.

12.6 A student earns Grade Point (GP) in each Subject/Course, on the basis of the Letter Grade obtained by him in that Subject/Course (excluding Mandatory non-credit Courses). Then the corresponding 'Credit Points' (CP) are computed by multiplying the Grade Point with Credits for that particular Subject/Course.

Credit Points (CP) = Grade Point (GP) x Credits …. For a Course

12.7 The Student passes the Subject/Course only when he gets GP $\geq$ 4 (P Grade or above).

12.8 The Semester Grade Point Average (SGPA) is calculated by dividing the Sum of Credit Points (ΣCP) secured from ALL Subjects/Courses registered in a Semester, by the Total Number of Credits registered during that Semester. SGPA is rounded off to TWO Decimal Places. SGPA is thus computed as

SGPA = $\{\sum_{i=1}^{N} C_i G_i\} / \{\sum_{i=1}^{N} C_i\}$ …. For each Semester,

where 'i' is the Subject indicator index (takes into account all Subjects in a Semester), 'N' is the no. of Subjects 'REGISTERED' for the Semester (as specifically required and listed under the Course Structure of the parent Department), C_i is the no. of Credits allotted to that ix Subject, and G_i represents the Grade Points (GP) corresponding to the Letter Grade awarded for that i Subject.

12.9 The Cumulative Grade Point Average (CGPA) is a measure of the overall cumulative performance of a student over all Semesters considered for registration. The CGPA is the ratio of the Total Credit Points secured by a student in ALL registered Courses in ALL Semesters, and the Total Number of Credits registered in ALL the Semesters. CGPA is rounded off to TWO Decimal Places. CGPA is thus computed from the I Year Second Semester onwards, at the end of each Semester, as per the formula

CGPA = $\{ \sum_{j=1}^{M} C_j G_j \} / \{ \sum_{j=1}^{M} C_j \}$ … for all S Semesters registered

(i.e., up to and inclusive of S Semesters, S $\geq$ 2),

where 'M' is the TOTAL no. of Subjects (as specifically required and listed under the Course Structure of the parent Department) the Student has 'REGISTERED' from the 1st Semester onwards up to and inclusive of the Semester S (obviously M > N), 'j' is the Subject indicator index (takes into account all Subjects from 1 to S Semesters), C_j is the no. of Credits allotted to the jth Subject, and G_j represents the Grade Points (GP) corresponding to the Letter Grade awarded for that jth Subject. After registration and completion of I Year I Semester however, the SGPA of that Semester itself may be taken as the CGPA, as there are no cumulative effects.

12.10 For Merit Ranking or Comparison Purposes or any other listing, ONLY the 'ROUNDED OFF' values of the CGPAs will be used.

12.11 For Calculations listed in Item 12.6–12.10, performance in failed Subjects/Courses (securing F Grade) will also be taken into account, and the Credits of such Subjects/Courses will also be included in the multiplications and summations. However, Mandatory Courses will not be taken into consideration.

13. DECLARATION OF RESULTS

a. Computation of SGPA and CGPA are done using the procedure listed in 12.6–2.10.

14. WITH HOLDING OF RESULTS

If the student has not paid fees to College at any stage, or has pending dues against his name due to any reason what so ever, or if any case of indiscipline is pending against him, the result of the student

may be withheld, and he will not be allowed to go into the next higher Semester. The Award or issue of the Degree may also be withheld in such cases.

15. SUPPLEMENTARY EXAMINATIONS

Supplementary examinations will be conducted immediately after the declaration of the regular examinations results for those who absent or appeared and failed in regular examinations. Such candidates writing supplementary examinations may have to write more than one examination per day.

16 TRANSCRIPTS

After successful completion of prerequisite credits for the award of degree a Transcript containing performance of all academic years will be issued as a final record. Duplicate transcripts will also be issued if required after the payment of requisite fee and also as per norms in vogue.

17 RULES OF DISCIPLINE

17.1 Any attempt by any student to influence the teachers, Examiners, faculty and staff of controller of Examination for undue favours in the exams, and bribing them either for marks or attendance will be treated as malpractice cases and the student can be debarred from the college.

17.2 When the student absents himself, he is treated as to have appeared and obtained zero marks in that subject(s) and grading is done accordingly.

17.3 When the performance of the student in any subject(s) is cancelled as a punishment for indiscipline, he is awarded zero marks in that subject(s).

17.4 When the student's answer book is confiscated for any kind of attempted or suspected malpractice the decision of the Examiner is final.

18. MALPRACTICE PREVENTION COMMITTEE

A malpractice prevention committee shall be constituted to examine and punish the students who involve in malpractice / indiscipline in examinations. The committee shall consist of:

a) Controller of examinations - Chairman
b) Addl. Controller of examinations.- Member Convenor
c) Subject expert - member
d) Head of the department of which the student belongs to. - Member
e) The invigilator concerned - member

The committee shall conduct the meeting after taking explanation of the student and punishment will be awarded by following the malpractice rules meticulously.

Any action on the part of candidate at the examination like trying to get undue advantage in the performance at examinations or trying to help another, or derive the same through unfair means is punishable according to the provisions contained hereunder. The involvement of the Staff who are in charge of conducting examinations, valuing examination papers and preparing / keeping records of documents relating to the examinations, in such acts (inclusive of providing incorrect or misleading information) that infringe upon the course of natural justice to one and all concerned at the examination shall be viewed seriously and will be recommended for appropriate punishment after thorough enquiry.

19. TRANSITORY REGULATIONS

Student who has discontinued for any reason, or has been detained for want of attendance or lack of required credits as specified, or who has failed after having undergone the Degree Programme, may be considered eligible for readmission to the same Subjects/Courses (or equivalent Subjects/Courses, as the case may be), and same Professional Electives/Open Electives (or from set/category of Electives or equivalents suggested, as the case may be) as and when they are offered (within the time-frame of 8 years from the Date of Commencement of his I Year I Semester).

20. STUDENT TRANSFERS

There shall be no Branch transfers after the completion of Admission Process.

21. GRADUATION DAY

The College shall have its own Annual Graduation Day for the award of Degrees issued by the University.

22. AWARD OF MEDALS

Institute will award Medals to the outstanding students who complete the entire course in the first attempt within the stipulated time.

23. SCOPE

i) Where the words “he”, “him”, “his”, occur in the write-up of regulations, they include “she”, “her”.

ii) Where the words “Subject” or “Subjects”, occur in these regulations, they also imply “Course” or “Courses”.

iii) The Academic Regulations should be read as a whole, for the purpose of any interpretation.

iv) In case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Chairman of the Academic Council is final.

The Academic Council may change or amend the Academic Regulations, Course Structure or Syllabi at any time, and the changes or amendments made shall be applicable to all Students with effect from the dates notified by the Academic Council Authorities.

Academic Regulations for B. Tech. (Lateral Entry Scheme)

(Effective for the students getting admitted into II year from the Academic Year 2016-2017 on wards)

1. The Students have to acquire 132 credits from II to IV year of B.Tech Program (Regular) for the award of the degree.
2. Students, who fail to fulfil the requirement for the award of the degree in 6 consecutive academic years from the year of admission, shall forfeit their seat.
3. The same attendance regulations are to be adopted as that of B. Tech. (Regular)
4. **Promotion Rule:**
   The student shall be promoted from third year to fourth year only if he fulfils the academic requirements of 44 out of 88 credits from all the exams conducted upto and including III year II semester regular examinations, whether the candidate takes the examinations or not.(Two regular and Two supplementary examinations of II year I semester; Two regular and one supplementary examinations of II year II semester; One regular and one supplementary examination of III year I semester; One regular examination of III year II semester.
5. **Award of Class:**
   After the student has satisfied the requirements prescribed for the completion of the program and is eligible for the award of B. Tech. Degree he shall be placed in one of the following four classes: The marks obtained in the best 132 credits will be considered for the calculation of percentage and award of class shall be shown separately.
6. All other regulations as applicable for B. Tech. Four-year degree course (Regular) will hold good for B.Tech (Lateral Entry Scheme).

MALPRACTICES RULES- DISCIPLINARY ACTIONFOR /IMPROPER CONDUCT IN EXAMINATIONS

S. No	Nature of Malpractices/Improper Conduct	Punishment
1 (a)	Possesses or keeps accessible in examination hall, any paper, note book, programmable calculators, Cell phones, pager, palm computers or any other form of material concerned with or related to the subject of the examination (theory or practical) in which he is appearing but has not made use of (material shall include any marks on the body of the candidate which can be used as an aid in the subject of the examination)	Expulsion from the examination hall and cancellation of the performance in that subject only.
(b)	Gives assistance or guidance or receives it from any other candidate orally or by any other body language methods or communicates through cell phones with any candidate or persons in or outside the exam hall in respect of any matter.	Expulsion from the examination hall and cancellation of the performance in that subject only of all the candidates involved. In case of an outsider, he will be handed over to the police and a case is registered against him.
2	Has copied in the examination hall from any paper, book, programmable calculators, palm computers or any other form of material relevant to the subject of the examination (theory or practical) in which the candidate is appearing.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the subjects of that Semester/year. The Hall Ticket of the candidate is to be cancelled and sent to the Principal.
3	Impersonates any other candidate in connection with the examination.	The candidate who has impersonated shall be expelled from examination hall. The candidate is also debarred and forfeits the seat. The performance of the original candidate who has been impersonated, shall be cancelled in all the subjects of the examination (including practical's and project work) already appeared and shall not be allowed to appear for examinations of the remaining subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. If the imposter is an outsider, he will be handed over to the police and a case is registered against him.
4	Smuggles in the Answer book or additional sheet or takes out or arranges to send out the question paper during the examination or answer book or additional sheet, during or after the examination.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.

5	Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.	Cancellation of the performance in that subject.
6	Refuses to obey the orders of the Addl. Controller of examinations / any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walk out or instigates others to walk out, or threatens the addl. Controller of examinations or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs or by visible representation, assaults the addl. Controller of examinations, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which result in damage to or destruction of property in the examination hall or any part of the College campus or engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that subject and all other subjects the candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the subjects of that semester/year. The candidates also are debarred and forfeit their seats. In case of outsiders, they will be handed over to the police and a police case is registered against them.
7	Leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the examination hall.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
8	Possess any lethal weapon or firearm in the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat.
9	If student of the college, who is not a candidate for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to 8.	Student of the colleges expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat. Person(s)who do not belong to the College will be handed over to police and, a police case will be registered against them.

10	Comes in a drunken condition to the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year.
11	Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.	Cancellation of the performance in that subject and all other subjects the candidate has appeared including practical examinations and project work of that semester/year examinations.
12	If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the principal for further action to award suitable punishment.	

COURSE STRUCTURE

MARRI LAXMAN REDDY GROUP OF INSTITUTIONS

MLR Institute of Technology

Laxma Reddy Avenue, Dundigal, Quthbullapur (M), Hyderabad – 500 043
Phone Nos: 08418 – 204066 / 204088, Fax: 08418 – 204088

Department of Electrical and Electronics Engineering (EEE)
Course Structure MLR-17

I B.Tech.- I SEMESTER

Course Code	Course Title	Course Area	Hours per Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P		Internal (CIE)	External (SEE)	Total
A3HS01	Differential Equations and Applications	BS	4	1	-	4	25	75	100
A3HS11	Technical English	HS	3	-	-	3	25	75	100
A3HS06	Applied Physics - I	HS	3	-	-	3	25	75	100
A3EE01	Electrical Circuits	ES	4	1	-	4	25	75	100
A3CS01	Computer Programming	ES	3	1	-	3	25	75	100
A3HS12	English Communication Skills Lab	HS	-	-	3	2	25	75	100
A3CS02	Computer Programming Lab using 'C'	ES	-	-	3	2	25	75	100
A3ME05	Engineering Drawing	ES	1	1	3	3	25	75	100
Total			**18**	**04**	**9**	**24**	**200**	**600**	**800**
Mandatory Course (Non-Credit)									
A3HS19	Technical Seminar – I / (Micro projects/EPICS/ Certification)	**MC**	**-**	**-**	**2**	**-**	**25**	**75**	**100**

I B.Tech.- II SEMESTER

Course Code	Course Title	Course Area	Hours per Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P		Internal (CIE)	External (SEE)	Total
A3HS03	Linear Algebra and Integral Transforms	BS	4	1	-	4	25	75	100
A3HS07	Applied Physics – II	BS	3	-	-	3	25	75	100
A3HS09	Engineering Chemistry	BS	3	-	-	3	25	75	100
A3HS02	ComputationalMethods and IntegralCalculus	BS	4	-	-	4	25	75	100
A3CS04	Data structures	ES	4	1	-	4	25	75	100
A3HS13	Engineering PhysicsLab	BS	-	-	3	2	25	75	100
A3CS05	Data Structures Lab	ES	-	-	3	2	25	75	100
A3HS20	IT & Engineering Workshop	ES		-	3	2	25	75	100
Total			**18**	**02**	**9**	**24**	**200**	**600**	**800**
Mandatory Course (Non-Credit)									
A3HS18	Technical Seminar II &Computational Mathematics (FOSS)	**MC**	**-**	**-**	**2**	**-**	**25**	**75**	**100**

II B.Tech-I SEMESTER

Course Code	Course Title	Course Area	Hours Per Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P		Internal (CIE)	External (SEE)	Total
A3EC02	Electronic Devices and circuits	PC	4	1	-	4	25	75	100
A3EE02	Network Analysis	ES	4	1	-	4	25	75	100
A3EE03	DC machines and transformers	PC	3	1	-	3	25	75	100
A3EE04	Electrical Measurements & Instrumentation	ES	3	-	-	3	25	75	100
A3EE05	Electromagnetic fields	PC	4	-	-	4	25	75	100
A3EE06	DC machines lab	PC	-	-	3	2	25	75	100
A3EE07	Electrical Circuits Lab	ES	-	1	3	2	25	75	100
A3EC08	Electronic Devices & Circuits Lab	ES	-	-	3	2	25	75	100
TOTAL			**18**	**04**	**09**	**24**	**200**	**600**	**800**
Mandatory Course (Non-Credit)									
A3HS17	Gender Sensitization	HS	**-**	**-**	**2**	**-**	**25**	**75**	**100**

II B.Tech-II SEMESTER

Course Code	Course Title	Course Area	Hours Per Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P		Internal (CIE)	External (SEE)	Total
A3EC03	Switching Theory & Logic Design	PC	4	1	-	4	25	75	100
A3EE08	AC Machines	PC	3	1	-	3	25	75	100
A3EC19	Control systems	PC	4	1	-	4	25	75	100
A3HS21	Probability and complex analysis	BS	3	1	-	3	25	75	100
A3EE09	Electrical Power generation	PC	4	-	-	4	25	75	100
A3EE10	AC machines Lab	PC	-	-	3	2	25	75	100
A3EE11	Control Systems Lab	PC	-	-	3	2	25	75	100
A3EE12	Electrical Measurements & Instrumentation Lab	PC	-	-	3	2	25	75	100
TOTAL			**18**	**04**	**09**	**24**	**200**	**600**	**800**
Mandatory Course (Non-Credit)									
A3HS16	Environmental Studies	HS	**3**	**-**	**-**	**-**	**25**	**75**	**100**

III B. Tech - I SEMESTER

Course Code	Course Title	Course Area	Hours Per Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P		Internal (CIE)	External (SEE)	Total
A3EC17	Linear and Digital IC Applications	PC	3	1	-	3	25	75	100
A3EE13	Power Electronics	PC	4	1	-	4	25	75	100
A3EE14	Power Transmission and Distribution	PC	4	1	-	4	25	75	100
A3EC27	Microprocessors and Microcontrollers	PC	4	1	-	4	25	75	100
	Open Elective-I	OE	**3**	**-**	**-**	**3**	**25**	**75**	**100**
A3EC25	IC Applications Lab	PC	-	-	3	2	25	75	100
A3EC37	Microprocessors and Microcontrollers Lab	PC	-	1	3	2	25	75	100
A3EE17	Power Electronics Lab	PC	-	-	3	2	25	75	100
TOTAL			**18**	**05**	**09**	**24**	**200**	**600**	**800**
Mandatory Course (Non-Credit)									
A3EE18	Technical Seminar-III (Micro Project/EPICS/ Certification)		**-**	**-**	**2**	**0**	**25**	**75**	**100**

III B.Tech-II SEMESTER

Course Code	Course Title	Course Area	Hours Per Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P		Internal (CIE)	External (SEE)	Total
A3EE19	Power Semiconductor Drives	PC	4	1	-	4	25	75	100
A3EC28	Digital Signal Processing	PC	3	1	-	3	25	75	100
A3EE20	Switch Gear and Protection	PC	4	-	-	4	25	75	100
	Open Elective-II	OE	**3**	**-**	**-**	**3**	**25**	**75**	**100**
	Professional Elective-I	PE	**3**	**-**	**-**	**3**	**25**	**75**	**100**
A3HS13	Advanced English Communication Skills Lab	HS	-	-	3	2	25	75	100
A3EC36	Digital Signal Processing Lab	PC	-	-	3	2	25	75	100
A3EE40	Electrical Simulation Lab	PC	-	-	3	2	25	75	100
A3EE28	Independent Study	CC	-	-	-	1	-	50	50
TOTAL			**17**	**02**	**09**	**24**	**200**	**650**	**850**

Note: Industry Oriented Mini Project Carried out during summer vacation between III Year-II SEM & IV year-I SEM and evaluated in IV year-ISEM.

IV B. Tech - I SEMESTER

Course Code	Course Title	Course Area	Hours per Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P		Internal (CIE)	External (SEE)	Total
A3EE29	Power Systems Operation and Control	PC	3	1	-	3	25	75	100
A3EE30	Power System Analysis	PC	4	1	-	4	25	75	100
A3EE31	Utilization of Electrical Energy	PC	4	-	-	4	25	75	100
	Open Elective-III	**OE**	**3**	**-**	**-**	**3**	**25**	**75**	**100**
	Professional Elective - II	**PE**	**3**	**-**	**-**	**3**	**25**	**75**	**100**
A3EE38	Power Systems Lab	PC	-	-	3	2	25	75	100
A3EE39	Power System Computer Aided Design Lab	PC	-	-	3	2	25	75	100
A3EE27	Power Semiconductor Drives Lab	PC	-	-	3	2	25	75	100
A3EE41	Industrial Oriented Mini Project	CC	-	-	2	1	-	50	50
Total			**17**	**03**	**11**	**24**	**200**	**650**	**850**

IV B.Tech- II SEMESTER

Course Code	Course Title	Course Area	Hours per Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P		Internal (CIE)	External (SEE)	Total
A3HS15	Management Science	HS	3	-	-	3	25	75	100
	Professional Elective – III	**PE**	**3**	**-**	**-**	**3**	**25**	**75**	**100**
	Professional Elective – IV	**PE**	**3**	**-**	**-**	**3**	**25**	**75**	**100**
A3EE47	Comprehensive Viva Voce	CC	-	-	-	1	-	50	50
A3EE48	Project Work	CC	-	-	12	12	50	150	200
A3EE49	Seminar	CC	-	-	3	2	50	-	50
Total			**09**	**00**	**15**	**24**	**175**	**425**	**600**

PROFESSIONAL ELECTIVES

S.No	PROFESSIONAL ELECTIVES							
	PE1	**CODE**	**PE2**	**CODE**	**PE3**	**CODE**	**PE4**	**CODE**
1	Embedded Systems	A3EE23	Power Electronic Applications in Power Systems	A3EE34	Switched Mode Power Supplies	A3EE42	Electrical Distribution Systems	A3EE44
2	Advanced Control Systems	A3EE24	Power Quality	A3EE35	Design, Estimation and Costing of Electrical Systems	A3EE43	Illumination Engineering	A3EE45
3	Programmable Logic Controllers	A3EE25	High Voltage Engineering	A3EE36	Digital Image Processing	A3EC46	Neural Networks and Fuzzy Logic	A3EC59
4	Wind and Solar Energy Systems	A3EE26	Analysis of Linear Systems	A3EE37	Fundamentals of VLSI Design	A3EC32	HVDC transmission and FACTS	A3EE46

OPEN ELECTIVES

OPEN ELECTIVE-I			
S. No.	**Course Code**	**Course Name**	**Offering Department**
1	A3CS54	Fundamentals of Data bases	Computer Science & Engineering
2	A3CS55	Software engineering Principles	
3	A3CS56	Core Java Programming	
4	A3IT05	Fundamentals of Information Technology	Information Technology
5	A3IT06	Basics of Mobile Application development	
6	A3IT07	Fundamentals of e-commerce	
7	A3EC22	Logic design	Electronics and Communication Engineering
8	A3EC23	Principles of communications	
9	A3EC24	Measurements and instrumentation *	
10	A3ME25	Fundamentals of Mechatronics	Mechanical Engineering
11	A3ME26	Basics of Thermodynamics	
12	A3ME27	Fundamentals of Engineering Materials	
13	A3AE17	Fabrication Process	Aeronautical Engineering
14	A3AE18	Fundamentals of Avionics	
15	A3AE19	Introduction to jets and rockets	
16	A3EE15	Electrical Engineering Materials	Electrical & Electronics Engineering
17	A3EE16	Electrical wiring and Safety Measures	

* The subject should not be opted by Electrical and Electronics Engineering Students

OPEN ELECTIVE-II			
S. No.	**Course Code**	**Course Name**	**Offering Department**
1	A3CS57	Elements of Cloud computing	Computer Science & Engineering
2	A3CS58	Computer Organization & Operating systems	
3	A3CS59	Fundamentals of Artificial Intelligence	
4	A3IT09	Principles of programming Languages	Information Technology
5	A3IT10	Human computer interface Design basics	
6	A3IT11	Computer and network security fundamentals	
7	A3EC30	Fundamentals of Integrated Circuits	Electronics and Communication Engineering
8	A3EC31	Signal Transmission through linear systems	
9	A3EC32	Fundamentals of VLSI Design	
10	A3ME34	Fundamentals of Operation research	Mechanical Engineering
11	A3ME35	Economics for Engineers	
12	A3ME36	Basics of Robotics	
13	A3AE27	Introduction to aircraft Industry	Aeronautical Engineering
14	A3AE28	Nondestructive testing Methods	
15	A3AE29	Fundamentals of Finite element methods	
16	A3EE21	Solar Energy and Applications	Electrical & Electronics Engineering
17	A3EE22	Non-Conventional Power Generation	

OPEN ELECTIVE-III			
S. No.	**Course Code**	**Course Name**	**Offering Department**
1	A3CS60	Soft computing	Computer Science & Engineering
2	A3CS61	Problem solving Techniques	
3	A3CS62	Discrete structures	
4	A3IT17	Software testing fundamentals	Information Technology
5	A3IT18	Basics of multimedia systems	
6	A3IT19	Basic Introduction to game development	
7	A3EC42	Introduction of Microprocessors and Microcontrollers	Electronics and Communication Engineering
8	A3EC43	Fundamentals of Image processing	
9	A3EC44	TV Engineering	
10	A3ME46	Introduction to material handling	Mechanical Engineering
11	A3ME47	Non convention energy sources	
12	A3ME48	Aspects of heat & mass transfer	
13	A3AE39	Guidance and control of aerospace vehicles	Aeronautical Engineering
14	A3AE40	Wind tunnel Techniques	
15	A3AE41	Introduction to Aerospace Technology	
16	A3EE32	Energy Audit and Management Systems	Electrical & Electronics Engineering
17	A3EE33	Energy Storage Systems	

I B.TECH I SEMESTER

SYLLABUS

DIFFERENTIAL EQUATIONS &APPLICATIONS

I B.Tech: EEE-I Semester **L T P C**

Course Code: A3HS0141 - 4

COURSE OVERVIEW:

This course develops the theory of differential equations and indicating its applications. This course deals with more advanced Engineering Mathematics topics which provide students with the relevant mathematical tools required in the analysis of problems in engineering and scientific professions. Topics include the differential equations of first order and their applications, higher order linear differential equations and their applications, functions of single variable and their applications, partial differential equations, Fourier series. The mathematical skills derived from this course form a necessary base to analytical and design concepts encountered in the program.

PREREQUISITE(S): Knowledge of differentiation and integration.

COURSE OBJECTIVES:

Get the knowledge of differential equations in mathematical modeling.

1. To explain higher order differential equations and their applications in engineering problem solving.
2. The modeling to mathematical problem and there by finds a solution using mathematical concepts.
3. To develop alternative ways to solve a problem and systematic approach of a solution in real life.
4. To gain experience of doing independent study and research.

COURSE OUTCOMES:

Up on successful completion of this course, student will be able to:

1. Specify standard methods for solving differential equations and their applications in geometrical andphysical problems.
2. Identify different types of higher order differential equations and their applications in engineering problem solving.
3. Apply partial derivatives to study maxima and minima of functions of two variables
4. Apply partial differential equations to solve the linear and nonlinear partial differentialequations.
5. Have a fundamental understanding of Fourier series and able to give Fourierexpansions of a givenfunction.
6. Participate and succeed in competitive examinations like GATE, GRE.

SYLLABUS

UNIT-I

DIFFERENTIAL EQUATIONS OF FIRST ORDER AND THEIR APPLICATIONS:
Exact equations andequations reducible to exact form- Application of first order differential equations- Orthogonal trajectories-Newton‘s law of cooling – Law of natural growth and decay.

UNIT – II

HIGHER ORDER LINEAR DIFFERENTIAL EQUATIONS AND THEIR APPLICATIONS:
Linear differentialequations of second and higher order with constant coefficients, Non-Homogeneous term of the type $Q(x) = e^{ax}$, sinax, cosax, $e^{ax}v(x)$, $x^nV(x)$ –Equations reducible to linear equations with constant coefficients- Cauchy‘s homogeneous linear equation – Legendre‘s linear equation – Method of variation of parameters – Applications to Electrical Circuits and Simple harmonic motion.

UNIT-III

PARTIAL DIFFERENTIATION:
Introduction – Limit – Continuity – Partial derivatives – Partial derivatives of Higher orders – Homogenous function – Euler's theorem on Homogenous function –Total Differential Coefficients.

FUNCTIONS OF SEVERAL VARIABLES:
Jacobian – Functional dependence – Maxima and Minima of functions of two variables – Lagrange's method of undetermined multipliers.

UNIT – IV

PARTIAL DIFFERENTIAL EQUATIONS:
Formation of partial differential equation by elimination ofarbitrary constants and arbitrary functions- Solutions of first order linear (Lagrange) equation and nonlinear (standard type) equations – Equations reducible to standard forms.

UNIT – V

FOURIER SERIES:
Determination of Fourier coefficients-Fourier series in an arbitrary interval-Fourier seriesof even and odd functions-Half range Fourier sine and cosine expansions.

TEXT BOOKS:

1 .Higher Engineering Mathematics by Dr.B.S.Grewal, Khanna publishers
2. Advanced Engineering Mathematics by R K Jain & S R K Iyengar, Narosa Publishers

REFERENCE BOOKS:

1. Advanced Engineering Mathematics by E. Kreyszig, John Wiley & Sons Publisher.
2. Engineering Mathematics by N.P.Balil, Lakshmi Publications.
3. Advanced Engineering Mathematics by Michael Greenberg, Pearson Education.

TECHNICAL ENGLISH

I B. Tech: EEE-I Semester **L T P C**

Course Code: A3HS11 **3 - - 3**

COURSE OVERVIEW:

The basic idea behind offering this certificate course as a subject at the undergraduate level is to acquaint students with a language held by common consent to be the most popular language and predictably the most used in countries across the globe. The lessons included as part of syllabus, aim to take the nuances of English to students as it reveals its strengths and complexity when used to perform a variety of functions. For prospective engineers, nothing could be more useful or productive than being able to reach out to the world of technology and business through grammar, vocabulary, collocations besides letter-writing, advertisements, posters, technical presentations, report writing, seminars etc. Teachers of English have a special role to play in polishing and honing the linguistic skills of engineers in the making, through a variety of tasks, assignments and role plays that bring alive the language in the classroom and prepare students for the world of work. The mission of taking the language to students is achieved from teaching texts that are rich in vocabulary and grammar, texts that teach learners how to contextualize, situate meaning amidst ambiguity and learn the art of being able to persuade, compel, cajole, complain, narrate, describe etc. through recourse to a range of devices- linguistic and literary- on offer. Besides, the course has in mind the task of preparing students to fulfill basic functions with language that come their way during the course of study, such as being able to compose email effectively in precise writing, essay writing , prepare technical reports/papers, write effective business ,formal and job application letters etc.

PRE- REQUESTIES: Nil

COURSE OBJECTIVES:

At the end of the course the student is expected to:

1. Talk about business subjects
2. Understand charts and graphs
3. Write short business emails, reports and make notes on simple topics.
4. Follow short telephone conversations.
5. Follow simple presentations/demonstrations.
6. Exchange straightforward opinions and make requests.
7. Offer advice and state routine requirements

COURSE OUTCOMES:

Up on successful completion of this course, student will be able to:

1. Acquire the use of grammar effectively (vocabulary and so on) through extensive coursework on writing reports and reading comprehensions, articles, essays, general discussion etc.
2. To bring an awareness among the future entrepreneurs about the risks in the running enterprises.
3. To inculcate profound knowledge through BEC for practical, everyday use in business.
4. Assess the skills of writing business letters in various situations and generate skills of writing business letters, essays and memos.
5. Categorize the various structures of reports and compose to use them in the professional scenario.

SYLLABUS

UNIT – I

Grammar: Introduction to Grammar, Parts of Speech
Vocabulary: Technical Vocabulary
Listening: Listening for specific information in short, long conversations andmonologues.
Speaking: Conversation between students in pairs and groups, general interaction andSocial language.
Reading: Reading for the Main idea, finding specific information, reading for detail,Reading and transferring information, Understanding the attitudes.
Writing: Writing short messages that include certain information.

UNIT – II

Grammar: Sentence and Sentence Construction
Vocabulary: Homophones, Homographs, Homonyms
Listening: Listening for Gist and detailed meaning and to identify the attitudes andopinions of the speakers
Speaking: Mini-presentations on a business theme by organizing a larger unit ofdiscourse &giving information and expressing opinions.
Reading: Reading for Opinion and writer‘s purpose, Reading for interpreting the visualinformation, reading for gist.
Writing: Writing a longer piece of correspondence based on another text.

UNIT – III

Grammar: Verb – Tense
Vocabulary: Word Formation – prefix and suffix.
Listening: Answering multiple choice questions on short conversations or monologues.
Speaking: Two-way conversation between the candidates followed by further promptingfrom theinterlocutor.
Reading: Reading for inference and Global meaning, Understanding Vocabulary andgrammar in a short text
Writing: Writing for functional/ communicative task- e.g. Re-arranging appointments,asking for permission, giving instructions

UNIT – IV

Grammar: Voice and Reported speech
Vocabulary: Synonyms and Antonyms.
Listening: Listening for completing notes based on conversation on a monologue.
Speaking: Expressing opinions, Agreeing and Disagreeing, Talking about oneself, onescurrent situations and plans.
Reading: Reading for understanding short, real world messages etc,
Writing: Writing for apologizing and offering compensation, making or alteringreservations.

UNIT – V

Grammar: Concord, Modal Auxiliary, Question Tags.
Vocabulary: Business Vocabulary.
Listening: Listening for answering multiple choice questions on a longer conversationor interview.
Speaking: Giving ones opinion on business situations, talking about some prompts foran extended period of time & Discussion with a business situation with apartner.
Reading: Reading for detailed comprehension of detailed material; Skimming andScanning.
Writing: Writing to deal with requests, giving information about a product.

REFERENCE BOOKS:

1. **Business Benchmark - Norman Whitby**
2. **Business results – Intermediate – John Hughes, John Newton**

WEB REFERENCES:

www.cambridgeenglish.org

APPLIED PHYSICS – I

I B. Tech: EEE-I SemesterLTPC

Course Code: A3HS06 3 - - 3

COURSE OVERVIEW:

Summarize the different types of errors; describe the structures of crystals and study of different X-ray diffraction methods, Electrical and Magnetic properties of various materials. Also to learn the properties of laser light and how it is used in various fields and comparing the different types of imaging and its importance.

PREREQUISITES: Fundamentals in Physics and Mathematics

COURSE OBJECTIVES:

This AP (Applied Physics) subject is common to **CSE, ECE, MECH, AERO & IT** branches of UG Engineering.

At the end of the course the student is expected to
1. Summarize the different types of errors.
2. Describe the structures of crystals and study of different X-ray diffraction methods.
3. Explain the origin of Electrical and Magnetic properties of various materials.
4. Learn the properties of laser light and how it is used invarious fields.
5. Comparing the different types of imaging and its importance.

COURSE OUTCOMES:

The student will be able to
1. Justify the propagation of errors with different methods.
2. Identify and describe crystal structures and size of the unit cell by diffraction methods.
3. Classify various magnetic, dielectric materials and apply knowledge gained in various fields.
4. Analyze why Laser light is more powerful than normal light and how it is used as a surgical tool.
5. Evaluate the advantages of imaging techniques.

Note: The figures in parentheses indicate approximate number of expected hours of instruction

SYLLABUS

UNIT-I

Measurements and Errors:
Measured, precision, accuracy, certainty, resolution; Errors - types andsources of errors (definitions and examples), Systematic error, Random error, Ambiguity error, Dynamic error, Drift, Noise.
D**ata Analysis-** Elements of statistics including precision and variance; Propagation of error with example of Wheatstone bridge, Graphical representation of scientific data.

UNIT-II

Crystal Structures:
Lattice points, Space lattice, Basis, Bravias lattice, unit cell and latticeparameters, Seven Crystal Systems with 14 Bravias lattices , Atomic Radius, Co-ordination Number and Packing Factor of SC, BCC, FCC, Miller Indices, Inter planer spacing of Cubic crystal system.
X-ray Diffraction:
Bragg's Law, X-Ray diffraction methods: Laue Method, Powder Method-Merits anddemerits.

UNIT –III

Dielectric Properties:
Electric Dipole, Dipole Moment, Dielectric Constant, Polarizability, ElectricSusceptibility, Displacement Vector, Types of polarization: Electronic, Ionic and Orientation Polarizations and Calculation of Polarizabilities (Electronic & Ionic) -Internal Fields in Solids, Clausius -Mossotti Equation, Piezo-electricity and Ferro- electricity.

Magnetic Properties:
Magnetic Permeability, Magnetic Field Intensity, Magnetic Field Induction,Intensity of Magnetization, Magnetic Susceptibility, Origin of Magnetic Moment, Bohr Magnetron, Classification of Dia, Para and Ferro Magnetic Materials on the basis of Magnetic Moment, Hysteresis Curve on the basis of Domain Theory of Ferro Magnetism, Soft and Hard Magnetic Materials, Ferrites and their Applications.

UNIT – IV

Fundamentals of Laser:
Characteristics of Laser, Energy levels in atoms, radiation matterinteraction, absorption of light, spontaneous emission of light, Stimulated emission of light , population of energy levels, Einstein A and B coefficients, Metastable state, population inversion, resonant cavity, excitation mechanisms, Lasing action.
Types of Lasers & Applications:
Solid State Laser: Ruby laser, Gas Laser: He-Ne Laser,Semiconductor Laser, Applications of Laser: Drilling, welding, micro machining, measurement of long distances, in CD write devices & printers, in Medicine as a surgical tool.

UNIT – V

Optics:
Interference–coherence (spatial, temporal) in thin films of uniform thickness (derivation);Diffraction Grating – use as a monochromator.
Imaging Techniques:
Imaging including importance, types of imaging (microscopes, telescopes,cameras etc.); Classification (visible, IR, electron, magnetic, UV/X-rays, gamma rays, microwaves); Comparative study of different types of imaging (with respect to magnification, resolution, image quality, applications).

Prescribed Books:

1. Modern Engineering physics : S. Chandralingam, K. Vijayakumar, S Chand Co.
2. Engineering Physics: S.O.Pillai, New age International.

Reference Books:
1. Solid State Physics: Charles Kittel, Wiley & Sons (Asia) Pvt. Ltd.
2. Fundamentals of physics:Halliday,Resnick,Walker.
3. Francis A.Jenkins, Harvey E. White, Fundamentals of Optics, McGraw Hill
4. Engineering Physics: P.K.Palanisamy, Scitech Publishers.
5. Eugene Hecht & A.R Ganesan (2009), Optics, Pearson
6. Bottaccini M.R, E.E. Merill, Instruments and Measurements, Bell and Howell

Note: The figures in parentheses indicate approximate number of expected hours of instruction.

ELECTRICAL CIRCUITS

I B. Tech: EEE-I Semester **L T P C**

Course Code: A3EE01 **4 1 - 4**

COURSE OVERVIEW:
This is a basic course for all Engineering students of first Year. The objective is to make them familiar with basic principles of Electrical Engineering. The course addresses the underlying concepts & methods behind Electrical Engineering. The course is present a problem oriented introductory knowledge of the Fundamentals of Electrical Engineering and to focus on the study of basic electrical parameters, basic principles, different types of electrical circuit and methods to solve electrical circuit.

PREREQUESTIES: Nil

COURSE OBJECTIVES:

At the end of the course the student is expected to

1. Comprehensive, theory based understanding of the underpinning natural and physical sciences and the engineering fundamentals applicable to the engineering discipline.
2. In-depth understanding of specialist bodies of knowledge within the engineering discipline.
3. Fluent application of engineering techniques, tools and resources.
4. Effective oral and written communication in professional and lay domains.

COURSE OUTCOMES:

On completion of this course you should be able to

1. Identify the main circuit elements and apply Kirchhoff's Laws to calculate currents, voltages and powers in typical linear and nonlinear electric circuits using a variety of analytical methods for DC, AC, transient and nonlinear analyses.
2. Reduce more complicated circuits into the Thevenin's and Norton's equivalent circuits.
3. Describe the operation and v-i characteristics of a diode and the operation of diode circuits.
4. Describe circuit elements in phasor domain and perform steady-state analysis using phasors.
5. Connect correctly an electrical circuit according to a given circuit diagram and use the analogue and digital multimeters and oscilloscope to display and measure basic electrical signals.
6. Write reports on laboratory experiments.

SYLLABUS

UNIT – I

INTRODUCTION TO ELECTRICAL CIRCUITS:
Concept of Circuit, R-L-C parameters, voltage and current sources, Independent and dependent sources, source transformation, voltage - current relationship for passive elements, Kirchhoff's laws, network reduction techniques, series, parallel and compound circuits.

UNIT – II

ANALYSIS OF ELECTRICAL CIRCUITS:
Mesh analysis: mesh equations by inspection method,super mesh analysis, nodal analysis: nodal equations by inspection method, super node analysis, and star-to-delta or delta-to-star transformation**.**

UNIT – III

SINGLE PHASE AC CIRCUITS:
R.M.S, average values and form factor for different periodic waveforms, steady state analysis of R, L and C (in series, parallel and series parallel combinations) with sinusoidal excitation, concept of reactance, impedance, susceptance and admittance.Concept of phase and phase difference.
POWER AND POWER FACTOR:
Concept of power factor, real and reactive powers, J notation,complex and polar forms of representation, complex power**.**

UNIT – IV

MAGNETIC CIRCUITS:
Faraday's laws of electromagnetic induction. Concept of self and mutualinductance, dot convention, coefficient of coupling, composite magnetic circuit, analysis of series and parallel magnetic circuits. Resonance in series and parallel circuits. Concept of band width and Q-factor.
NETWORK TOPOLOGY:
Definitions-graph, tree, basic tie set and basic cutest matrices for planarnetworks duality & dual networks.

UNIT – V

THREE PHASE CIRCUITS
Star and delta connections, phase sequence, relation between line and phase voltages and currents in balanced star and delta circuits, three phase three wire and three phase four wire systems, shifting of neutral point, analysis of balanced and unbalanced three phase circuits, measurement of active and reactive power.

TEXT BOOKS:

1. William H. Hayt, Jack E. Kemmerly, Steven M. Durbin (2006), Engineering Circuits Analysis, 7th Edition, Mc Graw Hill, New Delhi.
2. Van Valkenburg, M. E. (1974), Network Analysis, 3rd Edition, Prentice Hall of India, New Delhi.

REFERENCE BOOKS:

1. Joseph Edminister (2001), Electric Circuits, 6th Edition Schaum_s Outlines, Tata Mc Graw Hill, New Delhi.
2. Wadhwa C. L (2009), Electric Circuits Analysis, New Age International Publications, New Delhi.
3. Sudhakar, Shyammohan S. Palli (2003), Electrical Circuits, 2nd Edition, Tata Mc Graw Hill, New Delhi.
4. Chakrabarthy (2005), Circuit Theory, 4th Edition, Dhanpat Rai & Sons Publications, New

COMPUTER PROGRAMMING

	L	T	P	C
I B. Tech: EEE-ISemester				
Course Code:A3CS01	**3**	**1**	**-**	**3**

COURSE OVERVIEW:
To understand the importance of computer programming concepts such as pointers, structures, union, functions and I/O .

COURSE OUTCOMES: Nil

COURSE OBJECTIVES:

At the end of the course the student is expected to
1. Learn how to write modular, efficient and readable C programs
2. Declare and manipulate single and multi-dimensional arrays of the C data types.
3. Describe the techniques for creating program modules in C using functions and recursive functions.
4. Create and manage derived data types and perform operations on files.
5. Utilize pointers and dynamic memory allocation functions to efficiently solve problems

COURSE OUTCOMES:

Upon completion of the course, the students are expected to:
1. Write, compile and debug programs in C language.
2. Use different data types in a computer program.
3. Design programs involving decision structures, loops, arrays and functions.
4. Explain the difference between call by value and call by reference
5. Understand the dynamics of memory by the use of pointers.
6. Use different file operations to create/update basic data files.

SYLLABUS

UNIT-I

Introduction to the C Language:
Algorithm, Pseudo code, Flow chart, Background, C Programs,Identifiers, Data Types, Variables, Constants, Input / Output, Operators(Arithmetic, relational, logical, bitwise etc.), Expressions, Precedence and Associativity, Expression Evaluation, Type conversions, Statements- Selection Statements(making decisions) – if and switch statements, Repetition statements (loops)-while, for, do-while statements, Loop examples, other statements related to looping – break, continue, goto, Simple C Program examples.

UNIT-II

Functions:
Introduction to Structured Programming, Functions- basics, user defined functions, interfunction communication(call by value, call by reference), Standard functions, Storage classes-auto, register, static, extern, scope rules, arrays to functions, recursive functions, example C programs.

Arrays:
Basic concepts, one-dimensional arrays, two–dimensional arrays, multidimensional arrays,C programming examples.

UNIT – III

Pointers:
Introduction (Basic Concepts), pointers to pointers, compatibility, Pointer Applications-Arrays and Pointers, Pointer Arithmetic, memory allocation functions, array of pointers, pointers to void, pointers to functions, command –line arguments.

Strings:
Concepts, C Strings, String Input / Output functions, string manipulation functions, string /data conversion, C program examples.

UNIT-IV

Enumerated, Structure ,and Union Types:
The Type Definition(typedef), Enumerated types,Structures –Declaration, initialization, accessing structures, operations on structures, Complex structures, structures and functions, Passing structures through pointers, self-referential structures, unions, bit fields, C programming examples

UNIT-V

Input and Output:
Concept of a file, streams, text files and binary files, Differences between textand binary files, State of a file, Opening and Closing files, file input / output functions (standard library input / output functions for files), file status functions (error handling),Positioning functions, C program examples.

TEXT BOOKS:

1. Computer Science: A Structured Programming Approach Using C, B.A.Forouzan and R.F. Gilberg, ThirdEdition, Cengage Learning.
2. The C Programming Language by Brian Kernighan and Dennis Ritchie 2nd edition

REFERENCE BOOKS:

1. Let Us C Yashavant kanetkar BPB.
2. Absolute beginner's guide to C, Greg M. Perry, Edition 2,Publisher: Sams Pub., 1994.
3. Computer Programming and Data Structures by E Balagurusamy, Tata McGraw Hill.

ENGLISH COMMUNICATION SKILLS LAB

I B. Tech: EEE-I Semester **L T P C**

Course Code:A3HS12 **- - 3 2**

COURSE OVERVIEW:

English- being the foremost global language has its domination in internationally sensitive domains such as science and technology, business and commercial relation, education and diplomatic relationships, politics and administration and so on. It is the language of corporate India, a passport for better career, better pay, and advanced knowledge and for communication with the entire world. In higher education, English is the prevalent prestigious language. Careers in any area of business communication or within the government, or in science and technology require fluency in English. It is certainly considered instrumental in terms of having access to information from all over the world as a key factor for professional success. With the number of foreign investors flocking to India and the growth of outsourcing, English has come to play a key role for the transactions in written form in professional relationships between foreign and Indian companies. Hence in the existing world of cutthroat completion, it is vital to the students pursuing Engineering course to have a command not only on the academic skills but also on communication skills.

The basic idea behind offering English as a practical subject at the undergraduate level is to acquaint students with a language that enjoys currency as a lingua franca of the globe. For prospective engineers nothing could be more useful or productive than being able to reach out to the world of technology. In the ELCS lab the students are trained in Communicative English Skills, phonetics, word accent, word stress, rhythm and intonation, making effective oral presentations- both extempore and Prepared- seminars, group discussions, presenting techniques of writing, role play, telephonic skills, asking and giving directions, information transfer , debates, description of person, place, objects etc; . The lab encourages students to work in a group, engage in peer-reviews and inculcate team spirit through various exercises on grammar, vocabulary, listening and pronunciation games, etc.

PRE-REQUISITES: Nil

COURSE OBJECTIVES:

At the end of the course the student is expected to

1. To expose the students to a variety of self-instructional and learner-friendly modes of language learning.
2. To help the students to cultivate the habit of reading passages from the computer monitor, thus provides them the required facility to face computer-based competitive exams such as GRE, TOEFL, GMAT etc.
3. To enable them to learn better pronunciation through stress or word accent, intonation, and rhythm.
4. To train them to face interviews with confidence and enable them to prepare resume with cover letter.
5. To motivate them to use language effectively.
6. To prepare them to use communicative language and participate in public speaking.
7. To initiate them into greater use of the computer in power point presentation preparation, report Writing and e-mail writing etc.
8. To expose the Students to participate in group discussions, debates with ease.

COURSE OUTCOMES:

1. Learners learn how to pronounce words using the rules they have been taught.
2. Students learn the importance of speaking English using rhythm and intonation.
3. Students learn to overcome stage fear and make presentations with ease.
4. Students learn to use right words and phrases in keeping the demands of occasion.
5. Students learn to face different types of interviews with confidence.
6. Students learn to participate in group discussions.
7. Students learn to distinguish informal speech from formal speech through role plays.
8. Students learn to use the telephone etiquettes

SYLLABUS

The following course content is prescribed for the **BUSINESS ENGLISH CERTIFICATE- BEC PRELIMINARY English Language Communication Skills Lab**

Exercise – I

Listening: Listening to multiple-choice questions on short conversations or monologues

Speaking: Giving information about oneself and their opinions and Giving a short a talk onbusiness related topic

Reading: Reading multiple-choice questions on short text.

Writing: Writing a piece of internal business communication of 30-40 words (Email)

Exercise – II

Listening : Listening for completing notes based on a conversation and a monologue

Speaking : Giving short talk on business related topic.

Reading : Matching descriptions of people to short texts.
Matching statements to information given in a graph or graphs.

Writing : Writing a piece of internal business communication of 30-40 words (Message)

Exercise – III

Listening: Listening to multiple-choice questions on a longer conversation or interview.

Speaking: Debates, Extempore

Reading : Reading a longer text and deciding whether the statements about the text areright or wrong or if the information is not given.

Writing : Write a business letter or e-mail of 60-80 words, based on an input text andsome notes.

Exercise – IV

Listening: Listening to TV news channels and taking notes.
Listening to songs and writing down the lyrics.

Speaking: Interview sessions

Reading: Read a longer text and answer multiple-choice questions. Do a multiple choicetask.

Writing: Write a report.

Exercise – V

Listening: Watching short documentaries and making notes.

Speaking: Short plays, Presentations

Reading: Read short texts and fill in a form using information from the texts.

Writing : Write a short story.

Suggested Software:

K-Van solutions Software with CD

The Rosetta stone English library.

Clarity pronunciation power –part I.

Oxford advanced learner‘s compass, 7th Edition.

Learning to speak English -4 CDs.

Vocabulary in use, Michael McCarthy, felicity o‘den, Cambridge.

Murphy‘s English grammar, Cambridge with CD.

REFERENCE BOOKS:

1. Suresh Kumar. E. & Sreehari P.A (2007), Handbook for English Language Laboratories,
2. Cambridge University Press India Pvt. Ltd, New Delhi.
3. Mandal S. K (2006),Effective Communication & Public Speaking , Jaico Publishing House, New Delhi.
4. Grant Taylor (2004), English Conversation Practice, Tata McGraw Hill, New Delhi.
5. Balasubramanian .T (2000), A text book of English Phonetics for Indian Student, MacMillan Publishers, India.
6. Kamalesh Sadanand, Susheela Punitha (2008), Spoken English: A foundation Course: Parts 1 & 2, New Delhi, Orient Longman Pvt. Ltd

COMPUTER PROGRAMMING USING 'C' LAB

I B. Tech:EEE-I Semester	**L**	**T**	**P**	**C**
Course Code:A3CS02	**-**	**-**	**3**	**2**

COURSE OVERVIEW:

To understand the basic terminology used in computer programming and to write, compile and debug programs in C language and design programs involving decision structures, loops, arrays and functions.

PRE REQUISITES: Nil

COURSE OBJECTIVES:

At the end of the course the student is expected to:

1. Gain a working knowledge of C programming to write modular, efficient and readable C programs by Identifying the structural elements and layout of C source code.
2. Declare and manipulate single and multi-dimensional arrays of the C data types and derived data types like structures, unions.
3. Use functions from the portable C library and to describe the techniques for creating program modules using functions and recursive functions.
4. Manipulate character strings in C programs. Utilize pointers to efficiently solve problems.
5. Allocate memory to variables dynamically and Perform operations on text and binary files.

COURSE OUTCOMES:

At the end of the course students are able to:

1. Understand the basic terminology used in computer programming and to write, compile and debug programs in C language.
2. Design programs involving decision structures, loops, arrays and functions.
3. Understand the dynamics of memory by the use of pointers.
4. Use different file operations to create/update basic data files.

EXPERIMENTS

Week 1

Basic Linux commands
Write C programs to implement basic arithmetic operations – sum, average, product, difference,
Quotient and remainder of given numbers etc.

Week 2

Write a C program to find largest and smallest of given numbers.
Write a C program to find roots of a quadratic equation

Week 3

Write a C program to find the grade of a student
Write a C program which takes two integer operands and one operator form the user(+,-,*,/,% use switch)

Week4

Write a C program to find Sum of individual digits of given integer
Write a C program to generate first n terms of Fibonacci series
Write a C program to generate prime numbers between 1 and n

Week 5

Write a C program to calculate sum of series SUM=$1-x^2/2! +x^4/4!-x^6/6!+x^8/8!-x^{10}/10!$
Write a C program to generate Pascal's triangle

Week 6

Write a C program to find the factorial of a given integer using recursion and non recursion
Write a C program to find GCD of given integers using recursion and non recursion

Week 7

Write a C program to find largest and smallest number in a list of integers
Write a C program to find Addition of Two Matrices
Write a C program to find Multiplication of Two Matrices

Week 8

Write a C program to print 2-D array using pointers
Write a C program to allocate memory dynamically using memory allocation functions (malloc, calloc, realloc, free)

Week 9

Write C Program that uses functions to perform the following operations:
i)Insert sub-string into main string from given pos.
ii) Delete n Characters from a given position in given string.
iii) Check whether the given string is a palindrome or not

Week 10

Write a C program to copy one file to another
Write a C program to reverse first n characters in file(file name and n specified on command line)

Week 11

Write a C program to display the contents of a file
Write a C program to merge two files into a third file

Week 12

Write a C program that uses functions to perform following operations on complex numbers
a) Read b)write c)Add d)multiply (Use structure to represent complex number)

TEXT BOOKS:

1. C programming and Data Structures, P. Padmanabham, Third Edition, BS Publications

2. Computer Programming in C, V. Rajaraman, PHI Publishers.

REFERENCES:

1. C Programming, E.Balagurusamy, 3rd edition, TMH Publishers.
2. Mastering C, K.R. Venugopal and S.R. Prasad, TMH Publishers.

ENGINEERING DRAWING

I B. Tech: EEE-I Semester **L T P C**

Course Code:A3ME05 **1 1 3 3**

COURSE OVERVIEW:
One of the best ways to communicate one's ideas is through some form of picture or drawing. This is especially true for the engineer. An engineering drawing course focuses on usage of drawing instruments, lettering, construction of geometric shapes, etc. Students study use of dimensioning, shapes and angles or views of such drawings. Dimensions feature prominently, with focus on interpretation, importance and accurate reflection of dimensions in engineering drawing. Other areas of study in this course may include projected views and development of surfaces.

PRE REQUISITES: Nil

COURSE OBJECTIVES:

At the end of the course the student is expected to:

1. To have the knowledge of interpretation of dimensions of different quadrant projections.
2. To understand the basic principles of engineering drawing
3. To have the knowledge of generating the pictorial views
4. To understand the development of surfaces

COURSE OUTCOMES:

On completion of this course students are able to:

1. Students will be able to prepare and understand drawings.
2. The drawing skills of students will be improved.
3. Students will get an idea about various curves used in Engineering and their applications.
4. Students can understand and use the principles of orthographic projections.
5. By studying about projections of solids students will be able to visualize three dimensional objects and that will enable them to design new products.
6. Development of surfaces enables the student to design and fabricate surfaces of different shapes.
7. With a good knowledge in isometric projections the student will be able to represent the objects in three dimensional appearances

SYLLABUS

UNIT – I

INTRODUCTION TO ENGINEERING DRAWING:
Principles of engineering graphics and their significance – drawing instruments and their use – conventions in drawing – lettering – BIS conventions. Dimensioning rules, geometrical construction.

CURVES USED IN ENGINEERING PRACTICE AND THEIR CONSTRUCTIONS:
Conic Sections, Special Curves-Cycloids, Epicycloids, Hypocycloids.

UNIT - II

ORTHOGRAPHIC PROJECTION IN FIRST ANGLE PROJECTION ONLY:
Principles of orthographic projections – conventions – first and third angle projections. Projections of points and lines inclined to both the planes.

UNIT - III

PROJECTIONS OF PLANES AND SOLIDS:
Projections of regular planes, inclined to both planes. Projections of regular solids inclined to both planes.

UNIT – IV

DEVELOPMENT OF SURFACES:
Development of surfaces of right, regular solids–development of prisms, cylinders, pyramids, cones and their parts.

UNIT – V

ISOMETRIC PROJECTIONS:
Principles of Isometric Projections-Isometric Scale- Isometric Views-Conventions-Plane Figures, Simple and Compound Solids.

TRANSFORMATION OF PROJECTIONS:
Conversion of isometric Views to Orthographic Views. Conversion of orthographic views to isometric projections vice-versa.

TEXT BOOKS:

1. Engineering Drawing- Basant Agarwal, TMH
2. D. M. Kulkarni, A. P. Rastogi, and A. K. Sarkar (2009), Engineering Graphics with Auto CAD,PHI Learning Private Limited, New Delhi.

REFERENCE BOOKS:

1. D. Bhat (2006), Engineering Drawing, Charotar Publications, New Delhi.
2. Venugopal (2010), Engineering Drawing and Graphics, 2nd edition, New Age Publications, NewDelhi.
3. Johle (2009), Engineering Drawing, Tata Mc Graw Hill, New Delhi, India.
4. Trymbaka Murthy (2007), Computer Aided Engineering Drawing, I.K. International Publishers,New Delhi.
5. R.B. Choudary (2005), Engineering graphics with Auto CAD, Anuradha Publishers, New Delhi.
6. .Jolhe, Dhananjay (2006), Engineering Drawing: With an Introduction to CAD, Tata Mc Graw Hill, India.

TECHNICAL SEMINAR-I

MANDATORY NON-CREDIT COURSE

I B. Tech:EEE-I Semester	**L**	**T**	**P**	**C**
Course Code:A3HS19	**-**	**-**	**2**	**-**

COURSE OVERVIEW:

To identify and improve their technical/ non technical skills and communication skills in all aspects such as reading, writing and speaking.

COURSE OBJECTIVE:

Seminar is an important component of learning in an Engineering College, where the student gets acquainted with preparing a report & presentation on a topic.

PERIODICITY / FREQUENCY OF EVALUATION: Twice

PARAMETERS OF EVALUATION:

1. The seminar shall have topic allotted and approved by the faculty.
2. The seminar is evaluated for 25 marks for internal and 25 marks for external.
3. The students shall be required to submit the rough drafts of the seminar outputs within one week of the commencement of the class work.
4. Faculty shall make suggestions for modification in the rough draft. The final draft shall be presented by the student within a week thereafter.
5. Presentation schedules will be prepared by Department in line with the academic calendar.

The Seminars shall be evaluated in two stages as follows:

Rough draft

In this stage, the student should collect information from various sources on the topic and collate them in a systematic manner. He/ She may take the help of the concerned faculty.

The report should be typed in ―MS-Word‖ file with ―Calibri‖ font, with font size of 16 for main heading, 14 for sub-headings and 11 for the body text. The contents should also be arranged in Power Point Presentation with relevant diagrams, pictures and illustrations. It should normally contain 10 to 15 slides, consisting of the followings:

1.	Topic, name of the student & faculty	1 Slide
2.	List of contents	1 Slide
3.	Introduction	1Slides
4.	Descriptions of the topic (point-wise)	6 - 10 Slides
5.	Conclusion	1 - 2 Slides
6.	References/Bibliography	1 Slide

The soft copy of the rough draft of the seminar presentation in MS Power Point format along with the draft report should be submitted to the concerned faculty, with a copy to the concerned HOD within stipulated time.

The evaluation of the rough draft shall generally be based upon the following

1	Punctuality in submission of rough draft	2
2	Dress Code	3
3	Resources from which the seminar have been based	2

4	Report , and content of Presentation	5
5	Depth of the students knowledge in the subject	5
6	Reception from Questions	5
7	Time Management, Classroom Dynamic	3
	Total Marks	**25**

After evaluation of the first draft the supervisor shall suggest further reading, additional work and fine tuning, to improve the quality of the seminar work.
Within 7 days of the submission of the rough draft, the students are to submit the final draft incorporating the suggestions made by the faculty.

Presentation: (External)

After finalization of the final draft, the students shall be allotted dates for presentation (in the designated seminar classes) and they shall then present it in presence students, HOD, In-charge, faculties of the department and at least one faculty from some department / other department.

The student shall submit 3 copies of the Report neatly bound along with 2 soft copies of the PPT in DVD medium. The students shall also distribute the title and abstract of the seminar in hard copy to the audience. The final presentation has to be delivered with 18-25 slides.

The evaluation of the Presentation shall generally be based upon the following.

1.	Contents	10 Marks
2.	Delivery	10 Marks
3.	Relevance and interest the topic creates	10 Marks
4.	Ability to involve the spectators	10 Marks
5.	Question answer session	10 Marks
	Total	**50 Marks**

WHO WILL EVALUATE?

The presentation of the seminar topics shall be made before an internal evaluation committee comprising the Head of the Department or his/her nominee, seminar supervisor and a senior faculty of the department / other department.

I B.TECH II SEMESTER

SYLLABUS

LINEAR ALGEBRA AND INTEGRAL TRANSFORMS

I B. Tech: EEE-II Semester	**L**	**T**	**P**	**C**
Course Code:A3HS03	**4**	**1**	**-**	**4**

COURSE OVERVIEW:

This course focus on basic areas of theory and more advanced Engineering Mathematics topics which provide students with the relevant mathematical tools required in the analysis of problems in Engineering and scientific professions. The topics covered include solutions for linear systems, Eigen values and Eigen vectors, linear transformation, Laplace transforms, Application of partial differential equations, Fourier Transforms. The mathematical skills derived from this course form a necessary base to analytical and design concepts encountered in the program.

PREREQUISITE(S): NIL

COURSE OBJECTIVES:

At the end of the course the student is expected to:

1. Learn concepts of matrix algebra, methods of solving system of linear equations anddetermine Eigenvalues and Eigen vectors of a matrix.
2. Understand how the Eigen values and Eigen vectors of Hermitian, Unitary and Normal matrices differ fromthose of general matrices.
3. Know the basic properties of standard partial differential equations to solve engineering problems
4. Determine the Fourier transforms of a given function.
5. Analyze the characteristics and properties of Fourier transforms.

COURSE OUTCOMES:

After completing this course, the student will be able to:

1. Use elementary transformations to reduce matrices to echelon form, normal form and hence find their rank.
2. Make use of echelon forms in finding the solution of system of linear equations.
3. Compute Eigen values and Eigen vectors of square matrices. Reduce the quadratic form to canonical form.
4. Apply Laplace transform to solve differential equations which will be converted toalgebraic equation.
5. Determine Fourier transform, Fourier sine and cosine transform of a function
6. Apply partial differential equations to solve engineering problems.

SYLLABUS

UNIT – I

THEORY OF MATRICES:

Real matrices: Symmetric-skew-symmetric and orthogonal matrices–Complex matrices: Hermitian, Skew –Hermitian and Unitary matrices –Elementary row and column transformations –Elementary matrix-Finding rank of a matrix by reducing to Echelon form and Normal form-Finding the inverse of a matrix using elementary row/column transformations (Gauss-Jordan method)-Consistency of system of linear equations (homogeneous and non-homogeneous) using the rank of a matrix –Solving m n and n n linear system of equations by Gauss Elimination-Cayley-Hamilton Theorem (Statement and verification)-Finding inverse and powers of a matrix by Cayley-Hamilton Theorem

UNIT – II

LINEAR TRANSFORMATIONS:

Linear dependence and independence of vectors–LinearTransformation, orthogonal transformation-Eigen values and Eigen vectors of a matrix-properties of eigen values and eigen vectors of real and complex matrices- Diagonalization of a matrix. Quadratic forms up to three variables-Rank, Index, Signature and Nature of Quadratic form-Reduction of a Quadratic form to canonical form using linear and orthogonal transformations.

UNIT – III

LAPLACE TRANSFORM AND ITS APPLICATIONS TO ORDINARY DIFFERENTIAL EQUATIONS:

Laplace transforms of elementary functions- First shifting theorem - Change of scale property – Multiplication by t^n- Division by t – Laplace transforms of derivatives and integrals – Unit step function– Second shifting theorem – Periodic function – Evaluation of integrals by Laplace transforms – Inverse Laplace transforms- Method of partial fractions – Other methods of finding inverse transforms– Convolution theorem – Applications of Laplace transforms to ordinary differential equations.

UNIT – IV

FOURIER TRANSFOREMS:
Fourier integral theorem (statement)-Fourier sine and cosine integrals–Fourier transforms –Fourier sine and cosine transforms-properties- Inverse transforms-Finite Fourier transforms – Parseval's Identity

UNIT – V

SECOND ORDER PARTIAL DIFFERENTIAL EQUATIONS AND APPLICATIONS:
Method of separation of variables for second order equations-Applications of Partial differential equations- one dimensional wave equation, Heat equation.

TEXT BOOKS:

1. Higher Engineering Mathematics by Dr.B.S.Grewal, Khanna publishers.
2. Engineering mathematics, Vol –I, by Garg and Guptha, person publishers

REFERENCE BOOKS:

1. Advanced Engineering Mathematics by R K Jain& S R K Iyengar,Narosa Publishers
2. Advanced Engineering Mathematics by E. Kreyszig, John Wiley & Sons Publisher.
3. Engineering Mathematics by N.P.Balil, Lakshmi Publications.
4. Advanced Engineering Mathematics by Michael Greenberg, pearson Education.

APPLIED PHYSICS – II

I B. Tech: EEE-II Semester **L T P C**

Course Code: A3HS07 **3 - - 3**

COURSE OVERVIEW:

Classification of semiconductors and design of LED, LCD Solar cell, discuss the different types of optical fibers how it is used for communication in optical fiber networks and explain the engineering applications of ultrasonics and how super conductors are used in transmission lines.

PREREQUISITES: Fundamentals in Physics and Mathematics.

COURSE OBJECTIVES:

This AP (Applied Physics) subject is common to CSE, ECE, MECH, AERO & IT branches of UG Engineering.

At the end of the course the student is expected to:

1. Learn the behavior of matter waves and applications of Schrodinger wave equations
2. Periodic Potential Energy of Electron.
3. Explain the classification of semiconductors and design of LED,LCD Solar cell
4. Discuss the different types of optical fibers how it is used for communication in optical fiber networks.
5. Explain the engineering applications of ultrasonics and how super conductors are used in transmission lines.
6. Describe the basics of quantum teleportation.

COURSE OUTCOMES:

Upon successful completion of this course, student will be able to:

1. Prove that energies of electron is quantized when particle is moving in a potential box.
2. Analyze the type of semiconductors and construction of LCD with different material.
3. Justifying the optical fiber is more advantage than cables and optical fiber in sensor application.
4. Analyze the engineering applications of ultrasonic.
5. Analyze the impossibility of faster than light transfer of information.

SYLLABUS

UNIT-I

Quantum Mechanics:
Waves and Particles, de Broglie Hypothesis, Matter Waves, Davisson and Germer‘s Experiment, Heisenberg‘s Uncertainty Principle, Schrodinger‘s Time Independent Wave Equation-Physical Significance of the wave Function, Particle in One Dimensional Potential Box.

Band Theory of Solids:
Fermi-Dirac Statistics (Qualitative treatment), Electron in a periodic potential, Blochtheorem, Kronig –Penny Model (Qualitative treatment), Origin of Energy Band formation in Solids, Classification of Materials into Conductors, Semiconductors & Insulators, Effective mass of an Electron.

UNIT-II

Semiconductor Physics:
Intrinsic and Extrinsic Semiconductors, Fermi Level, Fermi level in Intrinsic and Extrinsic Semiconductors, Direct and Indirect Band gap semiconductors, Hall Effect and Applications.

Physics of Semiconductor Devices:
LED materials, Construction and Working of LED, Advantages and Disadvantages. LCD-Characteristics of LCD, Action of LCD display device. Solar Cells-Photovoltaic effect, Efficiency Issues, Solar materials, Advantages of Solar Cells.

UNIT –III

Fundamentals of Fiber Optics:

Structure and Principle of Optical Fiber, Acceptance Angle, Numerical Aperture, Types of Optical Fibers (SMSI, MMSI, MMGI), Attenuation in Optical Fibers, Optical fiber Communication System with block diagram. Fiber Optics sensors: Classification of Optical sensors, Pressure or Temperature Sensors and Displacement Sensors, Liquid level Sensors.

UNIT – IV

Ultrasonics:

Introduction-prodection of Ultrasonic waves-piezoelectric and magnetostriction method, properties and Detection of Ultrasonic waves, Engineering applications of Ultrasonics (Non-destrictive testing, cavitation, measurement of gauge).

Superconductivity:

Zero resistance, Critical temperature Tc ,Perfect diamagnetism, Meissner effect, Critical field Hc, Type I and Type II superconductors, Cooper pairs and formation of superconducting gap at Fermi level, Electron-Phonon interaction and BCS theory, Applications – Superconducting magnets, Transmission lines.

UNIT – V

Quantum computation:

Idea of qubit and examples of single qubit logic gates–classical bits, Qubit as a two level system; Bloch vector representation of state of qubit

Classical cryptography:

Introduction to cryptography, Vermam cipher; Public key cryptosystem; The RSA protocol; Comments on No cloning theorem; BB84 protocol, Quantum Teleportation – Basic Idea;

Text Books:

1. Modern Engineering physics : S. Chandralingam, K. Vijayakumar, S Chand Co.
2. Engineering Physics: S.O.Pillai, New age International.

Reference Books:

1. Solid State Physics: Charles Kittel, Wiley & Sons (Asia) Pvt. Ltd.
2. Fundamentals of physics: Halliday,Resnick,Walker.
3. Engineering Physics – By V Rajendran, Mc Graw Hill Edn.
4. Solar Photovoltaics – Fundamentals, Technologies and Applications 3rd Edition, PHI
5. Modern Engineering Physics – By S.L Gupta & Sanjeev Gupta, Dhanpat Rai Publications.
6. Principles of Quantum computation and Information – By G. Benenti, G. Casati, G. Strini, World scientific.
7. Engineering Physics: P.K. Palanisamy, Scitech Publishers.
8. Nielsen M. A., I. L Chung, Quantum Computation & Quantum Information, Cambridge Univ. Press.

Note: The figures in parentheses indicate approximate number of expected hours of instruction.

ENGINEERING CHEMISTRY

	L	T	P	C
I B.Tech:EEE-II Semester				
Course Code: A3HS09	**3**	**-**	**-**	**3**

COURSE OVERVIEW:

This course will involve minimum lecturing, content will be delivered through assigned reading and reinforced with large and small group discussions, as well as assigned in class (and occasional out of class) group activities. Water and its treatment for various purposes, engineering materials such as plastics, composites, ceramic, abrasives, their preparation, properties and applications, conventional and non-conventional energy sources, nuclear, solar, various batteries, combustion calculations, corrosion and control of metallic materials.

PREREQUISITES: Fundamentals in chemistry.

COURSEOBJECTIVES:

At the end of the course the student is expected to:

1. Discover the importance of electrical energy originated from chemical reactions articulate and utilize
2. corrosion prevention strategies and estimate corrosion behavior of materials and components.
3. Describe the role of water as an engineering material in steam and power generation.
4. Substantiate the utility of polymers in chemical and hardware industries. Inculcate knowledge of basic construction materials with its vital role.
5. Extrapolate the application of fuels in day to day life.
6. Focus on the behavior of different alloys in metallurgy. Understand the concept of colloid and extrapolate their applications in industry.

COURSE OUTCOMES:

Upon successful completion of this course, student will be able to:

1. Extrapolate the knowledge of cell, electrode, cathode, anode, electrolysis, electromotive force and reference electrode including corrosion of metals.
2. Understanding and explore the engineering applications of polymeric materials, cement, lubricants and refractories.
3. Interpret the vitality of phase rule in metallurgy.
4. Summarize the application of colloids and nanoparticles on industry level in controlling pollution

SYLLABUS

UNIT-I

ELECTROCHEMISTRY:
Introduction, Conductance-Specific, Equivalent and Molar conductance, effect of dilution on electrolytic conductance. EMF: Galvanic Cells, Nernst equation, numerical problems. Concept of concentration cells, electro chemical series-applications.
BATTERIES: Primary and secondary cells, (Lechlanche cell, Lead-Acid cell, Ni- Cd cell, Lithiumcells).
Applications of batteries, Fuel cells: Hydrogen – Oxygen fuel cell, advantages of fuel cells.
CORROSION AND ITS CONTROL:
Introduction, causes of corrosion, theories of corrosion–Chemical, Electrochemical corrosion. Corrosion control methods – Cathodic protection, sacrificial anode, impressed current cathode. Surface coatings – electroplating, metal cladding. Hot dipping.

UNIT–II

WATER TREATMENT:
Introduction to Hardness, causes, expression of hardness, units. Types of hardness, numerical problems. Treatment of water: Internal treatment(phosphate,colloidal,calgon and carbonate treatment) & External treatments: Lime- soda process, Ion exchange and Zeolite process. Desalination: Reverse osmosis and its significance. Numerical problems.

UNIT–III

ENGINEERING MATERIALS: HIGH POLYMERS:
Introduction, Types of Polymerization. Plastics: Thermoplastics & Thermosets. Preparation, properties and engineering applications of plastics: Poly vinyl chloride, Teflon, Nylon. Rubbers: Natural rubber and its vulcanization. Synthetic rubbers: Buna-S, Butyl rubber. Fibers: preparation, properties and applications of Polyester(Dacron): . Conducting Polymers: mechanism of conduction in poly acetylene and applications of Conducting Polymers.

MATERIALS CHEMISTRY:
Cement- Composition of Port land Cement setting and hardening of cement(reactions). Lubricants: characteristics of a good lubricant, classification with examples of lubricants. Refractories: characteristics of good refractories, classification. Nanomaterials: Introduction, preparation and applications.

UNIT–IV

ENERGY SOURCES:
Fuels: Classification fuels: Calorific value (LCV & HCV) and problems solid, liquid, gaseous fuels. Solid fuels: Coal- Its analysis by proximate and ultimate analysis. Liquid fuels: Petroleum and its refining. Gaseous fuels: Natural gas, LPG, CNG and their applications. Flue gas: Analysis of Flue gas by Orsat's method. Combustion: problems.

UNIT–V

PHASE RULE:
Gibb's phase rule equation. Definition of Terms: Phase, Components and Degrees of Freedom. Significance and limitations of phase rule. Phase diagrams: One component system- Water system. Two component system- Silver-lead system.

SURFACE CHEMISTRY:
Adsorption: Types of adsorption. Adsorption isotherm: Langmuir adsorptionisotherm, applications of adsorption. Colloids: Classification of colloids. Properties of colloids: Electrical & optical properties. Applications of colloids.

TEXT BOOKS:

1. PC Jain & Monica Jain, (2008). Engineering Chemistry, Dhanpatrai Publishing Company.
2. K.N Mishra, R.P Mani &B. Rama Devi(2009). Chemistry of Engineering Materials, CENGAGE.

REFERENCE BOOKS:

1. S.S Dara & Mukkanti, (2006). Engineering Chemistry, S. Chand & Co. New Delhi.
2. J.C Kuriacase & J Raja ram (2004), Engineering Chemistry, Tata McGraw Hills Co. New Delhi.
3. Engineering Chemistry by M Tirumala Chary & E. Laxminarayana (Second Edition), ScitechPublications, Chennai.

COMPUTATIONAL METHODS AND INTEGRAL CALCULUS

	L	T	P	C
I B.Tech:EEE-II Semester				
Course Code: A3HS02	**4**	**-**	**-**	**4**

COURSE OVERVIEW:

The course matter is divided in to 5 chapters covering duly-recognized are as of theory and study . This Course deals with more advanced Engineering Mathematics and Statistics topics which provide students with the relevant mathematical and statistical tools required in the analysis of problems in engineering and scientific professions. The topics covered include probability, random variables and distributions, solutions of algebraic and transcendental equations, interpolation, curve fitting, numerical integration and numerical solution of ordinary differential equations, Improper integration, multiple integrals and their applications, Vector integral theorems(Green‘s, Stoke‘s and Gauss‘s divergence theorems). The mathematical skills derived from this course forma necessary base to analytical and design concepts encountered in the programme.

PREREQUISITE(S): NIL

COURSE OBJECTIVES:

At the end of the course, students are expected to:

1. Develop an understanding of the role of distributions in engineering.
2. Acquaint students with the fundamental concepts of solving algebraic and transcendental equations.
3. Develop an understanding of the role of Numerical Analysis in engineering.
4. To gain experience of doing independent study and research.

COURSE OUTCOMES:

Up on successful completion of this course, student will be ableto:

1. Classify discrete and continuous distribution functions.
2. Determine numerical solution of Non Linear equations.
3. Discuss the Stability of a system of equations.
4. Demonstrate the use of curve fitting in correlation and regression analysis.
5. Explain numerical differentiation and integration.
6. Examine numerical interpolation and approximation of functions.
7. Interpret errors in Numerical Methods.
8. Evaluate double integrals by changing variables, changing order and triple integration to find the area and volume of given region.
9. Apply Beta and Gamma functions to evaluate improper integrals.
10. Apply Green‘s theorem to evaluate line integrals along simple closed contours on the plane, Stoke‘s theorem to give physical interpretation of the curl of a vector field and Divergence theorem to give physical interpretation of the divergence of a vector field.

SYLLABUS

UNIT-I

ALGEBRAIC AND TRANSCENDENTAL EQUATIONS:

Introduction – Graphical interpretation of solution of equations. Bisection method - Regula-falsi method - Iteration method - Newton-Raphson method – Solving system of non-homogeneous equations by L – U decomposition method (Crouts method) – Jacobi‘s Method – Gauss seidel iteration method.

UNIT-II

INTERPOLATION:
Finite differences: Forward, Backward and Central differences - Other difference operators and relations between them - Differences of a polynomial – Missing terms - Newton‘s forward interpolation, Newton‘s backward

interpolation, Gauss's forward and backward interpolation formulae and Stirling's formula. Interpolation with unequal intervals – Lagrange's interpolation.

CURVE FITTING:
Method of least squares - Fitting a straight line, second degree parabola and non-linear curves of the form $y= a e^{b x}$, $y= a x^{b,}$ $y = a b^{x}$ by the method of least squares.

UNIT-III

NUMERICAL INTEGRATION:
Newton-cotes quadrature formula - Trapezoidal rule - Simpson's one-third rule - Simpson's three-eighth rule.

NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS:
Taylor's series method –Picard's method - Euler's - modified Euler's Method - Runge-Kutta method

UNIT-IV

IMPROPER INTEGRATION, MULTIPLE INTEGRALS & APPLICATION

BETA AND GAMMA FUNCTIONS:
Relation between them, their properties–Evaluation of improper integrals using Gamma/Beta function.

MULTIPLE INTEGRALS:
Double and triple integrals–Change of order of integration-Change of variables in double integrals. Finding the area and volume of a region using double and triple integration

UNIT-V

VECTOR CALCULUS:
Scalar and vector point functions - Gradient, divergence, curl and their related properties -Solenoidal and irrotational vector point functions - Scalar potential function - Laplacian operator - Line integral - work done - surface integrals - volume integral - Vector integral theorems - Green's theorem in a plane - Stoke's theorem - Gauss divergence theorem (all theorem statements and their verification)

TEXT BOOKS:

1. Numerical Methods for Scientific and Engineering Computation by M.K. Jain, S.R.K.Iyengar and R.KJain, New Age International Publishers.
2. Higher Engineering Mathematics by Dr.B.S.Grewal, Khanna publishers

REFERENCE BOOKS:

1. Introductory Methods of Numerical Analysis by S. S. Sastry, PHIL Learning Pvt.Ltd

2. Advanced Engineering Mathematics by E. Kreyszig, John Wiley & Sons Publisher.

3. Advanced Engineering Mathematics by Lawrence Turyn, CRC press

DATA STRUCTURES

	L	T	P	C
I B.Tech: EEE-II Semester				
Course Code: A3CS04	**4**	**1**	**-**	**4**

COURSE OVERVIEW:

Computations of mathematics using programs and understand the stack and queue operations.

PREREQUISITES: Fundamentals of computers.

COURSE OBJECTIVES:

At the end of the course, students are expected to:

1. To teach efficient storage mechanisms of data for an easy access.
2. To design and implementation of various basic and advanced data structures.
3. To introduce various techniques for representation of the data in the real world.
4. To develop application using data structures.
5. To improve the logical ability

COURSE OUTCOMES:

Upon completion of the course, the students are able to:

1. Choose appropriate data structure as applied to specified problem definition.
2. Handle operations like searching, insertion, deletion, traversing mechanism etc. on various data structures.
3. Apply concepts learned in various domains like DBMS, compiler construction etc.
4. Able to use linear and non-linear data structures like stacks , queues , linked list.

SYLLABUS

UNIT-I

Time and space complexity, Data Structures – Introduction to Data Structures, abstract data types, Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list, circular linked list implementation, Double linked list implementation, insertion, deletion and searching operations. Applications of linked lists.

UNIT –II

Stacks-Operations, array and linked representations of stacks, stack applications-infix to postfix conversion, postfix expression evaluation, recursion implementation.

UNIT-III

Queues-operations, array and linked representations. Circular Queue operations, Dequeues, applications of queues.

UNIT-IV

Searching and Sorting – Sorting- selection sort, bubble sort, insertion sort, quick sort, merge sort, shell sort, radix sort, Searching-linear and binary search methods, comparison of sorting and searching methods.

UNIT-V

Trees – Definitions, tree representation, properties of trees, Binary tree, Binary tree representation, binary tree properties, binary tree traversals, binary tree implementation, applications of trees.

TEXT BOOKS:

1. Fundamentals of Data structures in C, 2nd Edition, E.Horowitz, S.Sahni and Susan Anderson-Freed, Universities Press.
2. Data structures A Programming Approach with C, D.S.Kushwaha and A.K.Misra, PHI.

REFERENCE BOOKS:

1. Data structures: A Pseudocode Approach with C, 2nd edition, R.F.GilbergAndB.A.Forouzan, CengageLearning.
2. Data structures and Algorithm Analysis in C, 2nd edition, M.A.Weiss, Pearson.
3. Data Structures using C, A.M.Tanenbaum,Y. Langsam, M.J.Augenstein, Pearson.
4. Data structures and Program Design in C, 2nd edition, R.Kruse, C.L.Tondo and B.Leung,Pearson.

ENGINEERING PHYSICS LAB

	L	T	P	C
I B. Tech: EEE-II Semester				
Course Code: A3HS13	-	-	3	2

COURSE OVERVIEW:

Engineering physics laboratory course includes the experimental methods for the determination of mechanical property (Rigidity modulus of a given material), frequency of an AC signal, basic electronic circuits (LED, RC circuit), and to study characteristics of LASERS & Optical fiber (LASER wavelength, divergence, Numerical aperture of fiber, Losses in fibers). This interdisciplinary knowledge is designed for the continuous innovation occurring with technology.

PRE REQUISITES: Basic physics

Course Objectives:

At the end of the course, students are expected to:

1. Describe the rigidity modulus of given wire by using Torsional pendulum.
1. Study of LED and SOLAR CELL characteristics
2. Understanding the propagation of laser light and how it is used for communication in Optical
3. Communication network
4. Learn how to calculate energy gap of given semiconductor
5. Explain the magnetic field along axis of current carrying coil
6. Describe the phenomenon of interference.

Course Outcomes:

Up on successful completion of this course, student will be able to:

1. Remember the property of elastic materials and modulus.
2. Understanding of characteristics of LED and SOLAR CELL.
3. Analyzing of energy gap of semiconductor.
4. Analyzing the wavelength of laser source using diffraction grating.
5. Explaining the magnetic field along the axis of a current carrying coil by using stewart & Gee's apparatus.
6. Understanding numerical aperture of optical fiber.
7. Explaining the interference phenomenon by using Newton's ring apparatus.

List of Experiments:

Any six experiments are to be performed:

1. Determination of rigidity modulus of the material of a given wire– Torsional pendulum.
2. Study of V-I characteristics of an LED.
3. Study of V-I & V-P characteristics of solar cell.
4. Determination of wavelength and angular divergence of given laser source-Diffraction grating.
5. Study of variation of magnetic field along a circular current carrying conductor – Stewart & Gee's apparatus.
6. Determination of energy gap of a given semiconductor material.
7. Determination of numerical aperture - optical Fibers.
8. Determination of radius of curvature of plano-convex lens – Newton's rings apparatus.

DATA STRUCTURS LAB

	L	T	P	C
I B. Tech: EEE-II Semester				
Course Code: A3CS05	-	-	3	2

COURSE OVERVIEW:

Computations of mathematics using programs and understand the stack and queue operations.

PRE REQUISITES: Fundamentals of computers and mathematics

COURSE OBJECTIVES:

At the end of the course, students are expected to:

1. To develop skills to design and analyze simple linear and nonlinear data Structures
2. To Strengthen the ability to identify and apply the suitable data structure for the given real world problem
3. To Gain knowledge in practical applications of data structures

COURSE OUTCOMES

Upon completion of the course, the students are able to:

1. Be able to design and analyze the time and space efficiency of the data structure
2. Be capable to identity the appropriate data structure for given problem
3. Have practical knowledge on the application of data structures.

WEEK1:

Write a program for creation, Search and Traversal of Single Linked List
Write a program to perform insertion and deletion operations in Single Linked List

WEEK2:

Write a program to merge two single linked lists.
Write a program to compare two single linked lists

WEEK3:

Write a program for creation, Search and Traversal of Circular Linked List.
Write a program to perform insertion and deletion operations in Circular Linked List

WEEK4:

Write a program for creation, Search and Traversal of Double Linked List
Write a program to perform insertion and deletion operations in Double Linked List

WEEK5:

Write a program to implement stack using Arrays 2.Write a program to implement stack using Linked List

WEEK6:

Write a program to convert infix expression to postfix expression using stack
Write a program to evaluate postfix expression

WEEK7:

Write a program to implement linear queue using Array
Write a program to implement linear queue using Linked List

WEEK8:

Write a program to implement insertions and deletions in a circular Queue
Write a program to perform search and count operations in a circular queue

WEEK9:

Write a program to implement insertions and deletions in a Deque using array
Write a program to perform search and count operations in a circular queue using linked list

WEEK10:

Write a program to implement the following

a) Linear search b) Binary Search

WEEK11:

Write a program to implement the following

a) Bubble sort b) Insertion sort c) Selection sort

WEEK12:

Write a program to implement the following

a) Merge sort b) Quick sort

IT&ENGINEERING WORKSHOP

I B.Tech:EEE-II Semester	**L**	**T**	**PC**
Course Code:A3HS20-	**-**	**3**	**2**

COURSE OVERVIEW:

PRE REQUISITES: Fundamentals of computers

COURSE OBJECTIVES:

COURSE OUTCOMES:

Upon completion of the course, the students are expected to:

PART-A

Anysix experiments **with minimum one** experiment from each section to be performed.

LIST OF EXPERIMENTS:

PC Hardware:

Task 1 --- Identifying Computer peripherals and its functions.

Task 2 ---Assembling and Disassembling of PC

a. Make comparative study of motherboards.
b. Observe and study various cables and connectors.
c. Study various cards used in a system viz. LAN card, Network Interface Card etc.
d. Study on various drives viz. CD Drive, Floppy Drive.
e. Study on hard disk viz.SSD, HDD.
f. To remove, study and replace CD ROM drive.
g. To Study on various types of printers viz. Dot Matrix, Laser, InkJet,etc.
h. To study parts of keyboard and mouse.
i. To assemble a PC.

Task---3:Every Student should individually install MS Windows on the personal computer. LabInstructor should verify the installation and follow it up with a VIVA.

Task ---4: Every student should install Linux on a computer. That computer should havewindows installed. The system should be configured as dual boot with both Windows and Linux. Lab Instructor should verify the installation and follow it up with a VIVA.

Internet & World Wide Web:

Task 5- Orientation & Connectivity Boot Camp: Students should get connected to their LocalArea Networkand access the Internet. In the process they configure the TCP/IP setting. Finally students should demonstrate, to the instructor, how to access the websites and email. If there is no internet connectivity preparations need to be made by the instructors to simulate the WWW on the LAN.

Task 6 - Web Browsers, Surfing the Web: Students customize their web browsers with theLAN proxysettings, bookmarks, search toolbars and pop up blockers. Also, plug-ins like Macromedia Flash and JRE for applets should be configured.

Task 7 - Search Engines & Netiquette: Students should know what search engines are and how to use the search engines. A few topics would be given to the students for which they need to search on Google. This should be demonstrated to the instructors.

Task 8 - Cyber Hygiene: Students would be exposed to the various threats on the internet and would beasked to configure their computer to be safe on the internet. They need to first install an antivirus software, configure their personal firewall and windows update on their computer. Then they need to customize their browsers to block pop ups, block active x downloads to avoid viruses and/or worms.

MICROSOFT OFFICE MS Word

Task 9 and 10 –Word Orientation: Word–Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter in word, Formatting Fonts in word, Drop Capin word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in both and Word, Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check , Track Changes , Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes and Paragraphs, Forms, Text Fields, Inserting objects, Mail Merge in Word.

MS Excel

Task 11 and 12 - Excel Orientation : Excel–Accessing, overview of toolbars, saving excel files, Using help and resources, Gridlines, Format Cells, Summation, auto fill, Formatting Text, Cell Referencing, Formulae in excel – average, standard deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function, LOOKUP/VLOOKUP, Split cells, freeze panes, group and outline, Sorting, Boolean and logical operators, Conditional formatting, Pivot Tables, Interactive Buttons, Importing Data, Data Protection, Data Validation

MS Power Point

Task 13 and 14 - PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows, Hyperlinks, Inserting –Images, Clip Art, Audio, Video, Objects, Tables and Charts, Master Layouts (slide, template, and notes), Types of views (basic, presentation, slide slotter, notes etc), Inserting – Background, textures, Design Templates, Hidden slides, Auto content wizard, Slide Transition, Custom Animation, Auto Rehearsing.

REFERENCE BOOKS:

1.Vikas Gupta (2008), Comdex *Hardware and Networking Course Kit*, DreamTech press, New Delhi, India.

2.Sumitabha Das (2008), *UNIX concepts and applications*, 4th Edition, Tata McGraw Hill, New

PART-B

At least one exercise from each trade to be performed

1. TRADES FOR EXERCISES:

Task 1: Carpentry exercises-1
Task 2: Carpentry exercises-2
Task 3: Fitting exercises-1
Task 4: Fitting exercises-2
Task 5: House wiring exercises-1 and exercises-2
Task 6: Tin smithyexercises-1 and exercises-2
Task 7: Foundryexercises-1 and exercises-2
Task 8: Soldering practice
Task 9: Implementation of basic circuits on PCB

TECHNICAL SEMINAR-II
AND
COMPUTATIONAL MATHEMATICS (FOSS)
MANDATORY NON-CREDIT COURSE

I B. Tech:EEE-II Semester	**L**	**T**	**P**	**C**
Course Code:A3HS18	**-**	**-**	**2**	**-**

COURSE OVERVIEW:

PRE REQUISITES:

COURSE OBJECTIVE:

Seminar is an important component of learning in an Engineering College, where the student gets acquainted with preparing a report & presentation on a topic.

COURSE OUTCOMES:

PERIODICITY / FREQUENCY OF EVALUATION: Twice

PARAMETERS OF EVALUATION:

1. The seminar shall have topic allotted and approved by the faculty.
   The seminar is evaluated for 25 marks for internal and 25 marks for external.
2. The students shall be required to submit the rough drafts of the seminar outputs within one week of the commencement of the class work.
3. Faculty shall make suggestions for modification in the rough draft. The final draft shall be presented by the student within a week thereafter.
4. Presentation schedules will be prepared by Department in line with the academic calendar.

The Seminars shall be evaluated in two stages as follows:
Rough draft
In this stage, the student should collect information from various sources on the topic and collate them in a systematic manner. He/ She may take the help of the concerned faculty.

The report should be typed in ―MS-Word‖ file with ―calibri font, with font size of 16 for main heading, 14 for sub-headings and 11 for the body text. The contents should also be arranged in Power Point Presentation with relevant diagrams, pictures and illustrations. It should normally contain 10 to 15 slides, consisting of the followings:

1.	Topic, name of the student & faculty	1 Slide
2.	List of contents	1 Slide
3.	Introduction	1Slides
4.	Descriptions of the topic (point-wise)	6 - 10 Slides
5.	Conclusion	1 - 2 Slides
6.	References/Bibliography	1 Slide

The soft copy of the rough draft of the seminar presentation in MS Power Point format along with the draft report should be submitted to the concerned faculty, with a copy to the concerned HOD within stipulated time.
The evaluation of the rough draft shall generally be based upon the following.

1	Punctuality in submission of rough draft	2
2	Dress Code	3
3	Resources from which the seminar have been based	2
4	Report , and content of Presentation	5
5	Depth of the students knowledge in the subject	5
6	Reception from Questions	5
7	Time Management, Classroom Dynamic	3
	Total Marks	**25**

After evaluation of the first draft the supervisor shall suggest further reading, additional work and fine tuning, to improve the quality of the seminar work.

Within 7 days of the submission of the rough draft, the students are to submit the final draft incorporating the suggestions made by the faculty.

Presentation: (External)

After finalization of the final draft, the students shall be allotted dates for presentation (in the designated seminar classes) and they shall then present it in presence students, HOD, In-charge, faculties of the department and at least one faculty from some department / other department.

The student shall submit 3 copies of the Report neatly bound along with 2 soft copies of the PPT in DVD medium. The students shall also distribute the title and abstract of the seminar in hard copy to the audience. The final presentation has to be delivered with 18-25 slides.

The evaluation of the Presentation shall generally be based upon the following.

1.	Contents	10 Marks
2.	Delivery	10 Marks
3.	Relevance and interest the topic creates	10 Marks
4.	Ability to involve the spectators	10 Marks
5.	Question answer session	10 Marks
	Total	**50 Marks**

WHO WILL EVALUATE?

The presentation of the seminar topics shall be made before an internal evaluation committee comprising the Head of the Department or his/her nominee, seminar supervisor and a senior faculty of the department / other department

COMPUTATIONAL MATHEMATICS (FOSS)

	L	T	P	C
I B. Tech: EEE-II Semester				
Course Code: A3HS18	-	-	2	-

COURSE OVERVIEW:

Pre Requisites: No Pre Requisites

COURSE OBJECTIVES:

The aim of this lab is to develop programming skills in C/MATLAB for the numerical methods & allied problems. More emphasis will be on writing programs with minimum possible code.

COURSE OUTCOMES:

After completion of this lab course, student will be well acquainted with the programming skills in C/MATLAB and able to write the codes for the problems they come across in engineering courses

SYLLABUS

UNIT- 1: Interpolation

Programming Tasks:

Write a program to determine y for a given x, if two arrays of x and y of same size are given.
(Using Newton‘s interpolation both forward and backward).
Write a program to determine y for a given x, if two arrays of x and y of same size are given.
(Using Lagrange‘s interpolation).
Write a program to determine y for a given x, if two arrays of x and y of same size are given. (Using Gauss interpolation).(Selection criteria of the interpolation formula are important).

UNIT -2: Curve Fitting

Programming Tasks:

Write a program to find a line of best fit from the given two arrays of x and y of same size.
Write a program to find a curve of the form $y = A e^{bx}$ from the given two arrays of x and y of same size.
Write a program to find a curve of the form $y = Ax^{b}$ the given two arrays of x and y of same Size.
Write a program to find a curve of the form $y = Ax^{2} + B x + C$ the given two arrays of x and y of same Size.

UNIT -3: Solution of Algebraic and Transcendental Equations

Programming Tasks:

Write a program to find the root of a given equation using bisection method. (Write this program such that the initial values given to the system are not usable, then the system should ask us to give new set of initial values).
Write a program to find the root of a given equation using method of false position. (Regula false position).
Write a program to find the root of a given equation using iteration method.
Write a program to find the root of a given equation using Newton Raphson method.

UNIT-4: Linear system of equations

Programming Tasks:

Write a program to find the solution of given system of linear equations using L-U decomposition method.
Write a program to find the solution of given system of linear equations using Jacobi‘s method.
Write a program to find the solution of given system of linear equations using Gauss siedel iteration method.
Write a program to find the solution of given system of linear equations using Gauss Jordan elimination method.

UNIT-5: Numerical Differentiation, Integration and Numerical solutions of First order differential Equations

Programming Tasks:

Write a program to evaluate definite integral using trapezoidal rule, Simpsons $1/3^{rd}$ rule and $3/8^{th}$ rule.
Write a program to solve to given differential equation using Taylor's series.
Write a program to solve to given differential equation using Euler's and modified Euler's method.
Write a program to solve to given differential equation using Runge-Kutta method.

TEXT BOOKS:

1. Numerical And Statistical Methods With Programming In C By Sujatha Sinha And Subhabadra Dinda,Scitec Publishers.
2. Numerical Methods, Principles, Analysis And Algorithms By Srimantapal & Subodh Bhunia, Oxford University Press.

REFERENCES:

1. Advanced Engineering Mathematics By Alan Jeffery.
2. Applied Numerical Methods Using Matlab By Rao.V.Dukkipati, New Age Publishers.
3. Numerical Methods In Science And Engineering- A Practical Approach By S.Rajasekharan, S. Chand Publications.
4. Introductory Methods Of Numerical Analysis By Ss Sastry

II B.TECH I SEMESTER

SYLLABUS

ELECTRONIC DEVICES AND CIRCUITS

II B-Tech –I Semester **L T P C**

Course Code:A3EC02 **4 1 - 4**

COURSE OVERVIEW:

This course covers fundamental topics on variety of electronic devices by using semiconductors. This course includes an introduction to semiconductor devices like various types of diodes and transistors. This course gives the knowledge about the principles and applications of diodes and transistors. This course provides a basis to continue study and research in the variety of different branches of semiconductor device applications.

PRE-REQUISITIES:

There are no pre-requites for this course but it is assumed that students will have a physics and mathematics background obtained at a high school (or equivalent) level. In particular, working knowledge of basic mathematics including differentiation and integration techniques is assumed.

COURSE OBJECTIVES:

At the end of the course, students are expected to:

1. To learn principle of operation, construction and characteristics of various electronic devices.
2. To study operation and characteristics of Rectifiers with filters.
3. To understand the analysis of small signal low frequency amplifiers.
4. To provide the concepts involved in design of electronic Circuits.

COURSE OUTCOMES:

After going through this course the student will be able to

1. Understand the operation and characteristics of various electronic devices.
2. Know the few applications of electronic devices.
3. Understand the importance of biasing and stabilization of transistors.
4. Design and Analyze the small signal model for BJT and FET amplifiers.

SYLLABUS

UNIT–I

P-N Junction Diode:

Qualitative Theory of P-N Junction, P-N Junction as a Diode, Diode Equation,Volt-Ampere Characteristics, Temperature dependence of VI characteristic, Ideal versus Practical – Resistance levels (Static and Dynamic), Transition and Diffusion. Capacitances, Diode Equivalent Circuits, Load Line Analysis, Breakdown Mechanisms in Semiconductor Diodes, Zener Diode Characteristics.

Special Purpose Electronic Devices:

Principle of Operation and Characteristics of Tunnel Diode(with the help of Energy Band Diagram), Varactor Diode, SCR and Semiconductor Photo Diode.

UNIT–II

Rectifiers and Filters :

The P-N junction as a Rectifier, Half wave Rectifier, Full wave Rectifier,Bridge Rectifier, Harmonic components in a Rectifier Circuit, Inductor Filters, Capacitor Filters, L Section Filters, π- Section Filters, Comparision of Filters, Voltage Regulation using Zener Diode**.**

UNIT-III

Bipolar Junction Transistor and UJT:
The Junction Transistor, Transistor Current Components, Transistor as an Amplifier, Transistor Construction, BJT Operation, BJT Symbol, Common Base, Common Emitter and Common Collector Configurations, Limits of Operation , BJT Specifications, BJT Hybrid Model, Determination of h-parameters from Transistor Characteristics, Comparison of CB, CE, and CC Amplifier Configurations, UJT and Characteristics.

UNIT–IV

Transistor Biasing and Stabilization:
Operating Point, The DC and AC Load lines, Need for Biasing, Fixed Bias, Collector Feedback Bias, Emitter Feedback Bias, Collector - Emitter Feedback Bias, Voltage Divider Bias, Bias Stability, Stabilization Factors, Stabilization against variations in VBE and β, Bias Compensation using Diodes and Transistors, Thermal Runaway, Thermal Stability, Analysis of a Transistor Amplifier Circuit using h-Parameters.

UNIT-V

Field Effect Transistor and FET Amplifiers Field Effect Transistor:
The Junction Field Effect Transistor (Construction, principle of operation symbol) – Pinch-off Voltage - Volt-Ampere characteristics, The JFET Small Signal Model, MOSFET(Construction, principle of operation, symbol), MOSFET Characteristics in Enhancement and Depletion modes.

FET Amplifiers:
FET Common Source Amplifier, Common Drain Amplifier, Generalized FET Amplifier, Biasing FET,
FET as Voltage Variable Resistor, Comparison of BJT and FET.

TEXT BOOKS:

1. Jacob Milliman, Christos C .Halkias, Satyabrata Jit (2015), *Electronic Devices and Circuits*, 3rd edition, Tata McGraw Hill, New Delhi.
2. G. K. Mittal (1999), *Electronic Devices and Circuits*, 22nd edition, Khanna Publications, New Delhi.

REFERENCE BOOKS:

1. David. A. Bell (1986), *Electronic Devices and Circuits*, 4th edition, Prentice Hall of India, New Delhi.
2. S. Shalivahanan, N. Suresh Kumar, A. Vallavaraj (2007), *Electronic Devices and Circuits*, 3rd edition, McGraw Hill, New Delhi, India.
3. Theodore. F. Bogart Jr, Jeffrey S. Beasley, Guillermo Rico (2004), *Electronic Devices and Circuits*, 6th edition Pearson Education ,India.
4. Robert Boylestad, Lowis Nashelsky (1993), *Electronic Devices and Circuit Theory*, 5th edition, Prentice Hall of India, New Delhi, India.

NETWORK ANALYSIS

II B. Tech-I Semester **L T P C**

Course Code: A3EE024 1 - 4

COURSE OVERVIEW:

Circuit elements, Basic laws: Ohm's, KVL, KCL, and Power calculations. Resistive circuits: voltage and current divider rules, Dependent sources. Circuit analysis techniques: Nodal and Mesh analysis. Network theorems: Thevenin's Norton's, Source transformation, Superposition, Maximum power transfer. Energy storage elements: definitions and voltage-current relationships. Responses of first order LR and LC circuits. Responses of second order circuits. Phasor steady-state sinusoidal circuits analysis.

PREREQUISITES: Basic Electrical Engineering

COURSE OBJECTIVES:

At the end of the course, students are expected to:

1. Analyze star and delta connected three phase circuits and calculate active and reactive powers
2. Understand the response of RL, RC & RLC circuits for DC &AC excitations
3. Discuss the concept of network functions and calculate network parameters.
4. Understand the simulation and design of various types of filters.

COURSE OUTCOMES:

Upon successful completion of this course, student will be able to:

1. Be able to systematically obtain the equations that characterize the performance of an electric circuit as well as solving both single phase and three-phase circuits in sinusoidal steady state.
2. Be able to calculate the transient and steady state response for dc and ac excitations
3. Acquire skills to calculate the parameters of a two port network.
4. Can analyze the filter circuit and design a filter circuit of desired performance.

SYLLABUS

UNIT – I

NETWORK THEOREMS:
Thevenin's, Norton's, Maximum Power Transfer, Superposition, Reciprocity, Millmann's, Tellegen's, and Compensation theorems for DC and AC excitations

UNIT – II

DC AND AC TRANSIENT ANALYSIS
Transient response: Initial conditions, transient response of RL, RC and RLC series and parallel circuits with DC and AC excitations, differential equation and Laplace transform approach.

UNIT – III

LOCUS DIAGRAMS AND NETWORK FUNCTIONS
Locus diagrams: Elementary treatment of locus diagrams of RL, RC and RLC circuits (series and parallel combinations).
Network functions: The concept of complex frequency, physical interpretation, transform impedance, series and parallel combination of elements, terminal ports, network functions for one port and two port networks, poles and zeros of network functions, significance of poles and zeros, properties of driving point functions and transfer functions, necessary conditions for driving point functions and transfer functions, time domain response from pole-zero plot.

UNIT – IV

TWO PORT NETWORK PARAMETERS

Two port network parameters: Z, Y, ABCD, hybrid and inverse hybrid parameters, conditions for symmetry and reciprocity, inter relationships of different parameters, interconnection (series, parallel and cascade) of two port networks, image parameters.

UNIT – V

FILTERS:

Classification of filters, filter networks, classification of pass band and stop band, characteristic Impedance in the pass and stop bands, constant-k low pass filter, high pass filter, m-derived filter, Bandpass filter and band elimination filter.

ATTENUATORS:

Symmetrical Attenuators, T-Attenuator, π-Attenuator, Bridged T type Attenuator, Lattice Attenuator

.

TEXT BOOKS:

1. A Chakrabarthy, "Electric Circuits", Dhanpat Rai & Sons, 6th Edition, 2010.
2. A Sudhakar, Shyammohan S Palli, "Circuits and Networks", Tata Mc Graw Hill, 4th Edition, 2010.

REFERENCE BOOKS:

1. John Bird, "Electrical Circuit Theory and technology", Newnes, 2nd Edition, 2003.
2. C L Wadhwa, "Electrical Circuit Analysis including Passive Network Synthesis", New AgeInternational, 2nd Edition, 2009.
3. David A Bell, "Electric Circuits", Oxford University press, 7th Edition, 2009
4. M E Van Valkenberg, "Network Analysis", PHI, 3rd Edition, 2014.
5. Rudrapratap, "Getting Started with MATLAB: A Quick Introduction for Scientists and Engineers",Oxford University Press, 1st Edition, 1999.

DC MACHINES AND TRANSFORMERS

II B. Tech-I Semester **L T P C**

Course Code: A3EE033 1 - 3

COURSE OVERVIEW:

The course content should be taught and with the aim to develop different types of skills so that students are able to acquire maintain various types of DC machines and single phase transformers safely.

PRE-REQUISITIES: Basic Electrical Engineering

COURSE OBJECTIVES:

At the end of the course, students are expected to:

1. Illustrate the theory of electromechanical energy conversion and the concept of co energy.
2. Demonstrate the working principle of different types of dc machines and transformers.
3. Analyze the losses in dc machines to improve the efficiency by conducting various tests.
4. Outline the principle of operation, construction and testing of single phase transformers

COURSE OUTCOMES:

Upon successful completion of this course, student will be able to:

1. Be able to understand the concept of energy conversion and demonstrate the parts of dc machine.
2. Understand the principle operation and characteristics of DC machines.
3. Understand the operation and efficiency of transformers.
4. Understand the concept of mutual induction and operation of transformer.

SYLLABUS

UNIT – I

ELECTROMECHANICAL ENERGY CONVERSION
Electromechanical energy conversion: Forces and torque in magnetic systems, energy balance, energy and force in a singly excited and multi excited magnetic field systems, determination of magnetic force, co energy.

UNIT – II

DC GENERATORS
DC generators: Principle of operation, construction, armature windings, lap and wave windings, simplex and multiplex windings, use of laminated armature, commutator, Emf equation, types of DC generators, voltage buildup, critical field resistance and critical speed, causes for failure to self-excited and remedial measures; Armature reaction: Cross magnetization and demagnetization, ampere turns per pole, compensating winding, commutation, reactance voltage, methods of improving commutation; Characteristics: Principle of parallel operation load sharing, use of equalizer bars and cross connection of field windings problems.

UNIT – III

DC MOTORS AND TESTING
DC motors: Principle of operation, back EMF, torque equation, condition for maximum power developed, types of DC motors, armature reaction and commutation, characteristics, methods of speed control, types of starters, numerical problems; Losses and efficiency: Types of losses, calculation of efficiency, condition for maximum efficiency.
Testing of dc machines: Swinburne's test, brake test, regenerative testing, Hopkinson‟s test, field‟s test, retardation test and separation of stray losses, problems

UNIT – IV

SINGLE PHASE TRANSFORMERS

Single phase transformers: Principle of operation, construction, types of transformers, emf equation, concept of leakage flux and leakage reactance, operation of transformer under no load and on load, phasor diagrams, equivalent circuit, efficiency, regulation and all day efficiency; Testing of transformer: objective of testing, polarity test, measurement of resistance, OC and SC tests, back to back test, heat run test, parallel operation, problems.

UNIT – V

THREE PHASE TRANSFORMERS

Three phase transformer: Principle of operation, star to star, delta to delta, star to delta, delta to star, three phase to six phase, open delta connection, scott connection; Auto transformers: Principles of operation, equivalent circuit, merits and demerits, no load and on load tap changers, harmonic reduction in phase voltages, problems.

Text Books:

1. J Nagrath, D P Kothari, "Electrical Machines", Tata Mc Graw Hill publication, 3rd Edition, 2010.
2. P S Bimbra, "Electrical Machines", Khanna Publishers, 2nd Edition, 2008.

Reference Books:

1. M G Say, E O Taylor, "Direct Current Machines", Longman Higher Education, 1st Edition, 1985.
2. M V Deshpande, "Electrical Machines", PHI Learning Private Limited, 3rd Edition, 2011.
3. 3.Ian McKenzie Smith, Edward Hughes, "Electrical Technology", Prentice Hall, 10thEdition, 2015
4. J B Gupta, "Theory and Performance of Electrical Machines", S K Kataria& Sons Publication, 14th
5. Edition, 2010.
6. A E Fitzgerald, Charles Kingsley, JR., Stephen D Umans, "Electric Machinery", McGraw Hill,6th Edition, 1985.

ELECTRICAL MEASUREMENTS& INSTRUMENTATION

II B. Tech-I Semester **L T P C**

Course Code:A3EE043- - 3

COURSE OVERVIEW:

Accuracy of measurement and error analysis. Absolute and secondary instruments and indicating instrument. Moving coil and moving iron instruments. Dynamometer type instruments. Induction type instruments. Wattmeter of Measuring of power and power factor. Bridges (DC). Bridges (AC). Current and potential transformers. Oscilloscopes.

PRE REQUISITES: Electronics Devices and Circuit

COURSE OBJECTIVES:

At the end of the course, students are expected to:

1. Demonstrate the construction, working and characteristics of electrical measurement instruments.
2. Illustrate the principles of energy measurement in electrical loads.
3. Outline the use of cathode ray oscilloscope.
4. Evaluate various transducers for electrical measurements.

COURSE OUTCOMES:

Upon successful completion of this course, student will be able to:

1. Understand the basic definition of electrical instruments.
2. Be able to calculate the value of error in an instrument and measure the accuracy.
3. Be able to find the value of unknown resistance by using bridge circuits.
4. Explain how to measure the power in a three phase circuit.
5. Understand the working of energy meter and calculate the energy consumed

SYLLABUS

UNIT – I

INTRODUCTION TO MEASURING INSTRUMENTS
Introduction: Classification of measuring instruments, deflecting, damping and control torques, types of errors, ammeter and voltmeter: PMMC, MI instruments, expression for deflection and control torque, errors and compensation extension of range using shunts and series resistance; Electro static voltmeter, electro type and attracted type, disc type, extension of range of ES voltmeters

UNIT – II

POTENTIOMETERS AND INSTRUMENT TRANSFORMERS:
DC Potentiometers: Principle and operation of Crompton potentiometer, standardization, measurement of unknown resistance, current, voltage; AC potentiometers: polar and coordinate type, standardization, applications; Instrument transformer: CT and PT, ratio and phase angle error.

UNIT – III

MEASUREMENT OF POWER AND ENERGY:
Measurement of Power: single phase dynamometer type wattmeter, LPF and UPF, double elements and three elements dynamometer wattmeter; Expression for deflection and control torque, extension of range of wattmeter by using instrument transformers, measurement of active and reactive power for balanced and unbalanced Systems
Measurement of Energy: Single phase induction type energy meter, driving and braking torques, errors and compensations, testing by phantom loading using RSS meter, three phase energy meter, Introduction to net energy metering (web ref: 4,5), maximum demand meters

UNIT – IV

DC AND AC BRIDGES:
Measurement of Resistance: Methods of measuring low, medium, high resistance, Wheatstone bridge, carry foster, Kelvin‟s double bridge, loss of charge method; Measurement of Inductance: Maxwell‟s bridge, hay‟s bridge , Anderson‟s bridge, Owen‟s bridge; Measurement of Capacitance: Desauty‟s bridge, Wein‟s bridge, Schering bridge.

UNIT – V

TRANSDUCERS AND OSCILLOSCOPES:
Transducers: Definition of transducers, Classification of transducers, Advantages of Electrical transducers, Characteristics and choice of transducers. Principle of operation of LVDT and capacitor transducers, LVDT Applications. Strain gauge and its principle of operation, gauge factor, Thermistors, Thermocouples, Piezo-electric transducers, Cathode ray oscilloscope: Cathode ray tube, time base generator, horizontal and vertical amplifiers, CRO probes, applications of CRO, Measurement of phase and frequency, Lissajous patterns, sampling oscilloscope, analog oscilloscope.

Text Books:

1. A K Sawhney, “Electrical and Electronic measurement and instruments”, Dhanpat Rai and Sons, Publications.
2. E W Golding and F C Widdis, “Electrical measurements and measuring instruments” wheeler publishing, 5th Edition

Reference Books

1. Buckingham and Price, “Electrical measurements”, Prentice Hall.
2. D V S Murthy, “Transducers and Instrumentation”, Prentice Hall of India, 2nd Edition, 2009.
3. A S Morris, “Principles of measurement of instrumentation”, Pearson/Prentice Hall of India,2nd Edition, 1994.
4. H S Kalsi, “Electronic Instrumentation”, Tata Mc Graw Hill Edition, 1st Edition 1995

ELECTROMAGNETIC FIELDS

II B. Tech-I Semester **L T P C**

Course Code:A3EE05 **4 - - 4**

COURSE OVERVIEW:

Electromagnetic field theory is the most fundamental subject in the curriculum of electrical engineering education. Electromagnetic field theory defines capacitors, inductors and resistors in terms of its primary electric and magnetic quantities like electric charge, electric potential, electric current, electric and magnetic flux. Electromagnetic explains universal concepts in three-dimension real world, i.e., electro-magnetic wave propagation in free-space.

PRE-REQUISITIES: Engineering Mathematics, physis

COURSE OBJECTIVES:

At the end of the course, students are expected to:

1. Demonstrate the concept of electrostatic field intensity and electric potential.
2. Illustrate polarization of dielectrics and the behavior of conductors and dielectrics in electric field.
3. Understand the concept of magnetic field intensity and flux density.
4. Discuss forces in magnetic fields and low of electromagnetic induction.

COURSE OUTCOMES:

Upon successful completion of this course, student will be able to:

1. Apply the concept of electrostatic field intensity and electric potential and be able to calculate the specified values.
2. Illustrate polarization of dielectrics and the behavior of conductors and dielectrics in electric field.
3. Be able to define the concept of magnetic field intensity and flux density.
4. Discuss forces in magnetic fields and low of electromagnetic induction.

SYLLABUS

UNIT – I

ELECTROSTATICS:
Electrostatic fields: Coulomb‟s law, electric field intensity due to line and surface charges, work done in moving a point charge in an electrostatic field, electric potential, properties of potential function, potential gradient, Gauss‟s law, application of Gauss‟s law, Maxwell‟s first law, Laplace‟s and Poisson‟s equations, solution of Laplace‟s equation in one variable

UNIT – II

CONDUCTORS AND DIELECTRICS:
Electric dipole: Dipole moment, potential and electric field intensity due to an electric dipole, torque on an electric dipole in an electric field, behavior of conductors in an electric field, electric field inside a dielectric material, polarization, conductor and dielectric, dielectric boundary conditions, capacitance of parallel plate and spherical and coaxial capacitors with composite dielectrics, energy stored and energy density in a static electric field, current density, conduction and convection current densities, Ohm‟s law in point form, equation of continuity

UNIT – III

MAGNETOSTATICS:
Static magnetic fields: Biot-Savart‟s law, magnetic field intensity, magnetic field intensity due to a straight current carrying filament, magnetic field intensity due to circular, square and solenoid current carrying wire, relation between magnetic flux, magnetic flux density and magnetic field intensity, Maxwell‟s second equation, div(B)=0. Ampere‟s circuital law and it‟s applications: Magnetic field intensity due to an infinite sheet of current and a long current carrying filament, point form of Ampere‟s circuital law, Maxwell‟s third equation, Curl

(H)=Jc, field due to a circular loop, rectangular and square loops.

UNIT – IV

FORCE IN MAGNETIC FIELD AND MAGNETIC POTENTIAL:

Magnetic force: Moving charges in a magnetic field, Lorentz force equation, force on a current element in a magnetic field, force on a straight and a long current carrying conductor in a magnetic field, force between two straight long and parallel current carrying conductors, magnetic dipole and dipole moment, a differential current loop as a magnetic dipole, torque on a current loop placed in a magnetic field; Scalar magnetic potential and its limitations: Vector magnetic potential and its properties, vector magnetic potential due to simple configurations, Poisson's equations, self and mutual inductance, Neumann's formula, determination of self-inductance of a solenoid, toroid and determination of mutual inductance between a straight long wire and a square loop of wire in the same plane, energy stored and density in a magnetic field, characteristics and applications of permanent magnets.

UNIT – V

TIME VARYING FIELDS AND FINITE ELEMENT METHOD:

Time varying fields: Faraday's laws of electromagnetic induction, integral and point forms, Maxwell's fourth equation, curl (E)=$\partial B/\partial t$, statically and dynamically induced EMFs, modification of Maxwell's equations for time varying fields, displacement current.

TEXT BOOKS:

1. William H Hayt,John A Buck, "EngineeringElectromagnetics", McGrawHill Publications, 8th Edition, 2012.
2. David J Griffiths, "Introduction to Electrodynamics" Pearson Education Ltd., 4th Edition, 2014

REFERENCE BOOKS:

1. Matthew N O Sadiku, S V Kulkarni, "Principles of Electromagnetics", Oxford University Press,6th Edition, 2015.
2. J D Krauss, Fleish, "Electromagnetics with Applications", McGraw Hill Publications, 5th Edition, 1999.
3. Matthew N O Sadiku, "Numerical Techniques in Electromagnetics", CRC Press, 2nd Edition, 2001.
4. William H Hayt, John A Buck, "Problems and Solutions in Electromagnetics", McGraw Hill
5. Publications, 1st Edition, 2010.

GENDER SENSITIZATION
(An Activity-based Course)

II B. Tech-I Semester **L T P C**
Course Code: A3HS17 - - 2 -

COURSE OBJECTIVES:

At the end of the course, students are expected to:

1. To develop students' sensibility with regard to issues of gender in contemporary India.
2. To provide a critical perspective on the socialization of men and women.
3. To introduce students to information about some key biological aspects of genders.
4. To expose the students to debates on the politics and economics of work.
5. To help students reflect critically on gender violence.
6. To expose students to more egalitarian interactions between men and women.

COURSE OUTCOMES:

Upon successful completion of this course, student will be able to:

1. Students will have developed a better understanding of important issues related to gender in contemporary India.
2. Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.
3. Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
4. Students will acquire insight into the gendered division of labour and its relation to politics and economics.
5. Men and women students and professionals will be better equipped to work and live together as equals.
6. Students will develop a sense of appreciation of women in all walks of life,
7. Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women, the textbook will empower students to understand and respond to gender violence.

UNIT-I

UNDERSTANDING GENDER:
Gender: Why Should We Study It? (Towards a World of Equals: Unit -1)
Socialization: Making Women, Making Men (Towards a World of Equals: Unit -2)
Introduction. Preparing for Womanhood. Growing up Male. First lessons in Caste. Different Masculinities.
Just Relationships: Being Together as Equals (Towards a World of Equals: Unit -12)
Mary Kom and ()tiler. Love and Acid just do not Mix. Love Letters. Mothers and Fathers, Further Reading: Rosa Parks-The Brave Heart.

UNIT — II

GENDER AND BIOLOGY:
Missing Women: Sex Selection and Its Consequences (Towards a World of Equals: Unit -4) Declining Sex Ratio. Demographic Consequences. Gender Spectrum: Beyond the Binary (Towards a World of Equals: Unit -10) Two or Many? Struggles with Discrimination. Additional Reading: Our Bodies, Our Health (Towards a World of Equals:Unit -13) .

UNIT — III

GENDER AND LABOUR: Housework: the Invisible Labour (Towards a World of Equals: Unit -3) "My Mother doesn't Work." "Share the Load." Women's Work: Its Politics and Economics (Towards a World of Equals: Unit -7) Fact and Fiction. Unrecognized and Unaccounted work. Further Reading: Wages and Conditions of Work.

UNIT — IV

ISSUES OF VIOLENCE: Sexual Harassment: Say Nol (Towards a World of Equals: Unit -6) Sexual Harassment, not Eve-teasing- Coping with Everyday Harassment- Further Reading: "Chupulu". Domestic Violence: Speaking Out (Towards a World of Equals: Unit -8) Is Home a Safe Place? -When Women Unite [Film). Rebuilding Lives. Further

Reading: New Forums for Justice. Thinking about Sexual Violence (Towards a World of Equals: Unit -11) Blaming the Victim-"I Fought for my Life...." - Further Reading: The Caste Face of Violence.

UNIT — V

GENDER STUDIES: Knowledge: Through the Lens of Gender (Towards a World of Equals: Unit -5)Point of View. Gender and the Structure of Knowledge. Further Reading: Unacknowledged Women Artists o Telangana. Whose History? Questions for Historians and Others (Towards a World of Equals: Unit -9) Reclaiming a Past. Writing other Histories. Further Reading: Missing s from Modern Telangana History.

Essential Reading: All the Units in the Textbook, "Towards a World of Equals: A Bilingual Textbookon Gender" written by A.Suneetha, Uma Bhrugubanda, Dugglrala Vasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Tharu.

Note: Since it is Interdisciplinary Course, Resource Persons can be drawn from the fields of EnglishLiterature or Sociology or Political Science or any other qualified faculty who has expertise in this field.

REFERENCE BOOKS:

1. Sen, Arnartya. 'More than One Million Women are Missing." New York Review of Books 37.20 (20 December 1990). Print. We Were Making History..' Life Stories of Women in the Telangana People's Struggle. New Delhi:Kali for Women, 1989.
2. Tripti Lahiri. "By the Numbers: Where Indian Women Work." Women's Studies Journal (14 November 2012) Available online at: http:// blogs.wsj.com/ India real time/2012111/14/by — the-numbers-where-Indian-women-work/>
3. K. Satyanarayana and Susie Tharu (Ed.) Steel Nibs Are Sprouting: New Dalit Writing From South India, Dossier 2: Telugu And Kannada http://harpercollins.co.in/BookDetail.aso?Book Code=3732.
4. Virnala. "Vantillu (The Kitchen)", Women Writing in India: 600 BC to the Present. Volume II:The 20th Century. Ed. Susie Tharu and K. Lalita. Delhi: Oxford University Press, 1995. 599-601.
5. Shatrughna, Veena et al. Women's Work and its Impact on Child Health and Nutrition, Hyderabad, NationalInstitute of Nutrition, Indian Council of Medical Research. 1993.
6. Stree Shakti Sanghatana. "We Were Making History ....' Life Stories of Women in the Telangana People's Struggle. New Delhi: Kali for Women, 1989.
7. Mernon, Nivedita. Seeing like a Feminist. New Delhi: Zubaan-Penguin Books, 2012
8. Jayaprabha, A. "Chupulu (Stares)". Women Writing in India: 6008C to the Present. Volume II: The 20th Century Ed. Susie Tharu and K. Lalita. Delhi: Oxford University Press, 1995. 596-597.
9. Javeed, Shayan and Anupam Manuhaar. "Women and Wage Discrimination in India: A Critical Analysis." International Journal of Humanities and Social Science Invention 2.4(2013)
10. Gautam, Liela and Gita Ramaswamy. "A 'conversation' between a Daughter and a Mother." Broadsheet on Contemporary Politics. Special Issue on Sexuality and Harassment: Gender Politics on Campus Today. Ed. Madhumeeta Sinha and Asma Rasheed. Hyderabad: Anveshi Research Center for Women's Studies, 2014.

DC MACHINES LAB

II B.Tech -I Semester **L T P C**

Course Code: A3EE06- - 3 2

COURSE OVERVIEW:

The course content should be taught and with the aim to develop different types of skills so that students are able to acquire maintain various types of DC machines and single phase transformers safely.

PRE-REQUISITIES: Electrical Fundamentals

COURSE OBJECTIVES:

At the end of the course, students are expected to:

1. Conduct various tests on DC series and shunt machines.
2. Develop procedure for speed control of DC machines and test with PLC and LabVIEW.
3. Utilize labVIEW, programmable logic controllers to control various machines.
4. Simulate DC machine to study the characteristics by using digital simulation.

COURSE OUTCOMES:

Upon successful completion of this course, student will be able to:

1. Be able to understand the concept of energy conversion and demonstrate the parts of dc machine.
2. Understand the principle operation and characteristics of DC machines.
3. Understand the operation and efficiency of transformers.
4. Understand the concept of mutual induction and operation of transformer

LIST OF EXPERIMENTS

1. Magnetization characteristics of DC shunt generator. Determination of critical field resistance and critical speed.
2. Load test on DC shunt generator. Determination of characteristics.
3. Load test on DC series generator. Determination of characteristics.
4. Load test on DC compound generator. Determination of characteristics.
5. Hopkinson's test on DC shunt machines. Predetermination of efficiency.
6. Fields test on DC series machines. Determination of efficiency.
7. Swinburne's test and speed control of DC shunt motor. Predetermination of efficiencies.
8. Brake test on DC compound motor. Determination of performance curves.

In addition to the above eight experiments, at least any two of the experiments from the following list are required to be conducted:

9. Brake test on DC shunt motor. Determination of performance curves.
10. Retardation test on DC shunt motor. Determination of losses at rated speed.
11. Separation of losses in DC shunt motor.

ELECTRICAL CIRCUITS LAB

II B.Tech -I Semester **L T P C**

Course Code: A3EE07- 1 3 2

COURSE OVERVIEW:

Practical and theoretical Study about all network theorems

PRE REQUISITES: Knowledge about all theorems

COURSE OBJECTIVES:

The course should enable the students to:

1. Apply different techniques used in electric circuit analysis to calculate circuit parameters and twoport network parameters.
2. Demonstrate the applications of Fourier transforms in electric circuits.
3. Design filters and analyze through digital simulation in electrical circuits.

LIST OF EXPERIMENTS

PART-A
The following experiments are required to be conducted as compulsory experiments

1. Verification of KVL and KCL
2. Verification of Thevenin's and Norton's theorems
3. Verification of Superposition and Reciprocity theorems
4. Verification of Maximum Power Transfer Theorems
5. Series and Parallel Resonance
6. Verification of Compensation and Millman's theorem.
7. Two port network parameters – Z – Y parameters.
8. Two port network parameters – A, B, C, D parameters.

In addition to the above eight experiments, at least any two of the experiments from the following list are required to be conducted

PART-B: SIMULATION EXPERIMENTS

1. Simulation of DC Circuits
2. DC Transient response
3. Mesh Analysis
4. Nodal Analysis

NOTE:

- Eight experiments are to be conducted from PART-A and any two experiments from PART-B

ELECTRONIC DEVICES & CIRCUITS LAB

II B-Tech- I Semester **L T P C**
- - 3 2

Course Code:A3EC08

COURSE OVERVIEW:

This course covers fundamental topics on variety of electronic devices by using semiconductors. This course includes an introduction to semiconductor devices like various types of diodes and transistors. This course gives the knowledge about the principles and applications of diodes and transistors. This course provides a basis to continue study and research in the variety of different branches of semiconductor device applications.

PRE-REQUISITIES: Engineering Mathematics and Physics.

COURSE OBJECTIVES:

1. To identify various components and testing of active devices.
2. To operate various equipments like multimeters, function generators, regulated power supplies and CRO
3. To know the characteristics of various active devices.
4. To study frequency response of Amplifiers.

COURSE OUTCOMES:

After going through this course the student will be able to

1. Calculate various parameters of devices from their characteristics.
2. Know the role of devices in real time applications.
3. Calculate h-parameters of BJT under various configurations.
4. Compute frequency response of various amplifiers.

LIST OF EXPERIMENTS

PART - A: **ELECTRONIC WORKSHOP PRACTICE**

1. Identification, Specifications, Testing of R, L, C Components (Color Codes), Potentiometers, Switches (SPDT, DPDT, and DIP), Coils, Relays, Bread Boards, PCB‘s.

2. Identification, Specifications and Testing of Active Devices: Diodes, BJTs, JFETs, MOSFETs, Power Transistors, LED‘s, LCD‘s, SCR, UJT.

3. Study and operation of Multimeters (Analog and Digital) Function Generator Regulated Power Supply (RPS) CRO
4. Soldering Practice

PART - B:

1. Forward and Reverse Bias Characteristics of PN junction diode.
2. Zener Diode Characteristics and Zener diode as voltage regulator.
3. Half wave rectifier with and without filters.
4. Full wave rectifier with and without filters.
5. Input & output characteristics of transistor in CB configuration.
6. Input & output characteristics of transistor in CE configuration.
7. Input & output characteristics of transistor in CC configuration
8. Drain and Transfer characteristics of JFET.
9. CE Amplifier using BJT/using FET
10. UJT characteristics.
11. SCR characteristics.

Note: Any 10 of above experiments are to be conducted

II B.TECH II SEMESTER

SYLLABUS

SWITCHING THEORY AND LOGIC DESIGN

II B-Tech –II Semester **L T P C**

Course Code:A3EC03 **4 1 - 4**

COURSE OVERVIEW:

This course provides in-depth knowledge of switching theory and the design techniques of digital circuits, which is the basis for design of any digital circuit.

PRE-REQUISITIES: Electronic devices

COURSE OBJECTIVES:

At the end of the course, students are expected to:

1. To discuss about the number system and Boolean algebra which are applicable in various switching functions
2. To describe the common forms of number representation in digital electronic circuits and to be able to convert between different representations
3. To discuss the combinational circuit‘s using simple logical operations
4. To illustrate the concepts of sequential circuits , enabling students to analyze sequential systems in terms of state machines
5. To explore the techniques to implement synchronous state machines using flip-flops

COURSE OUTCOMES:

Upon successful completion of this course, student will be able to:

1. Understand the basic digital logic fundamentals such as numbering systems, binary codes and Boolean algebra.
2. Understand the basic building blocks of digital systems like gates and minimization of Boolean expressions using K-map method
3. Design counters with the knowledge of combinational and sequential circuits.
4. Design the state diagrams with the knowledge of Mealy and Moore circuits and algorithmic state machines for binary multipliers.

SYLLABUS

UNIT- I

Review of Number systems:
Representation of numbers of different radix, conversion of numbers from one radix to another radix, r-1‘s complement and r‘s complement of unsigned numbers subtraction, problem solving .Signed binary numbers, different forms, problem solving for subtraction. 4-bit codes: BCD, EXCESS 3, alphanumeric codes,9‘s complement

UNIT- II

Logic operation, error detection and correction codes:
Basic logic operations NOT,OR, AND,Boolean theorems, Complement and dual of logical expressions, NAND and NOR Gates, EX-OR, EX-NOR Gates, standard SOP and POS, Minimization of logic functions using theorems, Generation of self dual functions. Gray code, error detection and error correction codes, parity checking even parity, odd parity, Hamming code, multi level AND-NOR Realizations. Two level NAND-NAND and NOR-NOR realizations. Degenerative forms and multi level realizations

UNIT-III

Sequential Machines Fundamentals:
Introduction, Basic Architectural Distinctions between Combinational and Sequential circuits, The Binary Cell, Fundamentals of Sequential Machine Operation, The Flip-Flop, The D-Latch Flip-Flop, The Clocked T Flip-Flop,

The ― Clocked J-K‖ Flip-Flop, Design of a Clocked Flip-Flop, Conversion from one type of Flip-Flop to another, Timing and Triggering Consideration, Clock Skew.

UNIT-IV

Sequential Circuit Design and Analysis:
Introduction, State Diagram, Analysis of Synchronous Sequential Circuits, Approaches to the Design of Synchronous Sequential Finite State Machines, Design Aspects, State Reduction, Design Steps, Realization using Flip-Flops Counters - Design of Single mode Counter, Ripple Counter, Ring Counter, Shift Register, Shift Register Sequences, Ring Counter Using Shift Register.

UNIT-V

Sequential Circuits and Algorithmic State Machines:
Finite state machine-capabilities and limitations, Mealy and Moore modelsminimization of completely specified and incompletely specified sequential machines, Partition techniques and Merger chart methods-concept of minimal cover table.

Salient features of the ASM chart-Simple examples-System designusing data path and control subsystems-control implementations-examples of weighing machine and Binary multiplier.

TEXT BOOKS:

1. Switching and Finite Automata Theory- ZviKohavi & Niraj K. Jha, 3rd Edition, Cambridge.

2. Digital Design- Morris Mano, PHI, 3rd Edition

REFERENCE BOOKS:

1. Introduction to Switching Theory and Logic Design – Fredriac J. Hill, Gerald R. Peterson, 3rd Ed,John Wiley &SonsInc

2. Digital Fundamentals – A Systems Approach – Thomas L. Floyd, Pearson, 2013.

3. Digital Logic Design - Ye Brian and Holds Worth, Elsevier 4. Fundamentals of Logic Design-Charles H. Roth, Cengage Learning, 5th, Edition, 2004.

AC MACHINES

II B-Tech –II Semester **L T P C**

Course Code: A3EE08 **3 1 - 3**

COURSE OVERVIEW:

To understand the construction of Synchronous generators & motors and special machines. Develop the ability to use Synchronous generators and motors for various practical applications.

PRE-REQUISITIES: Electrical Fundamentals

COURSE OBJECTIVES:

At the end of the course, students are expected to:

1. Discuss the construction, working and characteristics of three phase induction motor and synchronous motor.
2. Illustrate the equivalent circuit and speed control methods of three phase induction motors.
3. Outline the working and parallel operation of alternators.
4. Evaluate synchronous impedance and voltage regulation of synchronous machine.

COURSE OUTCOMES:

Upon successful completion of this course, student will be able to:

1. Understand the concept of rotating magnetic field in an Induction motor.
2. Able to demonstrate why the rotor rotates in the direction of magnetic field and cannot catch the speed of Synchronous speed
3. Understand how the winding are wound in an Alternator.
4. Able to explain what are harmonics and methods to reduce the harmonics
5. Explain the concept of Pitch factor and distribution factor.

SYLLABUS

UNIT – I

THREE PHASE INDUCTION MOTORS:
Three phase induction motors: Introduction, construction, types of induction motors, slip and frequency of rotor currents, rotor MMF and production of torque, equivalent circuit, power across air gap, torque and power output, torque slip characteristics, generating and braking modes, maximum (breakdown) torque, starting torque, maximum power output, problems.

UNIT – II

TESTING AND SPEED CONTROL OF INDUCTION MOTORS:
Equivalent circuit model: No load test and blocked rotor test, circuit model, starting methods, speed control of induction motors, induction generator, principle of operation, isolated induction generator, circle diagram, determination of induction motor parameters from circle diagram, problems

UNIT – III

ALTERNATORS:
Synchronous generators: Introduction, principle of operation, constructional features, armature windings, integral slot and fractional slot windings, distributed and concentrated windings, winding factors, basic synchronous machine model, circuit model of a synchronous machine, phasor diagrams, determination of synchronous impedance, short circuit ratio, armature reaction ampere turns and leakage reactance
Voltage regulation: Calculation of regulation by synchronous impedance method, MMF, ZPF and ASA methods, slip test, parallel operation of alternators, synchronization of alternators, problems

UNIT – IV

SYNCHRONOUS MOTORS:
Synchronous motors: Principle of operation, power developed, synchronous motor with different excitations, effect of increased load with constant excitation, effect of change in excitation with constant load, effect of excitation on armature current and power factor, construction of "V" and inverted "V" curves, power and excitation circles, starting methods, salient pole synchronous motor, phasor diagrams and analysis, synchronous condenser.

UNIT – V

SINGLE PHASE INDUCTION MOTOR:
Single phase induction motor: Principle of operation, two reaction theory, equivalent circuit analysis, split phase motor, construction, principle of operation, capacitor start motor, shaded pole motor, torque speed characteristics

TEXT BOOKS:

1. P S Bimbra, "Electrical Machines", Khanna Publishers, 2nd Edition, 2008.
2. I J Nagrath, D P Kothari, "Electrical Machines", TMH publication, 3rd Edition, 2010.

REFERENCE BOOKS:

1. A. E Fitzgerald, Charles Kingsley JR., Stephen D Umans, "Electric Machinery", Mc Graw Hill,6th Edition, 1985.
2. M G Say, "Alternating Current Machines", Pitman Publishing Ltd, 4th Edition, 1976.S K
3. Bhattacharya, "Electrical Machines", TMH publication, 2nd Edition,
4. J B Gupta, "Theory and Performance of Electrical Machines", S K Kataria& Sons Publication, 14thEdition, 2010

CONTROL SYSTEMS

II B. Tech-II Semester **L T P C**

Course Code: A3EC194 1-4

COURSE OVERVIEW:

This course focuses on the analysis and design of systems control. This course will introduce time-domain systems dynamic control fundamentals and their designissuesforelectricalengineeringapplications.Emphasiswillbeonlinear, time invariant, multi-input multi output continuous time systems. Topics include open and closed-loop state-space representations, analytical solutions, computer simulations, stability, controllability, observability, and controller/observer design.

PRE-REQUISITE:

For this course a strong background in linear algebra and differential equations is not required but is highly recommended. The MATLAB/SIMULINK computer software package will be used extensively to assist in the understanding of concepts and fundamentals of system dynamics and control, and also to analyze and design control systems

COURSE OBJECTIVES:

At the end of the course, students are expected to:

1. Organize modeling and analysis of electrical and mechanical systems.
2. Analyze control systems by block diagrams and signal flow graph technique.
3. Demonstrate the analytical and graphical techniques to study the stability.
4. Illustrate the frequency domain and state space analysis

COURSE OUTCOMES:

Upon successful completion of this course, student will be able to:

1. Understand the basic definition of control systems.
2. Explain the concept of Serve mechanism and different translational and rotational motions.
3. Understand the concept of order of a system and finding the response.
4. Able to find the steady state and transient state response of first and second order systems.
5. Explain the concept of relative stability and root locus, Nyquist plots.

SYLLABUS

UNIT – I

INTRODUCTION AND MODELING OF PHYSICAL SYSTEMS:
Control systems: Introduction, open loop and closed loop systems, examples, comparison, mathematical models and differential equations of physical systems, concept of transfer function, translational and rotational mechanical systems, electrical systems, force voltage and force current analogy

UNIT – II

BLOCK DIAGRAM REDUCTION AND TIME RESPONSE ANALYSIS:
Block Diagrams: Block diagram representation of various systems, block diagram algebra, characteristics of feedback systems, DC servomotors, signal flow graph, Mason‟s gain formula; Time response analysis: Standard test signals, shifted unit step, ramp and impulse signals, shifting theorem, convolution integral, impulse response, unit step response of first and second order systems, time response specifications, steady state errors and error constants, dynamic error coefficients method, effects of proportional, derivative and proportional derivative, proportional integral and PID controllers

UNIT – III

CONCEPT OF STABILITY AND ROOT LOCUS TECHNIQUE:
Concept of stability: Necessary and sufficient conditions for stability, Routh‟s and Routh Hurwitz stability criterions and limitations.
Root locus technique: Introduction, root locus concept, construction of root loci, graphical determination of 'k' for specified damping ratio, relative stability, effect of adding zeros and poles on stability.

UNIT – IV

FREQUENCY DOMAIN ANALYSIS:
Frequency domain analysis: Introduction, frequency domain specifications, stability analysis from Bode plot, polar plot, Nyquist plot, calculation of gain margin and phase margin, determination of transfer function, correlation between time and frequency responses

UNIT – V

STATE SPACE ANALYSIS AND COMPENSATORS:
State Space Analysis: Concept of state, state variables and state model, derivation of state models from block diagrams, diagonalization, solving the time invariant state equations, state transition matrix and properties, concept of controllability and observability. Compensators: Lag, lead, lag lead networks.

Text Books:

1. I J Nagrath, M Gopal, "Control Systems Engineering", New Age International Publications, 3rd Edition, 2007.
2. K Ogata, "Modern Control Engineering", Prentice Hall, 4th Edition, 2003.

Reference Books:

1. AAnand Kumar, "Control Systems", PHI Learning, 1st Edition, 2007.
2. S Palani, "Control Systems Engineering", Tata McGraw Hill Publications, 1st Edition, 2001.
3. N K Sinha, "Control Systems", New Age International Publishers, 1st Edition, 2002
4. N C Jagan, "Control Systems", BS Publications, 1st Edition, 2007

PROBABILITY AND COMPLEX ANALYSIS

II B-Tech –II Semester **L T P C**

Course Code: A3HS213 1 - 3

COURSE OVERVIEW:

Firstly it extends the analysis of real functions of one variable to the analysis of functions of two or more real variables in a systematic manner. Secondly it provides sufficient background in the analysis of functions of a complex variable for you to study advanced engineering mathematics or aspects of probability theory. Thirdly it gives a brief introduction to some concepts that are essential background for the area of modern functional analysis. You will also become more familiar and comfortable with the language, abstract formalisms and proof techniques that are present in all modern texts on analysis and its applications.

PRE-REQUISITIES: Basic Mathematics

COURSE OBJECTIVES:

At the end of the course, students are expected to:

1. Explain fundamental concepts of Probability theory.
2. Develop an understanding of the role of Complex Analysis in engineering.
3. Differentiation and Integration of complex valued functions.
4. Evaluation of integrals using Cauchy‘s integral formula and Taylor‘s series, Maclaurin‘s Series And Laurent‘s series expansions of complex functions.
5. Evaluation of integrals using residue theorem.
6. Express a line integral as a double integral and vice-versa.

COURSE OUTCOMES:

Upon successful completion of this course, student will be able to:

1. An ability to apply knowledge of mathematics, science and engineering as appropriate to the field of
2. Electronics and communication engineering practice.
3. Recall the basics of permutations and combinations in probability
4. Understand concept of limit, continuity differentiability and analyticity.
5. Calculate line integrals along piece wise smooth paths; interpret such quantities as work done by a force.
6. Calculate series solution by using Taylors and Maclaurin‘s series.
7. Evaluate Residues by Laurent series
8. Participate and succeed in competitive examinations like GATE, GRE.

SYLLABUS

UNIT – I

PROBABILITY, CORRELATION & REGRESSION:
Sample space and events, probability- axioms of probability-some Elementary theorems-conditional probability-Baye‘ s Theorem.
Coefficient of correlation, Rank correlation, Regression Coefficient and lines of Regression and multiple correlation and Regression.

UNIT – II

FUNCTIONS OF COMPLEX VARIABLES:
Complex functions and its representation on Argand plane, Concepts of limit Continuity, Differentiability, Analyticity and Cauchy-Riemann conditions, Harmonic functions- Milne-Thompson method
-Elementary functions

UNIT – III

COMPLEX INTEGRATION & COMPLEX POWER SERIES:
Line integral-Evaluation along a path and by indefinite integration-Cauchy's integral theorem- Cauchy's integral formula -Generalized integral formula.
Radius of convergence-expansion in Taylor's series-Maclaurin's series and Laurent series - Singular point - Isolated singular point-pole of order m - essential singularity

UNIT – IV

CONTOUR INTEGRATION:
Residue- Evaluation of residue by formula and by Laurent's Series- Residue Theorem. Evaluation of integrals of the type

(a) Improper real integral $\int_{-\infty}^{+\infty} f(x)dx$ (b) $\int_{c}^{c+2\pi} f(\cos\theta, \sin\theta)d\theta$

UNIT-V

CONFORMAL MAPPING:
Transformation by e^z, log z, z^2, z^n(n positive integer), sin z, cos z, Z+a/z , Translation, rotation, inversion and bilinear transformation–fixed point–cross z ratio properties – invariance of circles and cross ratio – determination of bilinear transformation mapping three given points.

Text Books:

1. C L Wadhwa, "Electric Power Systems", New age publications, New Delhi, 9th Edition, 2007.
2. Singh S N, "Electric Power Generation, Transmission and Distribution", Prentice Hall of India Pvt. Ltd., New Delhi, 2nd Edition, 2002.

Reference Books:

1. 1.J B Gupta, "A Course in Power Systems", S K Kataria and Sons, 2013 Edition, 2013
2. D Kothari and I J Nagrath, "Power System Engineering", McGraw Hill Education; 2nd Edition, 2007.
3. V K Mehta and Rohit Mehta, "Principles of Power System", S Chand, 3rd revised Edition, 2015.
4. M L Soni, P V Gupta, U S Bhatnagar and A Chakrabarthy, "A Text Book on Power System Engineering", Dhanpat Rai and Co Pvt. Ltd., revised Edition, 2009.
5. V Kamaraju, "Electrical Power Distribution Systems", TMH, Publication, Edition 2009
6. TuranGonen, "Electrical Power Distribution System Engineering", CRC Press, 3rd Edition, 2014.

ELECTRICAL POWER GENERATION

II B. Tech-II Semester **L T P C**

Course Code: A3EE094 - - 4

COURSE OVERVIEW:

1. To understand the development of electrical energy needs of various consumer areas and the relative mathematical analysis of it,
2. To describe and use from technical point of view the various methods of electrical energy production and to classify and use them from economic and operational point of view,
3. To understand the relationship between the electrical loads and the respective power production installations on the base of economic and technological criteria,
4. To use the methods and criteria of forming the selling price list of electrical energy

PRE-REQUISITIES: Electrical Fundamentals

COURSE OBJECTIVES:

At the end of the course, students are expected to:

1. Demonstrate thermal power generation systems including major subsystems.
2. Illustrate hydroelectric power generation systems along with pumped storage plants.
3. Understand basic working principles of nuclear power generation systems.
4. Apply knowledge of solar and wind power generation systems in design and implementation to obtainClean energy.

COURSE OUTCOMES:

Upon successful completion of this course, student will be able to:

1. Understand the basic definition of electrical instruments.
2. Be able to calculate the value of error in an instrument and measure the accuracy.
3. Be able to find the value of unknown resistance by using bridge circuits.
4. Explain how to measure the power in a three phase circuit.
5. Understand the working of energy meter and calculate the energy consumed.

SYLLABUS

UNIT – I

THERMAL POWER STATIONS
Thermal power station: Line diagram of thermal power station, paths of coal, steam, water, air, ash and flue gasses, description of thermal power station components, economizers, boilers, super heaters, turbines, condensers, chimney and cooling towers.

UNIT – II

HYDROELECTRIC POWER STATIONS
Hydroelectric power station: Elements, types, concept of pumped storage plants, storage requirements, mass curve and estimation of power developed from a given catchment area, heads and efficiencies, simple problems

UNIT – III

SOLAR ENERGY
Solar radiation: Environmental impact of solar power, physics of the sun, solar constant, extraterrestrial and terrestrial solar radiation, solar radiation on tilted surface, instruments for measuring solar radiation, solar radiation data, solar concentrators, collectors, thermal applications, design of standalone solar systems, simple problems.

UNIT – IV

WIND ENERGY

Wind energy: Sources and potential, power from wind, Betz criterion, components of wind energy conversion system, types of turbines, horizontal and vertical axis wind turbines, aerodynamics, momentum theory (actuator disk concept), operational characteristics, blade element theory, types of generating systems for wind energy: permanent magnet generators, DC generators, induction generators, doubly fed induction generators, applications of wind energy, safety and environmental aspects, simple problems

UNIT – V

NUCLEAR POWER STATIONS

Nuclear power stations: Nuclear fission and chain reaction, nuclear fuels, principle of operation of nuclear reactor and components, types of nuclear reactors, pressurized water reactor, boiling water reactor and fast breeder reactor, radiation hazards, shielding and safety precautions, applications.

TEXT BOOKS:

1. C L Wadhawa, "Generation, Distribution and Utilization of Electrical Energy", New Age International Limited, New Delhi, 3rd Edition, 2010.
2. G D Rai, "Non-Conventional Energy Sources", Khanna Publishers, 1st Edition, 2011.

REFERENCE BOOKS:

1. J B Gupta, "A Course in Electrical Power", S K Kataria and Sons, New Delhi, 15th Edition, 2013.
2. M V Deshpande, "Elements of Power Station design", Prentice Hall India Learning Private Limited, New Delhi, 1st Edition, 1992.
3. Mukund R Patel, "Wind and Solar Power Systems", CRC Press, 1st Edition, 1999
4. G N Tiwari, M K Ghosal, "Fundamentals of Renewable Energy Sources", Narosa Publications, NewDelhi, 1st Edition, 2007.

AC MACHINES LAB

II B.Tech -II Semester **L T P C**

Course Code: A3EE10 - - 3 2

COURSE OVERVIEW:

To understand the construction of Synchronous generators & motors andspecial machines. Develop the ability to use Synchronous generators and motors for various practical applications.

PRE-REQUISITIES: Electrical Fundamentals, Theoretical concept about Ac machines.

COURSE OUTCOMES:

1. Understand the concept of rotating magnetic field in an Induction motor.
2. Able to demonstrate why the rotor rotates in the direction of magnetic field and cannot catch the speed ofSynchronous speed
3. Understand how the winding are wound in an Alternator.
4. Able to explain what are harmonics and methods to reduce the harmonics
5. Explain the concept of Pitch factor and distribution factor.

COURSE OBJECTIVES:

The course should enable the students to:

1. Evaluate losses and determine the efficiency of single phase and three phase electrical machines.
2. Determine the voltage regulation, efficiency and temperature rise in various transformers.
3. Apply PLC and digital simulation software to gain practical knowledge

LIST OF EXPERIMENTS

The following experiments are required to be conducted as compulsory experiments

1. O.C. & S.C. Tests on Single phase Transformer
2. Sumpner's test on a pair of single phase transformers
3. Scott connection of transformers
4. No-load & Blocked rotor tests on three phase Induction motor
5. Regulation of a three –phase alternator by synchronous impedance &m.m.f. methods
6. Heat run test on single phase transformers
7. Equivalent Circuit of a single phase induction motor
8. Determination of Xd and Xq of a salient pole synchronous machine

In addition to the above eight experiments, at least any two of the following experiments are required to be conducted from the following list

1. Parallel operation of Single phase Transformers
2. Separation of core losses of a single phase transformer
3. Brake test on three phase Induction Motor

CONTROL SYSTEMS LAB

II B-Tech- II Semester **L T P C**
- - 3 2

Course Code:A3EE11

COURSE OVERVIEW:

This course focuses on the analysis and design of systems control. This course will introduce time-domain systems dynamic control fundamentals and their designissuesforelectricalengineeringapplications.Emphasiswillbeonlinear timeinvariant,multi-input multioutputcontinuous time systems. Topics include open and closed-loop state-space representations, analytical solutions, computer simulations, stability, controllability, observability, and controller/observer design.

PRE-REQUISITE:

A strong background in linear algebra and differential equations is not required but is highly recommended. The MATLAB/SIMULINK computer software package will be used extensively to assist in the understanding of concepts and fundamentals of system dynamics and control, and also to analyze and design control systems

COURSE OBJECTIVES:

1. Understand mathematical models of electrical and mechanical systems.
2. Analysis of control system stability using digital simulation.
3. Demonstrate the time domain and frequency domain analysis for linear time invariant systems.
4. Apply programmable logic controllers to demonstrate industrial controls in the laboratory

COURSE OUTCOMES:

1. Understand the basic definition of control systems.
2. Explain the concept of Serve mechanism and different translational and rotational motions.
3. Understand the concept of order of a system and finding the response.
4. Able to find the steady state and transient state response of first and second order systems.
5. Explain the concept of relative stability and root locus, Nyquist plots.

LIST OF EXPERIMENTS

Any Eight of the following experiments are to be conducted

1. Time response of Second order system
2. Characteristics of Synchro's
3. Programmable logic controller – Study and verification of truth tables of logic gates, simple Boolean expressions and application of speed control of motor.
4. Effect of feedback on DC servo motor
5. Transfer function of DC motor
6. Effect of P, PD, PI, PID Controller on a second order systems
7. Lag and lead compensation – Magnitude and phase plot
8. Transfer function of DC generator
9. Temperature controller using PID
10. Characteristics of magnetic amplifiers
11. Characteristics of AC servo motor

Any two simulation experiments are to be conducted using software tools

1. Simulation of Op-Amp based Integrator and Differentiator circuits.
2. Linear system analysis (Time domain analysis, Error analysis).
3. Stability analysis (Bode, Root Locus, Nyquist) of Linear Time Invariant system.
4. State space model for classical transfer function– Verification.

ELECTRICAL MEASUREMENTS& INSTRUMENTATION LAB

II B.Tech -II Semester **L T P C**

Course Code:A3EE12 - -3 2

COURSE OVERVIEW:

Accuracy of measurement and error analysis. Absolute and secondary instruments and indicating instrument. Moving coil and moving iron instruments. Dynamometer type instruments. Induction type instruments. Wattmeter of Measuring of power and power factor. Bridges (DC).Bridges (AC). Current and potential transformers. Oscilloscopes

PRE-REQUISITE: Electrical Circuits, Measurements and Instrumentation

COURSE OBJECTIVES:

1. Understand various measurement techniques used in electrical engineering.
2. Analyze waveforms using LabVIEW to measure various parameters.
3. Demonstrate the use of sensors and transducers in electrical and nonelectrical measurements.
4. Apply knowledge of virtual instruments in measurement of analysis of electrical parameters.

COURSE OUTCOMES:

1. Understand the basic definition of electrical instruments.
2. Be able to calculate the value of error in an instrument and measure the accuracy.
3. Be able to find the value of unknown resistance by using bridge circuits.
4. Explain how to measure the power in a three phase circuit.
5. Understand the working of energy meter and calculate the energy consumed.

LIST OF EXPERIMENTS

The following experiments are required to be conducted as compulsory experiments

1. Calibration and Testing of single phase energy Meter.
2. Calibration of dynamometer power factor meter.
3. Crompton D.C. Potentiometer – Calibration of PMMC ammeter and PMMC voltmeter.
4. Kelvin's double Bridge – Measurement of resistance – Determination of Tolerance.
5. Dielectric oil testing using H.T. testing Kit.
6. Schering bridge & Anderson bridge.
7. Measurement of 3 - Phase reactive power with single-phase wattmeter.
8. Measurement of parameters of a choke coil using 3 - voltmeter and 3 - ammeter methods.

In addition to the above eight experiments, at least any two of the experiments from the following list are required to be conducted

9. Calibration LPF wattmeter – by Phantom testing.
10. Measurement of 3-phase power with single watt meter.
11. Resistance strain gauge – strain measurements and Calibration.
12. Transformer turns ratio measurement using AC bridges.

ENVIRONMENTAL STUDIES

(MANDATORY COURSE NON-CREDIT)

II B-Tech –II Semester	**L T P C**
Course Code:A3HS16	**3 - - -**

Course Overview:

Environmental study is interconnected; interrelated and interdependent subject. Hence, it is multidisciplinary in nature. The present course is framed by expert committee of UGC under the direction of Honorable Supreme Court to be as a core module syllabus for all branches of higher education and to be implemented in all universities over India. The course is designed to create environmental awareness and consciousness among the present generation to become environmental responsible citizens. The course description is: multidisciplinary nature of environmental studies, Natural Resources: Renewable and non renewable resources; Ecosystems; Biodiversity and its conservation; Environmental Pollution; Social Issues and the Environment; Human Population and the Environment; pollution control acts and Field Work. The course is divided into five chapters for convenience of academic teaching followed by field visits.

PRE-REQUISITIES: NIL

Course Objectives:

1. Determine the Natural resources on which the structure of development is raised for sustainability of the society through equitable maintenance of natural resources.
2. Illustrate about biodiversity that raises an appreciation and deeper understanding of species, ecosystems and also the interconnectedness of the living world and thereby avoids the mismanagement, misuse and destruction of biodiversity.
3. Summarize a methodology for identification, assessment and quantification of global environmental issues in order to create awareness about the international conventions for mitigating global environmental problems.
4. Sustainable development that aims to meet raising human needs of the present and future generations through preserving the environment.
5. Outline green environmental issue provides an opportunity to overcome the current global environmental issues by implementing modern techniques like CDM, green building, green computing etc.

Course Outcomes:

Upon successful completion of the course, the student should be familiar with and be able to:

1. Explain the natural resources and their management.
2. Understanding the Classification and functioning of Ecosystems.
3. Remembering the Importance of biodiversity and its conservation.
4. Understanding the problems related to environmental pollution and management.
5. Apply the role of information technology, Analyze social issues and Acts associated with environment.

SYLLABUS

UNIT-I

Ecosystems:
Definition, Scope and Importance of ecosystem. Classification, structure and function of an ecosystem, Food chains, food web and ecological pyramids. Flow of energy, Biogeochemical cycles, Bioaccumulation, Bio magnification, ecosystem value, services and carrying capacity.

UNIT-II

Natural Resources: Classification of Resources:
Living and Non-Living resources, **water resources:** use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems.

Mineralresources: use and exploitation, environmental effects of extracting and using mineralresources,
Land resources: Forest resources, **Energy resources:** growing energy needs, renewable and nonrenewable energy sources, use of alternate energy source, case studies

UNIT-III

Biodiversity and Biotic Resources:
Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values. India as a mega diversity nation, Hot spots of biodiversity. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity: In-Situ and Ex-situ conservation. National Biodiversity act.

UNIT-IV

Environmental Pollution and Control Technologies
Environmental Pollution: Classification of pollution,
Air Pollution: Primary and secondary pollutants, Automobile and Industrial pollution, Ambient airquality standards.
Water pollution: Sources and types of pollution, drinking water quality standards.
Soil Pollution: Sources and types, Impacts of modern agriculture,.
Noise Pollution: Sources and Health hazards, standards,
Solid waste: Municipal Solid Waste management, composition and characteristics of e-Waste and itsmanagement.
Pollution control technologies: Wastewater Treatment methods: Primary, secondary and Tertiary. Overview of air pollution control technologies, Concepts of bioremediation
Global Environmental Problems and Global Efforts: Climate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS).. International conventions / Protocols: Earth summit, Kyoto protocol and Montréal Protocol.

UNIT-V:

Environmental Policy, Legislation & EIA:
Environmental Protection act, Legal aspects Air Act-1981, Water Act, Forest Act, Wild life Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules.
EIA: EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water, biological and Socio-economical aspects. Strategies for risk assessment
Towards Sustainable Future: Concept of Sustainable Development, Population and its explosion,Crazy Consumerism, Environmental Education, Urban Sprawl, Concept of Green Building, Ecological Foot Print, Life Cycle assessment (LCA), Low carbon life style

TEXT BOOKS:

1. Textbook of Environmental Studies for Undergraduate Courses by ErachBharucha for University Grants Commission.
2. Environmental Studies by R. Rajagopalan, Oxford University Press

REFERENCE BOOKS:

1. Environmental Science: towards a sustainable future by Richard T.Wright. 2008 PHL Learning Private Ltd. New Delhi.
2. Environmental Engineering and science by Gilbert M.Masters and Wendell P. Ela .2008 PHI Learning Pvt. Ltd.
3. Environmental Science by Daniel B. Botkin& Edward A.Keller, Wiley INDIA edition.
4. Environmental Studies by Anubha Kaushik, 4th Edition, New age international publishers. Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications

III B.Tech-I SEMESTER

SYLLABUS

LINEAR AND DIGITAL IC APPLICATIONS

III B. Tech-I Semester **L T P C**

Course Code: A3EC17 **4 1 - 4**

COURSE OVERVIEW:
Provide a strong foundation on Linear Circuits. Familiarize students with applications of various IC's.
Have a broad coverage in the field that is relevant for engineers to design Linear circuits using Op-amps. Familiarize the conversion of data from Analog to Digital and Digital to Analog

PREREQUISITE(S): Basic knowledge on Digital logic design.

COURSE OBJECTIVES:

1. To introduce the basic building blocks of linear integrated circuits.
2. To teach the linear and non-linear applications of operational amplifiers.
3. To introduce the theory and applications of PLL
4. To introduce the concepts of waveform generation and introduce some special function ICs...
5. Exposure to digital IC's

COURSE OUTCOMES:

Up on successful completion of this course, student will be able to:

1. Infer the DC and AC characteristics of operational amplifiers and its effect on output and their compensation techniques.
2. Elucidate and design the linear and non-linear applications of an op-amp and special application ICs.
3. Explain and compare the working of multivibrators using special application IC 555 and general
4. purpose op-amp
5. Classify and comprehend the working principle of data converters.
6. Illustrate the function of application specific ICs such as IC 565 PLL and its application in Communication
7. Analyze TTL and CMOS logic families.

SYLLABUS

UNIT–I INTEGRATED CIRCUITS AND OPERATIONAL AMPLIFIER:

Introduction, Classification of IC's, IC chip size and circuit complexity, basic information of Op-Amp IC741 Op-Amp and its features, the ideal Operational amplifier, Op-Amp internal circuit, Op-Amp characteristics - DC and AC.

UNIT–II LINEAR APPLICATIONS OF OP-AMP & NON-LINEAR APPLICATIONS OF OP-AMP:

Inverting and non-inverting amplifiers, adder, subtractor, Instrumentation amplifier, AC amplifier, V to I and I to V converters, Integrator and differentiator. Sample and Hold circuit, Log and Antilog amplifier, multiplier and divider, Comparators, Schmitt trigger, Multivibrators, Triangular and Square waveform generators, Oscillators

UNIT–III ACTIVE FILTERS, TIMER AND PHASE LOCKED LOOPS:

Introduction, Butterworth filters – 1st order, 2nd order low pass and high pass filters, band pass, band reject and all pass filters. Introduction to IC 555 timer, description of functional diagram, monostable and astable operations and applications, Schmitt trigger, PLL - introduction, basic principle, phase detector/comparator, voltage controlled oscillator (IC 566), low pass filter, monolithic PLL and applications of PLL.

UNIT–IV VOLTAGE REGULATOR, D to A AND A to D CONVERTERS::

Introduction, Series Op-Amp regulator, IC Voltage Regulators, IC 723 general purpose regulators, Switching Regulator. Introduction, basic DAC techniques - weighted resistor DAC, R- 2R ladder DAC, inverted R-2R DAC, A to D converters - parallel comparator type ADC, counter typeADC, successive approximation ADC and dual slope ADC, DAC and ADC Specifications.

UNIT–V CMOS LOGIC, COMBINATIONAL& SEQUNTIAL CIRCUITS USING TTL 74XX ICS:

CMOS logic levels, MOS transistors, Basic CMOS Inverter, NAND and NOR gates, CMOS AND-OR-INVERT and OR-AND-INVERT gates, implementation of any function using CMOS logic. Study of logic gates using 74XX ICs, Four-bit parallel adder(IC 7483), Comparator(IC 7485), Decoder(IC 74138, IC 74154), BCD-to-7-segmentdecoder(IC 7447), Encoder(IC 74147), Multiplexer(IC74151), Demultiplexer (IC 74154).
Flip Flops (IC 7474, IC 7473), Shift Registers, Universal Shift Register(IC 74194), 4- bit asynchronous binary counter(IC 7493).

TEXT BOOKS:

1. D. Roy Choudhury, Shail B. Jain (2012), Linear Integrated Circuit, 4th edition, New Age International Pvt.Ltd.,New Delhi,India

2. Ramakant A. Gayakwad, (2012), OP-AMP and Linear Integrated Circuits, 4th edition, Prentice Hall / Pearson Education, NewDelhi.

3. Floyd, Jain (2009), Digital Fundamentals, 8th edition, Pearson Education, New Delhi.

REFERENCE BOOKS:

1. Sergio Franco (1997), Design with operational amplifiers and analog integrated circuits, McGraw Hill, New Delhi.

2. Gray, Meyer (1995), Analysis and Design of Analog Integrated Circuits, Wiley International, New Delhi.

POWER ELECTRONICS

III B-Tech –I Semester **L T P C**

Course Code: A3EE13 **4 1 - 4**

COURSE OVERVIEW:

The application of electronics to energy conversion and control. Topics covered include: modeling, analysis, and control techniques; design of power circuits including inverters, rectifiers, and DC-DC converters; analysis and design of magnetic components and filters; and characteristics of power semiconductor devices. Numerous application examples will be presented such as motion control systems, power supplies, and radio-frequency power amplifiers.

PREREQUISITE(S): Basic knowledge on Electronic Devices

COURSE OBJECTIVES:

The course should enable the students to:

I. Integrate the revolutionary development in power transmission, distribution and utilization with the Advent of semiconductor devices.
II. Demonstrate rectifiers, choppers and various schemes of pulse width modulated inverters.
III. Explain AC voltage converters and cycloconverters.
IV. Outline complete range of power supplies, including switched mode and uninterruptible power supplies.

Course Outcomes:
1. Articulate the basics of power electronic devices
2. Express the design and control of rectifiers, inverters.
3. Design of power electronic converters in power control applications
4. Ability to express characteristics of SCR, BJT, MOSFET and IGBT.
5. Ability to express communication methods.
6. Ability design AC voltage controller and Cyclo Converter.
7. Ability to design Chopper circuits.

SYLLABUS

UNIT – I POWER SEMICONDUCTOR DEVICES AND COMMUTATION CIRCUITS

Power semiconductor devices and commutation circuits: Thyristors, principle of operation of silicon controlled rectifiers (SCR), bipolar junction transistor (BJT), power metal oxide semiconductor filed effect transistor (MOSFET), power insulated gate bipolar transistor (IGBT), gate turnoff thyristor (GTO) and characteristics, turn on and turnoff methods, dynamic characteristics of SCR, two transistor analogy, uni junction transistor firing circuit, series and parallel operation of SCR‟s, design of snubber circuit; Specifications and ratings: Ratings of SCR, BJT and IGBT, line commutation and forced commutation circuits, numerical problems.

UNIT – II SINGLE PHASE AND THREE PHASE CONTROLLED RECTIFIERS

AC - DC converters: Phase control technique, single phase line commutated converters, midpoint and bridge connections, half controlled converters and semi converters with R, RL and RLE loads, derivation of average load voltage and current, active and reactive power inputs to the converters without and with freewheeling diode, numerical problems; Fully controlled converters: Midpoint and bridge connections with R, RL loads and RLE load, derivation of average load voltage and current, line commutated inverters, active and reactive power inputs to the converters without and with freewheeling diode, derivation of load voltage and current, numerical problems; Three phase converters: Three pulse and six pulse converters, midpoint and bridge connections, average load voltage with R and RL loads, effect of source inductance, operation of single phase and three phase dual converters, numerical problems.

UNIT – III AC VOLTAGE CONTROLLERS AND CYCLOCONVERTERS

AC - AC controllers: Introduction, single phase two SCR‟s in anti-parallel, with R and RL loads, modes of operation of TRIAC, TRIAC with R and RL loads, derivation of RMS load voltage, current and power factor, wave forms, numerical problems;

Cyclo converters: Principle of operation of single phase midpoint and bridge type cyclo converters with resistive and inductive loads, continuous and discontinuous mode of operation.

UNIT-IV DC-DC CONVERTERS

DC - DC converters: Principle of operation of choppers, time ratio control and current limit control strategies, types of choppers, derivation of load voltage and currents with R, RL and RLE loads, AC chopper, problems; Switched mode regulators: Study of buck, boost and buck - boost regulators, Cuk regulators.

UNIT – V INVERTERS

DC - AC converters: Single phase inverter, basic series inverter, parallel inverter, operation and waveforms, voltage source inverter (VSI), three phase inverters 180, 120 degrees conduction modes of operation, voltage control techniques for inverters, pulse width modulation techniques, reduction of harmonics, current source inverter (CSI) with ideal switches, capacitor commutated type CSI, numerical problems.

TEXT BOOKS:

1. M D Singh, K B Kanchandhani, "Power Electronics", Tata Mc Graw Hill Publishing Company, 2nd Edition, 1998.

2. Dr. P S Bimbhra, "Power Electronics", Khanna Publishers, 5th Edition, 2012.

3. Ned Mohan, Tore M Undeland, William P Robbins, "Power Electronics: Converters, Applications, and Design", 3rd Edition, John Wiley and sons, 2002.

4. M H Rashid, "Power Electronics, Circuits, Devices and Applications", Pearson, 3rd Edition, 2001.

REFERENCE BOOKS:

1. Vedam Subramanyam, "Power Electronics", New Age International Limited, 2nd Edition, 2006.

2. P C Sen, "Power Electronics", Tata McGraw-Hill Publishing, 1st Edition, 1987.

3. G K Dubey, S R Doradra, A Joshi, R M K Sinha, "Thyristorised Power Controllers", New Age International Limited, 2nd Edition, 2008.

4. V R Moorthi, "Power Electronics Devices", Oxford University Press, 4th Edition, 2005.

WEB REFERENCES:

1. https://www.nptel.iitm.ac.in
2. https://www.iare.ac.in
3. https://www.bookboon.com/en/introduction-to-power-electronics-ebook

E-TEXT BOOKS:

1. https://www.freebookcentre.net
2. https://www.amazon.in/power-electronics-handbook
3. https://www.circuitstoday.com

POWER TRANSMISSION AND DISTRIBUTION

III B-Tech –I Semester **L T P C**

Course Code: A3EE14 **4 1 - 4**

COURSE OVERVIEW:

Electrical Power Transmission Systems engineering along with distribution network analysis, planning and design, play a critical role in the technical management, development, and acquisition of complex power and energy technology systems. They are the professionals responsible for planning, coordinating, and overseeing group efforts that translate operational need into technology solution, and whose tools and skills determine whether a system will meet cost, schedule, and performance goals.

PREREQUISITE(S): Knowledge on Power systems

COURSE OBJECTIVES:

The course should enable the students to:

I. Estimate the voltage regulation and efficiency of different transmissions lines.
II. Demonstrate the mechanical design of overhead lines, cables and insulators.
III. Illustrate the performance of different types of distribution systems.
IV. Discriminate the operation of different distribution schemes and design of feeders.

Course Outcomes: At the end of the Course the student would be able to:
1. Analyze the performance of various Units involved in the power plants.
2. Apply power system fundamentals to the design of a system that meet specific needs.
3. Design a power system solution based on the problem requirements and realistic Constraints.
4. Develop a major design experience in power a system that prepares them for Engineering practice

SYLLABUS

UNIT – I TRANSMISSION LINE PARAMETERS

Transmission line parameters: Types of conductors, simple diagrams of typical towers and conductors for 400, 220 and 132 kV operations calculation of resistance for solid conductors, calculation of inductance for single phase and three phase, single and double circuit lines, concept of GMR and GMD, symmetrical and asymmetrical conductor configuration with and without transposition, numerical problems, calculation of capacitance for 2 wire and 3 wire systems, effect of ground on capacitance, capacitance calculations for symmetrical and asymmetrical single and three phase, single and double circuit lines, numerical problems; Corona: Types, critical disruptive voltages, factors affecting corona, methods for reducing corona power loss, corona current wave form, charge voltage diagram, audible, radio interference.

UNIT - II
MODELLING AND PERFORMANCE OF TRANSMISSION LINES

Classification of transmission lines: Short, medium and long line and their model representations, nominal T, nominal π and A, B, C, D constants for symmetrical and asymmetrical networks, numerical problems, mathematical solutions to estimate regulation and efficiency of all types of lines, numerical problems; Long transmission line: Rigorous solution, evaluation of A, B, C, D constants, interpretation of the long line equations, methods of voltage control, Ferranti effect, incident, reflected and refracted waves, surge impedance and surge impedance loading of long lines, wave length and velocity of propagation of waves, representation of long lines, equivalent T and equivalent π network model, numerical problems

UNIT – III OVER HEAD INSULATORS AND UNDER GROUND CABLES

Overhead insulators: Types of insulators, string efficiency and methods for improvement, numerical problems, voltage distribution, calculation of string efficiency, capacitance grading and static shielding.

Underground cables: Types of cables, construction, types of insulating materials, calculations of insulation resistance and stress in insulation, numerical problems, capacitance of single and 3 core belted cables, numerical

problems, grading of cables, capacitance grading, numerical problems, description of inter sheath grading, numerical problems.

UNIT – IV MECHANICAL DESIGN OF TRANSMISSION LINES AND TYPES OF DISTRIBUTION SYSTEMS

Sag and tension calculations: Sag and tension calculations with equal and unequal heights of towers, effect of wind and ice on weight of conductor, numerical problems, stringing chart and sag template and its applications; Types of distribution systems: Radial and ring main system, current and voltage calculation in distributors with concentrated and distributed load, Kelvin‟s law for the design of feeders and its limitations, substation design, types of substation, bus bar arrangement, substation bus schemes, substation location substation equipments, Indian electricity rules, various voltage levels of transmission and distribution systems, Indian grid scenario.

UNIT-V GENERAL ASPECTS OF AC DISTRIBUTION SYSTEMS

Distribution systems: Classification of distribution systems, comparison of DC Vs AC and underground Vs over head distribution systems, requirements and design features of distribution system; Voltage drop calculations in AC distributors for the following cases: Power factors referred to receiving end voltage and with respect to respective load voltages, numerical problems.

TEXT BOOKS:

1. C L Wadhwa, “Electric Power Systems”, New age publications, New Delhi, 9th Edition, 2007.
Singh S N, “Electric Power Generation, Transmission and Distribution”, Prentice Hall of India Pvt. Ltd., New Delhi, 2nd Edition, 2002.

2. Turan Gonen, “Electrical Power Distribution System Engineering”, CRC Press, 3rd Edition, 2014.

3.V Kamaraju, “Electrical Power Distribution Systems”, TMH, Publication, Edition 2009

REFERENCE BOOKS:

1.J B Gupta, “A Course in Power Systems”, S K Kataria and Sons, 2013 Edition, 2013

2. D Kothari and I J Nagrath, “Power System Engineering”, McGraw Hill Education; 2nd Edition, 2007.

3. V K Mehta and Rohit Mehta, “Principles of Power System”, S Chand, 3rd revised Edition, 2015.

4. M L Soni, P V Gupta, U S Bhatnagar and A Chakrabarthy, “A Text Book on Power System Engineering”, Dhanpat Rai and Co Pvt. Ltd., revised Edition, 2009.

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1. https://www.en.wikipedia.org/wiki/Electric_power_transmission
2. https://www.iec.ch/about/brochures/pdf/technology/transmission.pdf
3. https://www.teriin.org/upfiles/pub/papers/ft33.pdf
4. https://www.energy.gov/sites/prod/files/2015/09/f26/QTR2015-3F-Transmission-and Distribution_1.pdf

E-TEXT BOOKS:

1. https://www.jfgieras.com/Grigsby_Chapter_34_LEM.pdf
2. https://www.personal.psu.edu/sab51/vls/vonmeier.pdf
3. https://www.edsonjosen.dominiotemporario.com

MICROPROCESSORS AND MICROCONTROLLERS

III B. Tech-I Semester **L T P C**

Course Code: A3EC27 **3 1 - 3**

COURSE OVERVIEW:

Understand the basic 8, 16 bit microprocessor architecture and its functionalities and programming model of microprocessor. To develop the microprocessor based programs for various applications.To make the interfacing in between microprocessor and various peripherals. To develop DOS/BIOS programs. To develop the micro controller based programs for various applications. To enable the students to understand basic feature of 8051 and AVR controller.

PREREQUISITE(S): Introduction to architecture, operation, and application of Microprocessors.

COURSE OBJECTIVES:

1. To develop an in-depth understanding of the operation of microprocessors
2. To master the assembly language programming using concepts like assembler directives, Procedures, macros, software interrupts etc.
3. To create an exposure to basic peripherals, its programming and interfacing techniques
4. To understand the concept of Interrupts and interfacing details of 8086
5. To impart the basic concepts of serial communication in 8086

COURSE OUTCOMES:

Up on successful completion of this course, student will be able to:

1. Understand the internal organization and different modes of operation of popular 8086 microprocessors / 8051 microcontrollers.
2. Understand the importance of addressing modes and the instruction set of the processor / controller which is used for programming the processor and controller. Use design tools for microprocessor system design, test and evaluation.
3. Understand I/O operation with 8086 and software interaction and integration.
4. Understand the memory organization and interrupts of processors/ micro-controllers helps in various system designing aspects.
5. Design and conduct experiments related to microprocessor/microcontroller based system design.

SYLLABUS

Unit-I 8086 architecture: 8086 architecture- functional diagram, Register organization, memory segmentation, programming model, Memory addresses, physical memory organization, Signal descriptions of 8086-common function signals, timing diagrams.

UNIT-II Instruction set and assembly language programming of 8086: Instruction formats. Addressing modes, instruction set, assembler directives. Macros, Simple programs involving logical, branch and call instructions. Sorting, evaluating arithmetic expressions, string manipulations.

UNIT-III

I/O Interface: 8255 PPI, various modes of operation and interfacing to 8086, interfacing of key board, display. Stepper motor interfacing, D/A &A/D converter.

Interfacing With advanced devices: Memory interfacing to 8086, Interrupts of 8086, Vector interrupt table, Interrupt service routine, Serial communication standards, serial data transfer schemes, 8251 USART architecture and Interfacing.

UNIT-IV

Introduction to microcontrollers: overview of 8051 microcontroller, Architecture, I/O ports, Memory organization, addressing modes and instruction set of 8051, Simple programs.

UNIT-V

8051 Real Time Control: Programming Timer interrupts, programming external hardware interrupts, Programming the serial communication interrupts, Programming 8051 timers and counters.

TEXT BOOKS:

1.D.V.Hall, Microprocessors and Interfacing. TMGH, 2nd edition 2006. 2.Kenneth.J.Ayala. The 8051 microcontroller, 3rd edition, Cengage learning,2010

3.Advanced microprocessors and peripherals-A.K ray and K.M.Bhurchandani, TMH, 2nd edition 2006.

1. D.V.Hall, Microprocessors and Interfacing. TMGH, 2nd edition 2006.

2. Kenneth.J.Ayala. The 8051 microcontroller, 3rd edition, Cengagelearning,2010

3. Advanced microprocessors and peripherals-A.K ray and K.M.Bhurchandani, TMH, 2nd edition 2006.

REFERENCES:

1. The 8051 microcontrollers, architecture and programming and applications-K.Uma Rao, AndhePallavi., Pearson, 2009.

2. Micro computer system 8086/8088 family architecture, programming and design- By Liu and GA Gibson, PHI, 2nd Ed.,

3. Microcontrollers and application, Ajay.V.Deshmukh,TMGH,2005

4. The 8085 microprocessor: Architecture, programming and interfacing- K.Uday Kumar, B.S.Umashankar, 2008, Pearson

5. Microprocessors and microcontrollers- S.V.Altaf

OPEN ELECTIVES -I

ELECTRICAL ENGINEERING MATERIALS

(OPEN ELECTIVE – 1)

III B. Tech-I Semester **L T P C**

Course Code: A3EE15 **3 - - 3**

COURSE OVERVIEW:

In almost every case, the work of engineers finds application through materials. The future of Electrical Engineering itself is squarely dependent upon the ability to understand, exploit and apply ever-new electronic, photonic and magnetic properties of materials and with the advent of "nanotechnology" the richness of new properties and the impact of materials on electrical engineers has, arguably, never been more significant. With a greater understanding of materials, electrical engineers are already leaders in the most pressing societal issues, from renewable energy and environmental sustainability to ultra-portable communication and biocompatible medical devices.

PREREQUISITES:

Knowledge on engineering physics

COURSE OBJECTIVES:

To understand about various electrical engineering materials

COURSE OUTCOMES:

1. Analyze the various engineering materials.
2. Application of various engineering materials.

SYLLABUS

UNIT I: CONDUCTORS

Classification: High conductivity, high resistivity materials, fundamental requirements of high conductivity materials and high resistivity materials, mobility of electron in metals, commonly used high conducting materials, copper, aluminum, bronze brass, properties, characteristics, constantan, platinum, nichrome, properties, characteristics and applications, materials used for contacts.

UNIT II: SEMICONDUCTORS

General concepts, energy bands, types of semiconductors, Fermi Dirac distribution, intrinsic Semi-conductors, extrinsic Semi-conductors, hall effect, drift, mobility, diffusion in Semiconductors, Semi-conductors and their applications, superconductors.

UNIT III: DIELECTRICS AND INSULATORS

Properties of gaseous, liquid and solid dielectric, dielectric as a field medium, electric conduction in gaseous, liquid and solid dielectric, breakdown in dielectric materials, mechanical and electrical properties of dielectric materials, effect of temperature on dielectric materials, polarization, loss angle and dielectric loss, petroleum based insulating oils, transformer oil, capacitor oils, properties, solid electrical insulating materials, fibrous, paper boards, yarns, cloth tapes, sleeving wood, impregnation, plastics, filling and bounding

materials, fibrous, film, mica, rubber, mica based materials, ceramic materials, classification of insulation (solid) and application in AC and DC machines.

UNIT IV: MAGNETIC MATERIALS

Soft and hard magnetic materials, diamagnetic, paramagnetic and ferromagnetic materials, electric steel, sheet steel, cold rolled grain oriented silicon steel, hot rolled grain oriented silicon steel, hot rolled silicon steel sheet, hysteresis loop, hysteresis loss, magnetic susceptibility, coercive force, curie temperature, magneto-striction.

UNIT V: OPTICAL PROPERTIES OF SOLIDS

Photo emission, photo emission materials, electro luminescence junction diode, photo emitters, photo transistor, photo resistors, injunction lasers, optical properties of semiconductors, application of photo sensitive materials (CRT, Tube light, photo panels etc.).

Text Books:

1. "Electrical Engineering Materials",Dekker,PHI Pbs.
2. "Electrical Engineering Materials", Indulkar,S.Chand

Reference Books:

1. "Electrical Engineering Materials", Tareev
2. "Electrical Engineering Materials", Yu. Koritsky.
3. "Electrical Engineering Materials", R.K.Rajput, Laxmi Pbs.

ELECTRICAL WIRING AND SAFETY MEASURES

(OPEN ELECTIVES-1)

III B. Tech-I Semester **L T P C**

Course Code: A3EE16 **3 - - 3**

COURSE OVERVIEW:

The course will be of great interest to all professionals who would like to learn about the electrical wiring system. It will also be of interest to all learners who are interested in developing a career in the field and learning the practical aspects of the trade. If you are interested in a career in construction, you may find this course of general professional interest. If you always thought you would like to know more about electrical systems, then this might just be the opportunity you have been waiting for to learn more.

COURSE OBJECTIVES:

1. To Study the wiring diagram of residential.
2. To understand the Safety measures of Electrical wiring

PRE-REQUISITE(S):

Knowledge of electrical equipments, Electrical units

COURSE OUTCOMES:

The student will be able to:

1. Know safety measures & state safety precautions.

2. Test single phase, three phase transformer, DC & AC machine as per IS.

3. Ascertain the condition of insulation & varnishing if necessary.

4. Identify faults & measures to repair faults.

SYLLABUS

UNIT-1 BASICS OF ELECTRICAL INSTALLATIONS

Electric Supply System, Three phase four wire distribution system, Protection of Electric Installation against over load, short circuit and Earth fault, General requirements of electrical installations, testing of installations, Types of loads, Systems of wiring, Service connections, Service Mains, Sub-Circuits, Location of Outlets, Location of Control Switches, Location of Main Board and Distribution board, Guide lines for Installation of Fittings, Load Assessment, Permissible voltage drops and sizes of wires, estimating and costing of Electric installations.

UNIT II EARTHING

Introduction & importance, Factors affecting Earth Resistance, Methods of earthling Substation and Transmission tower earthling, Neutral and Earth wire, Transformer Neutral Earthling.

UNIT-III SAFETY & PREVENTION OF ACCIDENTS

Definition of terminology used in safety , I.E. Act & statutory regulations for safety of persons & equipments working with electrical installation . Dos & don'ts for substation operators as listed in IS. Meaning & causes of electrical accidents factors on which severity of shock depends.

UNIT-IV RESIDENTIAL BUILDING ELECTRIFICATION

General rules guidelines for wiring of Residential Installation and positioning of equipments. Principles of circuit design in lighting and power circuits. Procedures for designing the circuits and deciding the number of sub- circuits. Method of drawing single line diagram & wiring diagram.

UNIT-V INDIAN ELECTRICITY RULES FOR CONSUMER ENDS& SUBSTATION AND METERS

Rule 28 : Voltage level definitions. Rule 30: Service lines & apparatus on consumer premises.
Rule 31: Cut-out on consumer's premises. Rule46: Periodical inspection & testing of consumer's installation.
Rule 47: Testing of consumer's installation. Rule 54: Declared voltage of supply to consumer.
Rule 55: Declared frequency of supply to consumer.
Rule 56: Sealing of meters & cut-outs.
Rule 77: Clearances above ground of the lowest conductor. Rule 79: Clearances between conductors & trolley wires.
Rule 87: Lines crossing or approaching each other. Rule 88: Guarding.

Text Books:

1. K.B. Raina, S.K.Bhattacharya Electrical Design;Estimating and costing New Age International (p) Limited, New Delhi Surjit Singh.

2. Electrical Estimating and costing Dhanpat Rai and company, New Delhi .J.B.Gupta

3.A course in Electrical Installation, Estimating & costing S.K.Kataria & sons,S.L. Uappal .

4. Electrical wiringEstimating and costing Khanna Publication. ,A.K.Sawhney

5. Electrical Machine Design Danpat Rai & co.

6. The Electricity Rule 2005Universal Law Publishing Co. Pvt. Ltd. N. AlagappanS. Ekambaram

7. Electrical Estimating and costing Tata Mc Graw Hill Publication, New Delhi ,Surjit Singh

8. Tarlok Sibgh Installation, Commissioning & Maintenance of Electrical Equipment S.K.Kataria & Sons

9. B.V.S.Rao Operation & Maintenance of Electrical Machines Vol I & II Media Promoters & Publisher Ltd. Mumbai

INTEGRATED CIRCUITS APPLICATIONS LAB

III B. Tech- I Semester **L T P C**
Course Code: A3EC25 - - 3 2

COURSE OVERVIEW:

The course consists of laboratory tasks dealing with different types of Analog IC , timers and regulators and also implementing Combinational and Sequential Programs UsingVerilog HDL It is a credit based laboratory course designed as a supplement to the Linear andDigital Integrated Circuit Applications theory course. Primary emphasis is placed on practicalperformance of Circuits which are designed by analog IC's. Laboratory experiments areconducted to reinforce theory and to provide practical experience with analog IC's , timers,Regulators and Verilog HDL Programming.The course covers practical experiments ondifferent Applications of Analog IC's and Verilog HDL programming.

PRE-REQUISITIES:

Pulse and Digital Circuits,Linear IC Applications,Switching Theory and Logic Design, Digital Design through Verilog HDL

COURSE OBJECTIVES:
To demonstrate the characteristics and applications of Op-Amps
To verify the functionality of specific ICs like 555 timer, and voltage regulators.
To verify the functions of various digital ICs
To study and build applications with ASLKV2010 Starter Kit

COURSE OUTCOMES:

After going through this course the student will be able to

Design various applications using Op-Amps
Design various applications with specific ICs like 555 timer, IC741
Design various sequential and Combinational circuits using digital ICs
Design applications using ASLKV 2010 Starter Kit

LIST OF EXPERIMENTS

LINEAR ICS: (Hardware Verification)

1. Measurement of IC741 op-amp parameters.
2. Basic applications of IC741 op-amp.
3. Integrator and differentiator using IC741 op-amp.
4. Precision rectifiers using IC741 op-amp.
5. Adder, Subtract or, Comparator using IC 741 Op-Amp.
6. Active Low Pass & High Pass Butterworth filters (1st &2nd Order).
7. RC Phase Shift and Wien Bridge Oscillators using IC 741 Op-Amp
8. IC 555 timer in Astable and Monostable operation.
9. Schmitt trigger circuits using IC 741 op-amp & IC 555 timer.
10. Voltage regulator IC 723, three terminal voltage regulators- 7805, 7809, 7912.
11. Study of Logic Gates and Some applications.
12. Study of Flip-Flops and some applications.
13. Sampling Gates

Note: Any 12 of above experiments are to be conducted.

MICROPROCESSORS AND MICROCONTROLLERS LAB

III B.Tech -I Semester **L T P C**

Course Code: A3EC37 **- 1 3 2**

COURSE OVERVIEW:
Familiarize the architecture of 8086 processor, assembling language programming and interfacing with various modules. The student can also understand of 8051 Microcontroller concepts, architecture, programming and application of Microcontrollers. Student able to do any type of embedded systems, industrial and real time applications by knowing the concepts of Microprocessor and Microcontrollers.

PREREQUISITE(S): Basic knowledge on programming in 'C', Microprocessors instructions

COURSE OBJECTIVES:

1. Devices and circuits to microprocessors and microcontrollers.
2. Design and develop both the hardware and software for microprocessor /microcontroller based systems.
3.To provide practical introduction to microcontrollers and microprocessors, assembly language programming techniques
and interfacing Connect peripheral Interpret specifications for any microprocessor or peripheral chip

COURSE OUTCOMES:

After going through this course the student will be able to

A) Develop the basic skills on hardware and software/programming of microprocessor

B) Enhance assembly language programming skills for simple and complex calculations used in various engineering disciplines.

C) Capable to innovative and design intelligent systems, called embedded systems, using microprocessor for special purpose.

D) Involve in verification of functionality, speed and power of microprocessor based system

LIST OF EXPERIMENTS

I. MICROPROCESSOR 8086:

1) Programs involving data Transfer Instructions
   - Byte and word transfer in different addressing modes
   - Block move Without overlapping
   - Block move With overlapping
   - Block interchanging

2) Programs involving arithmetic and logical operations like addition and subtraction of multi precision numbers
   - Addition and Subtraction of Multi precision numbers
   - Multiplication and division of signed and unsigned Hexadecimal numbers
   - ASCII adjustment instructions
   - Code Conversion
   - Arithmetic program to find square ,cube ,LCM ,GCD and factorial

3) Programs involving bit manipulation instructions like checking
   - If given data is positive or negative
   - If given data is odd or even
   - Logical ones and zeros in a given data
   - 2 out of 5 code
   - Bit wise palindrome
   - Nibble wise palindrome

4) Programs involving Branch / Loop instructions like :

5) Programs on arrays: addition/subtraction of N nos., finding largest/smallest no., Ascending /descending order, etc. Near and Far Conditional and Unconditional jumps, Call and Returns

6) Programs on String Manipulations like string transfer, string reversing, searching for a character in a string, palindrome etc

7) Programs involving on Software Interrupts

8) Programs to use DOS interrupt INT 21H Function calls:

Reading a Character from Keyboard, Buffer Keyboard input .Display of characters/String on console
Creation of a new file, read/write from a file,
Read system date, set system date, read system time, set system time

II. INTERFACING WITH 8086:

1) Experiments on interfacing 8086 with the following modules through 8255 PPI / 8257 DMA / 8259 PIC
A/D and D/A converters
Matrix keyboard interface
Seven segment display interface
Stepper motor interface
Traffic signals by interfacing traffic controller to 8086

Programming of Microcontroller 8051

2) Execute the Program for Arithmetic and logical instructions

3) Execute the Program to verify timers/counters.

4) Develop and execute the program to interface stepper motor to the8051 Microcontroller.

5) Develop and execute the program to interface LCD to 8051.

6) Develop and execute the program to interface Keyboard to 8051

POWER ELECTRONICS LAB

III B.Tech -I Semester **L T P C**

Course Code: A3EE17 **- - 3 2**

COURSE OVERVIEW:

Understand and learn the characteristics of power electronics devices and control methods of rectifiers and choppers To learn different gating circuits for thyristor turn-on. To learn the operation of ac voltage controllers and inverters. To learn the simulation of power electronics circuits. To understand the concepts of different loads

PREREQUISITE(S): Knowledge on Power Electronics subject

COURSE OBJECTIVES:

The course should enable the students to:

I. Examine the characteristics of various devices and application of firing circuits used in power electronics.
II. Outline the performance characteristics of AC voltage regulators, choppers, inverters, rectifiers and cyclo converters.
III. Demonstrate the working principle of various power electronic devices and circuits using simulation.
IV. Design the circuit of switched mode power supplies through simulation.

COURSE OUTCOMES:

The student will be able to

1. Design a Commutation circuit of a thyristor.
2. Control a supply voltage using converters.
3. Select a suitable power electronic device for different applications.
4. Use PSPICE software for determining the performance of given power electronic converters.

LIST OF EXPERIMENTS

Expt. 1 SCR, MOSFET AND IGBT
Study the characteristics of SCR, MOSFET and IGBT.
Expt. 2 GATE FIRING CIRCUITS
Gate firing circuits of SCR.
Expt. 3 HALF CONTROLLED CONVERTER
Single phase half controlled converter with R and RL loads
Expt. 4 FORCED COMMUTATION CIRCUITS
Forced commutation circuits (Class A, Class B, Class C, Class D and Class E).
Expt. 5 FULLY CONTROLLED BRIDGE CONVERTER
Single phase fully controlled bridge converter with R and RL loads.
Expt. 6 SERIES INVERTER
Single phase series inverter with different loads
Expt. 7 PARALLEL INVERTER
Single phase parallel inverter with different loads.
Expt. 8 VOLTAGE CONTROLLER
Single phase AC voltage controller with R and RL loads
Expt. 9 DUAL CONVERTER
Single phase dual converter with R and RL loads
Expt. 10 CYCLOCONVERTER
Single phase cyclo converters with R and RL loads
Expt. 11 THREE PHASE CONVERTERS
Three phase half converter with R and RL loads.
Expt. 12 MOSFET BASED CHOPPERS
Operation of step down chopper using MOSFET.
Expt. 13 SIMULATION OF THREE PHASE FULL CONVERTER
Simulation of three phase full converter and PWM inverter with R and RL loads by using MATLAB
Expt. 14 SIMULATION OF BUCK – BOOST CHOPPER
Simulation of boost, buck, buck boost converter with R and RL loads by using MATLAB.

REFERENCE BOOKS:

1. M H Rashid, "Power Electronics, Circuits, Devices and Applications", Pearson, 3rd Edition, 2001.

2. M D Singh, K B Kanchandhani, "Power Electronics", Tata McGraw Hill Publishing Company, 7th Edition, 2007.

3. Dr. P S Bimbhra, "Power Electronics", Khanna Publishers, 5th Edition, 2012.

WEB REFERENCES:

1. https://www.ee.iitkgp.ac.in
2. https://www.citchennai.edu.in
3. https://www.iare.ac.in

SOFTWARE AND HARDWARE REQUIREMENTS:

SOFTWARE: MATLAB R2015a

HARDWARE: Desktop Computers (04 nos)

TECHNICAL SEMINAR-II

(MANDATORY COURSE NON CRIDIT)

III B.Tech -I Semester **L T P C**

Course Code: A3EE18 **- - 2 -**

COURSE OVERVIEW:
To expose students to the 'real' working environment and get acquainted with the organization structure, business operations and administrative functions. To set the stage for future recruitment by potential employers

Prerequisite(s): Knowledge on Internet

COURSE OBJECTIVE:

Seminar is an important component of learning in an Engineering College, where the student gets acquainted with preparing a report & presentation on a topic.

PERIODICITY / FREQUENCY OF EVALUATION: Twice

PARAMETERS OF EVALUATION:
1. The seminar shall have topic allotted and approved by the faculty.
2. The seminar is evaluated for 25 marks for internal and 25 marks for external.
3. The students shall be required to submit the rough drafts of the seminar outputs within one week of the commencement of the class work.
4. Faculty shall make suggestions for modification in the rough draft. The final draft shall be presented by the student within a week thereafter.
5. Presentation schedules will be prepared by Department in line with the academic calendar.

The Seminars shall be evaluated in two stages as follows:
Rough draft
In this stage, the student should collect information from various sources on the topic and collate them in a systematic manner. He/ She may take the help of the concerned faculty
The report should be typed in ―MS-Word‖ file with ―calibri‖ font, with font size of 16 for main heading, 14 for sub-headings and 11 for the body text. The contents should also be arranged in Power Point Presentation with relevant diagrams, pictures and illustrations. It should normally contain 10 to 15 slides, consisting of the followings

1.	Topic, name of the student & faculty	1 Slide
2.	List of contents	1 Slide
3.	Introduction	1Slides
4.	Descriptions of the topic (point-wise)	6 - 10 Slides
5.	Conclusion	1 - 2 Slides
6.	References/Bibliography	1 Slide

The soft copy of the rough draft of the seminar presentation in MS Power Point format along with the draft report should be submitted to the concerned faculty, with a copy to the concerned HOD within stipulated time.
The evaluation of the rough draft shall generally be based upon the following.

1	Punctuality in submission of rough draft	2
2	Dress Code	3
3	Resources from which the seminar have been based	2
4	Report , and content of Presentation	5
5	Depth of the students knowledge in the subject	5
6	Reception from Questions	5
7	Time Management, Classroom Dynamic	3
	Total Marks	**25**

After evaluation of the first draft the supervisor shall suggest further reading, additional work and fine tuning, to improve the quality of the seminar work.

Within 7 days of the submission of the rough draft, the students are to submit the final draft incorporating the suggestions made by the faculty.

Presentation: (External)

After finalization of the final draft, the students shall be allotted dates for presentation (in the designated seminar classes) and they shall then present it in presence students, HOD, In-charge, faculties of the department and at least one faculty from some department / other department.

The student shall submit 3 copies of the Report neatly bound along with 2 soft copies of the PPT in DVD medium. The students shall also distribute the title and abstract of the seminar in hard copy to the audience. The final presentation has to be delivered with 18-25 slides.

The evaluation of the Presentation shall generally be based upon the following.

1.	Contents	10 Marks
2.	Delivery	10 Marks
3.	Relevance and interest the topic creates	10 Marks
4.	Ability to involve the spectators	10 Marks
5.	Question answer session	10 Marks
	Total	**50 Marks**

WHO WILL EVALUATE?

The presentation of the seminar topics shall be made before an internal evaluation committee comprising the Head of the Department or his/her nominee, seminar supervisor and a senior faculty of the department / other department.

ELECTRICAL ENGINEERING MATERIALS

(OPEN ELECTIVE – 1)

III B. Tech-I Semester **L T P C**

Course Code: A1EE15 **3 - - 3**

COURSE OVERVIEW:

In almost every case, the work of engineers finds application through materials. The future of Electrical Engineering itself is squarely dependent upon the ability to understand, exploit and apply ever-new electronic, photonic and magnetic properties of materials and with the advent of "nanotechnology" the richness of new properties and the impact of materials on electrical engineers has, arguably, never been more significant. With a greater understanding of materials, electrical engineers are already leaders in the most pressing societal issues, from renewable energy and environmental sustainability to ultra-portable communication and biocompatible medical devices.

PREREQUISITES:

Knowledge on engineering physics

COURSE OBJECTIVES:

To understand about various electrical engineering materials

COURSE OUTCOMES:

1. Analyze the various engineering materials.
2. Application of various engineering materials.

SYLLABUS

UNIT I: CONDUCTORS

Classification: High conductivity, high resistivity materials, fundamental requirements of high conductivity materials and high resistivity materials, mobility of electron in metals, commonly used high conducting materials, copper, aluminum, bronze brass, properties, characteristics, constantan, platinum, nichrome, properties, characteristics and applications, materials used for contacts.

UNIT II: SEMICONDUCTORS

General concepts, energy bands, types of semiconductors, Fermi Dirac distribution, intrinsic Semi-conductors, extrinsic Semi-conductors, hall effect, drift, mobility, diffusion in Semiconductors, Semi-conductors and their applications, superconductors.

UNIT III: DIELECTRICS AND INSULATORS

Properties of gaseous, liquid and solid dielectric, dielectric as a field medium, electric conduction in gaseous, liquid and solid dielectric, breakdown in dielectric materials, mechanical and electrical properties of dielectric materials, effect of temperature on dielectric materials, polarization, loss angle and dielectric loss, petroleum based insulating oils, transformer oil, capacitor oils, properties, solid electrical insulating materials, fibrous, paper boards, yarns, cloth tapes, sleeving wood, impregnation, plastics, filling and bounding materials, fibrous, film, mica, rubber, mica based materials, ceramic materials, classification of insulation (solid) and application in AC and DC machines.

UNIT IV: MAGNETIC MATERIALS

Soft and hard magnetic materials, diamagnetic, paramagnetic and ferromagnetic materials, electric steel, sheet steel, cold rolled grain oriented silicon steel, hot rolled grain oriented silicon steel, hot rolled silicon steel sheet, hysteresis loop, hysteresis loss, magnetic susceptibility, coercive force, curie temperature, magneto-striction.

UNIT V: OPTICAL PROPERTIES OF SOLIDS

Photo emission, photo emission materials, electro luminescence junction diode, photo emitters, photo transistor, photo resistors, injunction lasers, optical properties of semiconductors, application of photo sensitive materials (CRT, Tube light, photo panels etc.).

Text Books:

1. "Electrical Engineering Materials",Dekker,PHI Pbs.
2. "Electrical Engineering Materials", Indulkar,S.Chand

Reference Books:

1. "Electrical Engineering Materials", Tareev
2. "Electrical Engineering Materials", Yu. Koritsky.
3. "Electrical Engineering Materials", R.K.Rajput, Laxmi Pbs.

ELECTRICAL WIRING AND SAFETY MEASURES

(OPEN ELECTIVES-1)

III B. Tech-I Semester **L T P C**

Course Code: A3EE16 **3 - - 3**

COURSE OVERVIEW:

The course will be of great interest to all professionals who would like to learn about the electrical wiring system. It will also be of interest to all learners who are interested in developing a career in the field and learning the practical aspects of the trade. If you are interested in a career in construction, you may find this course of general professional interest. If you always thought you would like to know more about electrical systems, then this might just be the opportunity you have been waiting for to learn more.

COURSE OBJECTIVES:

1. To Study the wiring diagram of residential.
2. To understand the Safety measures of Electrical wiring

PRE-REQUISITE(S):

Knowledge of electrical equipments, Electrical units

COURSE OUTCOMES:

The student will be able to:

1. Know safety measures & state safety precautions.

2. Test single phase, three phase transformer, DC & AC machine as per IS.

3. Ascertain the condition of insulation & varnishing if necessary.

4. Identify faults & measures to repair faults.

SYLLABUS

UNIT-1 BASICS OF ELECTRICAL INSTALLATIONS

Electric Supply System, Three phase four wire distribution system, Protection of Electric Installation against over load, short circuit and Earth fault, General requirements of electrical installations, testing of installations, Types of loads, Systems of wiring, Service connections, Service Mains, Sub-Circuits, Location of Outlets, Location of Control Switches, Location of Main Board and Distribution board, Guide lines for Installation of Fittings, Load Assessment, Permissible voltage drops and sizes of wires, estimating and costing of Electric installations.

UNIT II EARTHING

Introduction & importance, Factors affecting Earth Resistance, Methods of earthling Substation and Transmission tower earthling, Neutral and Earth wire, Transformer Neutral Earthling.

UNIT-III SAFETY & PREVENTION OF ACCIDENTS

Definition of terminology used in safety , I.E. Act & statutory regulations for safety of persons & equipments working with electrical installation . Dos & don'ts for substation operators as listed in IS. Meaning & causes of electrical accidents factors on which severity of shock depends.

UNIT-IV RESIDENTIAL BUILDING ELECTRIFICATION

General rules guidelines for wiring of Residential Installation and positioning of equipments. Principles of circuit design in lighting and power circuits. Procedures for designing the circuits and deciding the number of sub- circuits. Method of drawing single line diagram & wiring diagram.

UNIT-V INDIAN ELECTRICITY RULES FOR CONSUMER ENDS& SUBSTATION AND METERS

Rule 28 : Voltage level definitions. Rule 30: Service lines & apparatus on consumer premises.
Rule 31: Cut-out on consumer's premises. Rule46: Periodical inspection & testing of consumer's installation.
Rule 47: Testing of consumer's installation. Rule 54: Declared voltage of supply to consumer.
Rule 55: Declared frequency of supply to consumer.
Rule 56: Sealing of meters & cut-outs.
Rule 77: Clearances above ground of the lowest conductor. Rule 79: Clearances between conductors & trolley wires.
Rule 87: Lines crossing or approaching each other. Rule 88: Guarding.

Text Books:

1. K.B. Raina, S.K.Bhattacharya Electrical Design;Estimating and costing New Age International (p) Limited, New Delhi Surjit Singh.

2. Electrical Estimating and costing Dhanpat Rai and company, New Delhi .J.B.Gupta

3.A course in Electrical Installation, Estimating & costing S.K.Kataria & sons,S.L. Uappal .

4. Electrical wiringEstimating and costing Khanna Publication. ,A.K.Sawhney

5. Electrical Machine Design Danpat Rai & co.

6. The Electricity Rule 2005Universal Law Publishing Co. Pvt. Ltd. N. AlagappanS. Ekambaram

7. Electrical Estimating and costing Tata Mc Graw Hill Publication, New Delhi ,Surjit Singh

8. Tarlok Sibgh Installation, Commissioning & Maintenance of Electrical Equipment S.K.Kataria & Sons

9. B.V.S.Rao Operation & Maintenance of Electrical Machines Vol I & II Media Promoters & Publisher Ltd. Mumbai

III B.TECH II SEMESTER

SYLLABUS

POWER SEMICONDUCTOR DRIVES

IV B.Tech -I Semester

L T P C

Course Code:A3EE19 **4 1 - 4**

COURSE OVERVIEW:

Characteristics, fabrication, and application of power semiconductor devices, which may include p-i-n and Schottky diodes, insulated gate bipolar transistors, field effect transistors, and thyristors. Effect of semiconductor material, device structure, and current injection levels on device performance. Device drive requirements and power circuit interaction. Implementation of power devices using wide band gap semiconductors such as silicon carbide and gallium nitride

PRE-REQUISITIES:

Knowledge of semiconductor materials, gained from the graduate course on semiconductor material and to identify the properties needed for use in high electric fields and high currents and to understand why certain materials are used when fabricating power semiconductor devices

COURSE OBJECTIVES:

To understand and analyze various powers Semi Conductor drives methods.

COURSE OUTCOMES:
After going through this course the student will be able to

.

To understand and analyze various powers Semi Conductor drives methods.

SYLLABUS

UNIT – I CONTROL OF DC MOTORS BY PHASE CONTROLLED CONVERTERS:

Introduction to Thyristor controlled Drives, Single Phase semi and Fully controlled converters connected to D.C separately excited and D.C series motors, continuous current operation, output voltage and current waveforms. Speed and Torque expressions, Speed – Torque Characteristics. Three phase semi and fully controlled converters connected to D.C separately excited and D.C series motors, output voltage and current waveforms. Speed and Torque expressions, Speed–Torque characteristics.

UNIT – II FOUR QUADRANT OPERATION OF DC DRIVES:

Introduction to Four quadrant operation – Motoring operations, Electric Braking – Plugging, Dynamic and Regenerative Braking operations. Four quadrant operation of D.C motors by dual converters – Closed loop operation of DC motor (Block Diagram Only)

CONTROL OF DC MOTORS BY CHOPPERS:

Single quadrant, Two –quadrant and four quadrant chopper fed dc separately excited and series excited motors. Continuous current operation, Output voltage and current wave forms , Speed torque expressions, speed torque characteristics. Problems on Chopper fed D.C Motors, Closed Loop operation (Block Diagram Only)

UNIT – III CONTROL OF INDUCTION MOTOR OF STATOR SIDE:

Variable voltage characteristics, Control of Induction Motor by Ac Voltage Controllers, Waveforms, speed torque characteristics.

STATOR FREQUENCY CONTROL:

Variable frequency characteristics, Variable frequency control of induction motor by Voltage source and current source inverter and cyclo converters. PWM control, Comparison of VSI and CSI operations, Speed torque

characteristics, numerical problems on induction motor drives, closed loop operation of induction motor drives (Block Diagram Only).

UNIT – IV CONTROL OF INDUCTION MOTOR OF ROTOR SIDE:

Static rotor resistance control, Slip power recovery, Static Scherbius drive, Static Kramer Drive, their performance and speed torque characteristics, advantages applications.

UNIT – V CONTROL OF SYNCHRONOUS MOTORS:

Separate control & self control of synchronous motors. Operation of self controlled synchronous motors by VSI and CSI cyclo converters. Load commutated CSI fed Synchronous Motor, Operation, Waveforms, speed torque characteristics, Applications, Advantages. Closed Loop control operation of synchronous motor drives (Block Diagram Only), variable frequency control, Cycloconverter, PWM, VFI, CSI

TEXT BOOKS:

1. G. K. Dubey (2002), Fundamentals of Electric Drives, 2nd edition, Narosa Publications, New Delhi.

2. M. H. Rashid (2003), Power Electronic Circuits, Devices and applications, 3rd edition, Prentice Hall of India, New Delhi, India.

REFERENCE BOOKS:

1. M. D. Singh, K. B. Khanchandani (2008), Power Electronics, 2nd Edition, Tata McGraw Hill Publications, New Delhi.

2. Vedam Subramanyam (2008), Thyristor Control of Electric drives, 1st Edition, Tata McGraw Hill Publications, New Delhi, India.

3. S. K. Pillai (2007), A First course on Electrical Drives, 2nd Edition, New Age International (P) Ltd.,NewDelhi

DIGITAL SIGNAL PROCESSING

III B.Tech -II Semester **L T P C**

Course Code: A3EC28 **3 1 - 3**

COURSE OVERVIEW:
This course provides an introduction to digital signal processing for both undergraduate and for graduate students. In this course, a detailed examination of basic digital signal processing operations including sampling/reconstruction of continuous time signals, Fourier and Z-transforms will be given. The Fourier and Z-transforms will be used to analyze the stability of systems, and to find the system transfer function. The discrete Fourier transform (DFT) and fast Fourier transform (FFT) will be studied. Finally, we will examine time and frequency domain techniques for designing and applying infinite impulse response (IIR) and finite impulse response (FIR) digital filters. Two-dimensional signals and introductory image processing operations will also be discussed.

PREREQUISITE(S): Basic knowledge on Engineering Mathematics

COURSE OBJECTIVES:

1. To provide background and fundamental material for the analysis and processing of digital signals.
2. To familiarize the relationships between continuous-time and discrete-time signals and systems.
3. To study fundamentals of time, frequency and z-plane analysis and to discuss the inter-relationships of these Analytic method
4. To study the designs and structures of digital (IIR and FIR) filters from analysis to synthesis for a given Specifications
5. To introduce a few real-world signal processing applications.

COURSE OUTCOMES:

1. Understand how digital to analog (D/A) and analog to digital (A/D) converters operate on a signal and be able to model these operations mathematically.
2. Perform time, frequency and Z-transform analysis on signals and LTI systems and study the properties like stability, causality, time-invariance and etc.
3. Understand the inter-relationship between DFT and various transforms.
4. Understand the significance of various filter structures and effects of round-off errors.
5. Design of infinite impulse response filters for a given specification.
6. Study the architecture of DSP's and applications

SYLLABUS

UNIT–I
INTRODUCTION TO DIGITAL SIGNAL PROCESSING: Discrete time signals & systems, linear shift invariant systems, stability and causality, discrete time systems described by difference equations, Frequency domain representation of discrete time signals and systems.

UNIT–II
FOURIER SERIES AND FOURIER TRANSFORMS: Discrete Fourier series representation of periodic sequences, Properties of discrete Fourier series, Discrete Fourier transforms: frequency domain sampling, , linear convolution of sequences using DFT, Computation of DFT, Relationship of DFT to other transforms, Properties of DFT, Fast Fourier transforms (FFT) - Radix-2 FFT algorithm, Radix-4 FFT algorithms, Inverse FFT.

UNIT–III
Z-TRANSFORMS: Review of Z-transforms, Properties of Z-transform, Rational Z-transforms, and Inversion of Z-transforms, stability and causality.

REALIZATION OF DIGITAL FILTERS: Structures for FIR systems: Direct form structure, Cascade form structures, Structures for IIR systems: Direct form structures, Signal flow graphs and transposed structures, cascade form structures, Parallel form structures.

UNIT–IV
DESIGN OF FIR DIGITAL FILTERS: Symmetric and antisymmeric FIR filters, Design of linear phase FIR Digital Filters using Windows, Design of linear phase FIR Digital Filters by Frequency Sampling method.

DESIGN OF IIR DIGITAL FILTERS: IIR filter design by Approximation of Derivatives, IIR filter design by impulse invariance, IIR filter design by bilinear transformation, Characteristics of commonly used analog filters (Butter worth and Chebyshev), Frequency transformations, comparison of IIR & FIR filters.

UNIT– V

MULTIRATE DIGITAL SIGNAL PROCESSING: Decimation by a factor D, interpolation by a factor I, sampling rate conversion by a rational factor I/D, Filter Design & Implementation for sampling rate conversion, Multi stage Implementation of sampling rate conversion.

TEXT BOOKS:

1. John G. Proakis, Dimitris G. Manolakis (2007), Digital Signal Processing, Principles, Algorithms, and Applications,Pearson Education / PHI, India.

2. A.V. Oppenheim, R. W. Schaffer (2009), Discrete Time Signal Processing, Prentice Hall of India, New Delhi.

REFERENCE BOOKS:

1. Andreas Antoniou (2006), Digital Signal Processing, Tata McGraw Hill, NewDelhi.

2. M. H. Hayes (2007), Schaums Outlines of Digital Signal Processing, Tata McGraw Hill, India.

SWITCHGEAR AND PROTECTION

III B.Tech -II Semester **L T P C**

Course Code: A3EE20 4 - - 4

COURSE OVERVIEW:

This course deals with the study of transients, various circuit breakers and relays that come across switchgear and protection of power system.

PREREQUISITE(S): To understand and analyze circuit breakers and relays

COURSE OBJECTIVES: To understand and analyze circuit breakers and relays

COURSE OUTCOMES:

After going through this course the student will be able to

To understand and analyze circuit breakers and relays

SYLLABUS

UNIT – I CIRCUIT BREAKERS:

Circuit Breakers: Elementary principles of arc interruption, Recovery, Restriking Voltage and Recovery voltages, Restriking Phenomenon, Average and Max. RRRV. Current Chopping and Resistance Switching, CB ratings and Specifications, Types. Auto reclosures, description and Operation of following types of circuit breakers, Minimum Oil Circuit breakers, Air Blast Circuit Breakers, Vacuum and SF6 circuit breakers.

UNIT – II ELECTROMAGNETIC AND STATIC RELAYS:

Principle of Operation and Construction of Attracted armature, Balanced Beam, Induction Disc and Induction Cup relays.

RELAYS CLASSIFICATION:

Instantaneous, DMT and IDMT types. Application of relays: Over current/ Under voltage relays, Direction relays, Differential Relays and Percentage Differential Relays.

UNIVERSAL TORQUE EQUATION, DISTANCE RELAYS:

Impedance, Reactance and Mho and Off-Set Mho relays, Comparison. Static Relays: Static Relays verses Electromagnetic Relays.

UNIT – III GENERATOR, FEEDER AND BUS-BAR PROTECTION:

Protection of generators against Stator faults, Rotor faults, and Abnormal Conditions. Restricted Earth fault and Inter-turn fault Protection. Numerical Problems on % Winding Unprotected. Protection of Bus bars – Differential protection.

PROTECTION OF TRANSFORMERS AND TRANSMISSION LINES:

Percentage Differential Protection, Buchholtz relay Protection. Over Current, Three-zone distance relay protection using Impedance relays. Translay Relay.

UNIT – IV POWER SYSTEM TRANSIENTS:

Types of System Transients - Travelling or Propagation of Surges - Attenuation, Distortion, Reflection and Refraction Coefficients - Termination of lines with different types of conditions - Open Circuited Line, Short Circuited Line, T-Junction, Lumped Reactive Junctions , Bewley's Lattice Diagrams
(for all the cases mentioned with numerical examples).

UNIT – V NEUTRAL GROUNDING:

Grounded and Ungrounded Neutral Systems.- Effects of Ungrounded Neutral on system performance. Methods of Neutral Grounding: Solid, Resistance, Reactance - Arcing Grounds and Grounding Practices.

PROTECTION AGAINST OVER VOLTAGES:

Generation of Over Voltages in Power Systems.-Protection against Lightning Over Voltages - Valve type and Zinc-Oxide Lightning Arresters.

TEXT BOOKS:

1.Badari Ram, D. N. Viswakarma (2007), Power System Protection and Switchgear, 1st edition, Tata McGraw Hill Publications, New Delhi.

2.C. L. Wadhwa (2011), Electrical Power Systems, 6th edition, New Age International (P) Limited, New Delhi.

REFERENCE BOOKS:

1.Sunil S. Rao (1999), Switchgear and Protection, 10th edition, Khanna Publishers, New Delhi.

2.M. L. Soni, P. V. Gupta, U. S. Bhatnagar, A. Chakraborti (1999), A Text Book on Electrical Engineering, 1st edition, Dhanpat Rai & Co. Pvt. Ltd, New Delhi.

OPEN ELECTIVES –II

SOLAR ENERGY AND APPLICATIONS
(OPEN ELECTIVE – 2)

III B.Tech -II Semester **L T P C**

Course Code: A3EE21 **3 - - 3**

COURSE OVERVIEW:
Introduction to principles and technologies for solar thermal energy collection, conversion, and utilization. Various solar heat collection and conversion systems. Solar heating systems, liquid based solar heating systems for buildings. Simple to complex problems of solar thermal energy conversion and storage identification, formulation and solving

PREREQUISITE(S):
Basic knowledge on photovoltaic cell, p-n junction diode, semi conductors**.**

COURSE OBJECTIVES:

1.To introduce the basic concepts and novel technologies in solar thermal systems; to provide a balance between both frontier technology updates and existing solar thermal energy strategies, in both a quantitative and qualitative way.
2.To develop skills to design, model, analyze and evaluate solar thermal systems.
3.To develop creative thinking and to deal with complex multi-disciplinary solar thermal energy projects that involve the provision of effective and efficient solutions.
4.To provide students for practical training in the design of different solar thermal systems, such as water heating and control, solar collection, solar energy storage and system design.

COURSE OUTCOMES:

A. Be able to understanding of principles and technologies for solar thermal energy collection, conversion and utilization
B. Be able to understanding of solar heating systems, liquid based solar heating systems for buildings.
C. Be able to identify, formulate and solve simple to complex problems of solar thermal energy conversion and storage.
D. Be able to identify and understand solar thermal systems' components and their function.
E. Be able to analyze hot water load and solar resource data and use this information to properly size a solar thermal system.

SYLLABUS

UNIT – I PRINCIPLES OF SOLAR RADIATION:
Role and potential of new and renewable source, the solar energy option, Environmental impact of solar power, physics of the sun, the solar constant, extraterrestrial and terrestrial solar radiation, solar radiation on titled surface, instruments for measuring solar radiation and Sun shine, solar radiation data.

UNIT – II SOLAR ENERGY COLLECTORS:
Flat plate and concentrating collectors, classification of concentrating collectors, orientation and thermal analysis, advanced collectors.

STORAGE AND APPLICATIONS:
Different methods of solar energy storage, Sensible, latent heat and stratified storage, solar ponds. Solar Applications- solar heating /cooling technique, solar distillation and drying.

UNIT – III PHOTO VOLTAICS (PV):
Fundamentals of solar cells, types of solar cells, semiconducting materials, band gap theory, absorption of photons, excitations and photo emission of electrons, band engineering.

PV CELL PROPERTIES:
Solar cell properties and design, p-n junction photodiodes, depletion region, electrostatic field across the depletion layer, electron and holes transports, device physics, charge carrier generation, recombination and other losses, I-V characteristics, output power.

UNIT – IV SOLAR CELL APPLICATIONS:
PV cell interconnection, module structure and module fabrication, Equivalent circuits, load matching, efficiency, fill factor and optimization for maximum power, Design of stand-alone PV systems, system sizing, device structures, device construction, DC to AC conversion, inverters, on-site storage and grid connections.

UNIT – V COST ANALYSIS AND ENVIRONMENTAL ISSUES:
Cost analysis and pay back calculations for different types of solar panels and collectors, installation and operating costs, Environmental and safety issues, protection systems, performance monitoring.

ALTERNATIVE ENERGY SOURCES:
Solar Energy: Types of devices for Solar Energy Collection, Thermal Storage System. Control Systems, Wind Energy, Availability, Wind Devices, Wind Characteristics, Performance of Turbines and systems.

TEXT BOOKS:

1.G. D. Rai (2009), *Non-Conventional Energy Sources*, 4th edition, Khanna Publishers, New Delhi.

2.Martin A. Green (2008), *Solar Cells: Operating Principles, Technology and system Applications*, 1st edition,Prentice Hall, New Delhi.

REFERENCES BOOKS:

1.Sukatme (2008), Solar Energy, 3rd Edition, McGraw Hill Companies, New Delhi.

2.D. Yogi gosuami, Frank Kreith, Jan F. Kreider (2000), Principles of Solar Engineering, 2nd edition, Taylor & Francis, USA.

NON-CONVENTIONAL POWER GENERATION

(OPEN ELECTIVE-2)

III B.Tech -II Semester **L T P C**

Course Code: A3EE22 **3 - - 3**

COURSE OVERVIEW:

Non-Conventional Power Generation deals with knowledge on solar power generation and implementation. It deals with solar energy collection, storage and application.

PREREQUISITE(S): Basic knowledge on photo voltaic cells

COURSE OBJECTIVES:

The course should enable the students to:

I. Demonstrate power generation systems including major subsystems.
II. Understand basic working principles of nuclear power generation systems.
III. Apply knowledge of solar power generation systems in design and implementation to obtain clean energy.

COURSE OUTCOMES:

I. Understand basic working principles of nuclear power generation systems.
II. Apply knowledge of solar power generation systems in design and implementation to obtain clean energy.

SYLLABUS

UNIT – I PRINCIPLES OF SOLAR RADIATION:
Role and potential of new and renewable source, the solar energy option, Environmental impact of solar power, physics of the sun, the solar constant, extraterrestrial and terrestrial solar radiation, solar radiation on titled surface, instruments for measuring solar radiation and Sun shine, solar radiation data.

UNIT – II SOLAR ENERGY COLLECTORS:
Flat plate and concentrating collectors, classification of concentrating collectors, orientation and thermal analysis, advanced collectors.

STORAGE AND APPLICATIONS:
Different methods of solar energy storage, Sensible, latent heat and stratified storage, solar ponds. Solar Applications- solar heating /cooling technique, solar distillation and drying.

UNIT – III PHOTO VOLTAICS (PV):

Fundamentals of solar cells, types of solar cells, semiconducting materials, band gap theory, absorption of photons, excitations and photo emission of electrons, band engineering.

PV CELL PROPERTIES:
Solar cell properties and design, p-n junction photodiodes, depletion region, electrostatic field across the depletion layer, electron and holes transports, device physics, charge carrier generation, recombination and other losses, I-V characteristics, output power.

UNIT – IV SOLAR CELL APPLICATIONS:
PV cell interconnection, module structure and module fabrication, Equivalent circuits, load matching, efficiency, fill factor and optimization for maximum power, Design of stand-alone PV systems, system sizing, device structures, device construction, DC to AC conversion, inverters, on-site storage and grid connections.

UNIT – V COST ANALYSIS AND ENVIRONMENTAL ISSUES:
Cost analysis and pay back calculations for different types of solar panels and collectors, installation and operating costs, Environmental and safety issues, protection systems, performance monitoring.

ALTERNATIVE ENERGY SOURCES:
Solar Energy: Types of devices for Solar Energy Collection, Thermal Storage System. Control Systems, Wind Energy, Availability, Wind Devices, Wind Characteristics, Performance of Turbines and systems.

TEXT BOOKS:

1. G. D. Rai (2009), *Non-Conventional Energy Sources*, 4th edition, Khanna Publishers, New Delhi.

2. Martin A. Green (2008), *Solar Cells: Operating Principles, Technology and system Applications*, 1st edition, Prentice Hall, New Delhi.

REFERENCES BOOKS:

1. Sukatme (2008), Solar Energy, 3rd Edition, McGraw Hill Companies, New Delhi.

2. D. Yogi gosuami, Frank Kreith, Jan F. Kreider (2000), Principles of Solar Engineering, 2nd edition, Taylor & Francis, USA.

PROFESSIONAL ELECTIVES –I

EMBEDDED SYSTEMS

(PROFESSIONAL ELECTIVE- 1)

III B.Tech -II Semester **L T P C**

Course Code: A3EE23 **3 - - 3**

COURSE OVERVIEW:

This course covers the broad range of foundational skills that apply across all embedded computer system application areas, from thermostats to self-driving vehicles. The emphasis is at the layer where hardware meets software. This course explains about Complex Systems and Microprocessor,\the Embedded System Design Process, 8051 Micro controller Hardware, assembly Language Programming Process, Programming Tools and Techniques, Interfacing with Keyboards, Displays/A and A/D Conversions, Real Time Operating Systems and Advanced Architectures.

PREREQUISITE(S): Microprocessors, Microcontroller, Operating Systems

COURSE OBJECTIVES:

1. Explains about the basic functions, structure, concepts and applications of embedded systems.
2. Describes the 8051 Microcontrollers and their applications in an embedded environment
3. Gives the knowledge about the development of embedded software using RTOS.
4. Implementation of small programs to solve well-defined problems on an embedded platform.
5. Explains about the tools used to develop in an embedded environment and Implement Real Time applications on embedded platform

COURSE OUTCOMES:

After going through this course the student will be able to

1. Analyze and understand basic concept of embedded systems
2. Develop embedded hardware and software development cycles and tools
3. Analyze to understand what is a microcomputer, microcontroller, and embedded system.
4. Analyze to learn how to design RTOS in embedded systems
5. Develop different embedded networked based applications

SYLLABUS

UNIT–I EMBEDDED COMPUTING: Introduction, complex systems and microprocessor, the embedded system design process, formalisms for system design, design examples.

UNIT–II THE 8051 ARCHITECTURE:

8051 micro controller hardware, input/output ports and circuits, external memory, counter and timers, serial data input/output, interrupts.

BASIC ASSEMBLY LANGUAGE PROGRAMMING CONCEPTS:

The assembly language programming process, programming tools and techniques, programming the 8051. Data transfer and logical instructions, arithmetic operations, decimal arithmetic, jump and call instructions, Example programs

UNIT–III INTRODUCTION TO REAL-TIME OPERATING SYSTEMS:

Tasks and task states, tasks and data, semaphores, and shared data; message queues, mailboxes and pipes, timer functions, events, memory management, interrupt routines in an RTOS environment.

UNIT–IV BASIC DESIGN USING A REAL-TIME OPERATING SYSTEM:

Principles, semaphores and queues, hard real-time scheduling considerations, saving memory and power, an example RTOS like uC-OS (open source).

EMBEDDED SOFTWARE DEVELOPMENT TOOLS:

Host and target machines, linker/locators for embedded software, getting embedded software into the target system, debugging techniques: Testing on host machine, using laboratory tools, an example system.

UNIT–V INTRODUCTION TO ADVANCED ARCHITECTURES:

ARM and SHARC, processor and memory organization and instruction level parallelism; networked embedded systems: bus protocols, I2C bus and CAN bus; internet-enabled systems, design example- elevator controller.

TEXT BOOKS:

1. Wayne Wolf (2008), Computers as Components-principles of embedded computer system design, Elsevier, New Delhi, India.

2. Kenneth J. Ayala (2008), The 8051 Microcontroller, 3rd edition, Cengage Learning, India.

3. David E. Simon (1999), An Embedded Software Primer, Pearson Education, India.

REFERENCE BOOKS:

1. Jean J. Labrosse (2000), Embedding System Building Blocks, 2nd edition, CMP publishers, USA.

2. Raj Kamal (2004), Embedded Systems, Tata McGraw hill, India.

3. Ajay V. Deshmukh (2005), Micro Controllers, Tata McGraw hill, India.

4. Frank Vahid, Tony Givargis (2002), Embedded System Design, John Wiley, India.

ADVANCED CONTROL SYSTEMS

(PROFESSIONAL ELECTIVE- 1)

	L	T	P	C
III B.Tech -II Semester				
Course Code: A3EE24	**3**	**-**	**-**	**3**

COURSE OVERVIEW:

To understand the concept of state variable and stability analysis.

PREREQUISITE(S): Basics on control systems, Laplace transform and other transformation

COURSE OBJECTIVES:

I. Apply phase plane analysis to linear and non linear control systems.
II. Analyze the stability of the systems using different techniques.
III. Illustrate the design of optimal controller.
IV. Demonstrate state variable analysis, non-linear systems and optimal control.

COURSE OUTCOMES:

After going through this course the student will be able to

I. Apply phase plane analysis to linear and non linear control systems.
II. Analyze the stability of the systems using different techniques.
III. Illustrate the design of optimal controller.
IV. Demonstrate state variable analysis, non-linear systems and optimal control.

SYLLABUS

UNIT- I STATE VARIABLE ANALYSIS

Concept of state , state variable and state model, state models for linear and continuous time systems,solution of state and output equation, controllability and observability, pole placement, state observer design of control systems with observers

UNIT-II PHASE LINE ANALYSIS

Features of linear and non linear systems, common physical non linearity's, methods of linearising non linear systems, concept of phase portraits, singular points, limit cycles, construction of phase portraits, phase plane analysis of linear and non linear systems, isoclines method

UNIT -III DESCRIBING FUNCTION ANALYSIS

Basic concepts, derivation of describing functions for common non-linearities. Describing function analysis of non-linear systems, Conditions for stability, Stability of oscillations

UNIT - IV STABILITY ANALYSIS

Introduction, Liapunov‟s stability concept, Liapunov‟s direct method, Lure‟s transformation, Aizerman‟s and Kaman‟s conjecture, Popov‟s criterion, Circle criterion.

UNIT – V OPTIMAL CONTROL

Introduction, decoupling, time varying optimal control, linear quadratic regulator (LQR), steady state optimal control, optimal estimation, multivariable control design

TEXT BOOKS:

I. J Nagrath and M Gopal, „Control Systems Engineering‟, New Age International Publishers
2.Ashish Tewari, „Modern control Design with Matlab and Simulink‟, John Wiley, 2nd Edition, 2002

REFERENCE BOOKS:

1.George J Thaler, "Automatic Control Systems", Jaico Publishers, 1st Edition, 1993.

2.M Gopal, "Modern control system theory", New Age International Publishers, 1st Edition, 2002.

3.Gene F Franklin, J David Powell, Abbasemami-Naeini, "Feedback Control of Dynamic Systems", 4th Edition, Pearson Education, 1st Edition 2002.

PROGRAMMABLE LOGIC CONTROLLERS

(PROFESSIONAL ELECTIVE- 1)

III B.Tech -II Semester **L T P C**

Course Code: A3EE25 **3 - - 3**

COURSE OVERVIEW:

To learn the basic programming of PLC resisters, functions data handling analog and digital operations.

PREREQUISITE(S): Basics on control systems, Functions of analog and digital systems

COURSE OBJECTIVES:

I. To understand the basics of PLC.
II. To understand the data handling functions analog and digital.
III. To understand digital logic gates and Boolean algebra system in ladder diagrams.

COURSE OUTCOMES:

After going through this course the student will be able to

I. To understand the basics of PLC.
II. To understand the data handling functions analog and digital.
III. To understand digital logic gates and Boolean algebra system in ladder diagrams.

SYLLABUS

UNIT – I PLC BASICS:

PLC system, I/O modules and interfacing, CPU processor, programming Equipment, programming formats, construction of PLC ladder diagrams, Devices connected to I/O modules.

UNIT - IIPLC PROGRAMMING:

Input instructions, outputs, operational procedures, programming examples using contacts and coils.Drill press operation.

LADDER DIAGRAMS:

Digital logic gates, programming in the Boolean algebra system, conversion examples Ladder Diagrams for process control: Ladder diagrams & sequence listings, ladder diagram construction and flowchart for spray process system.

UNIT – III PLC RESISTERS:

Characteristics of Registers, module addressing, holding registers, Input Registers, Output Registers.

PLC FUNCTIONS:

Timer functions & Industrial applications, counters, counter function industrial applications, Arithmetic functions, Number comparison functions, number conversion functions

UNIT – IV DATA HANDLING FUNCTIONS:

SKIP, Master control Relay, Jump, Move, FIFO, FAL, ONS, CLR & Sweep functions and their applications. Bit Pattern and changing a bit shift register, sequence functions and applications, controlling of two-axis & three axis Robots with PLC, Matrix functions.

UNIT – V ANALOG PLC OPERATION:

Analog modules& systems, Analog signal processing, Multi bit Data Processing, Analog output Application Examples, PID principles, positions indicator with PID control, PID Modules, PID tuning, PID functions.

TEXT BOOKS:

1. John W. Webb, Ronald A. Reiss (2008), Programmable Logic Controllers - Principles and Applications, 5th

edition, Prentice Hall of India, New Delhi.

REFERENCES BOOKS:

1. J. R. Hackworth, F. D. Hackworth (2004), Programmable Logic Controllers - Programming Method and Applications, 1st edition, Pearson Education, New Delhi.

WIND AND SOLAR ENERGY SYSTEMS
(PROFESSIONAL ELECTIVE- I)

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
A3EE26	PEC	3	0	0	3	30	70	100

COURSE OVERVIEW:

To understand the concept of state variable and stability analysis.

PREREQUISITE(S): Basics on control systems, Laplace transform and other transformation

COURSE OBJECTIVES:

I. Apply phase plane analysis to linear and non linear control systems.
II. Analyze the stability of the systems using different techniques.
III. Illustrate the design of optimal controller.
IV. Demonstrate state variable analysis, non-linear systems and optimal control.

COURSE OUTCOMES:

After going through this course the student will be able to

At the end of this course, students will demonstrate the ability to
 Understand the energy scenario and the consequent growth of the power generation from renewable energy sourc
. Understand the basic physics of wind and solar power generation.
 Understand the power electronic interfaces for wind and solar generation.
 Understand the issues related to the grid-integration of solar and wind energy systems

SYLLABUS

UNIT-1: Physics of Wind Power **Classes: 10**

History of wind power, Indian and Global statistics, Wind physics, Betz limit, Tip speed ratio, stall and pitch control, Wind speed statistics-probability distributions, Wind speed and power-cumulative distribution functions.

UNIT- 2: Wind generator topologies: **Classes: 10**

Review of modern wind turbine technologies,Fixed and Variable speed wind turbines, Induction Generators, Doubly-Fed Induction Generators and their characteristics, PermanentMagnet Synchronous Generators, Power electronics converters. Generator-Converter configurations, Converter Control.

UNIT-3: The Solar Resource: **Classes: 10**

Introduction, solar radiation spectra, solar geometry, Earth Sun angles,observer Sun angles, solar day length, Estimation of solar energy availability.

UNIT-4: Solar photovoltaic: **Classes: 10**

Technologies-Amorphous, mono crystalline , polycrystalline; V-I characteristics of a PV cell, PV module, array, Power Electronic Converters for Solar Systems, Maximum Power Point Tracking (MPPT) algorithms. Converter Control.

UNIT- 5: Network Integration Issues: **Classes: 10**

Overview of grid code technical requirements. Fault ride-through for wind farms - real and reactive power regulation, voltage and frequency operating limits, solar PV and wind farm behaviour during grid disturbances. Power quality issues. Power system interconnection experiences in the world. Hybrid and isolated operations of solar PV and wind systems.

Solar thermal power generation: Technologies, Parabolic trough, central receivers, parabolic dish, Fresnel, solar pond, elementary analysis.

Text / References:

1. T. Ackermann, “Wind Power in Power Systems”, John Wiley and Sons Ltd., 2005.

2. G. M. Masters, "Renewable and Efficient Electric Power Systems", John Wiley and Sons, 2004.
3. S. P. Sukhatme, "Solar Energy: Principles of Thermal Collection and Storage", McGraw Hill, 1984.
4. H. Siegfried and R. Waddington, "Grid integration of wind energy conversion systems" John Wiley and Sons Ltd., 2006.
5. G. N. Tiwari and M. K. Ghosal, "Renewable Energy Applications", Narosa Publications, 2004.
6. J. A. Duffie and W. A. Beckman, "Solar Engineering of Thermal Processes", John Wiley & Sons, 1991.

ADVANCED ENGLISH COMMUNICATION SKILLS LAB

(Common to all branches)

III B.Tech -II Semester **L T P C**

Course Code: A3HS13 **- - 3 2**

COURSE OVERVIEW:

The introduction of the Advanced Communication Skills Lab is considered essential at3rdyear level. At this stage, the students need to prepare themselves for their careers which may require them to listen to, read, speak and write in English both for their professional and interpersonal communication in the globalised context. The proposed course should be a laboratory course to enable students to use 'good' English and perform the following:

1. Gathering ideas and information to organize ideas relevantly and coherently.
2. Engaging in debates.
3. Participating in group discussions.
4. Facing interviews.
5. Writing project / research reports/technical reports.
6. Making oral presentations.
7. Writing formal letters.
8. Transferring information from non-verbal to verbal texts and vice-versa.
9. Taking part in social and professional communication.

PREREQUISITE(S): English communication skills

COURSE OBJECTIVES:

T**his Lab focuses on using multi-media instruction for language development to meet the following targets:**

1. To improve the students' fluency in English, through a well-developed vocabulary and enable them to listen to English spoken at normal conversational speed by educated English speakers and respond appropriately in different Socio-cultural and professional contexts.
2. Further, they would be required to communicate their ideas relevantly and coherently in writing.
3. To prepare all the students for their placements.

Course Outcomes:
1.Better Understanding of nuances of language through audio-visual experience and group activities
2. Neutralization of accent for in telligibility
3. Speaking with clarity and confidence thereby enhancing employability skills of the students

SYLLABUS

The following course content to conduct the activities is prescribed for the Advanced Communication Skills (ACS) Lab:

1. Listening for writing short answers, identifying topic, context, function, etc.

2. Activities on Fundamentals of Inter-personal Communication and Building Vocabulary-Starting a conversation-responding appropriately and relevantly- using the right body language- Role Play indifferent situations & Discourse Skills-using visuals-Synonyms and antonyms, word roots, one-word substitutes, prefixes and suffixes, study of word origin, business vocabulary, analogy, idioms and phrases, collocations & usage of vocabulary.

3. Activities on Reading Comprehension-General Vs Local comprehension, reading for facts, guessing meanings from context, scanning, skimming ,inferring meaning, critical reading &effective goggling, understanding sentence structure/ error identification.

4. Functional/Communicative Task e.g. giving instructions, explaining a development, asking for comments, requesting information, agreeing to requests Correspondence: e.g. explaining, apologizing, reassuring, and complaining. Report: describing, summarizing. Proposal: describing summarizing, recommending, persuading. Activities on Writing Skills – Structure and presentation of different types of writing- letter writing/Resumewriting/e-correspondence/Technicalreportwriting/Portfoliowriting- planning for writing- improving one's writing.

5. Format and Focus on Conversation between the interlocutor and each candidate- Giving personal information. Talking about present circumstances, past experiences and future plans, expressing opinions, speculating etc.-A _mini presentation‘ by each candidate on a business theme- Organizing a larger unit of discourse-Giving information and expressing and justifying opinions-Two-way conversation between candidates followed by further prompting from the interlocutor -Expressing and justifying opinions, speculating, comparing and contrasting agreeing and disagreeing etc.

6. Activities on Presentation Skills - Oral presentations (individual and group) through JAM sessions/seminars/PPTs and written presentations through posters/projects/reports/e-mails/assignments etc.

7. Activities on Group Discussion and Interview Skills - Dynamics of group discussion, intervention,summarizing,modulationofvoice,bodylanguage,relevance,fluencyand organization of ideas and rubrics for evaluation- Concept and process, pre-interview planning, opening strategies,answeringstrategies,interviewthroughtele-conference&video-conference and Mock Interviews.

Minimum Requirement: The Advanced Communication Skills (ACS) Laboratory shall have the following infra-structural facilities to accommodateatleast35 students in the lab:

1. Spacious room with appropriate acoustics.
2. Round Tables with movable chairs
3. Audio-visual aids
4. LCD Projector
5. Public Address system
6. P- IVProcessor,HardDisk-80 GB, RAM-512 MBMinimum,Speed-2.8 GHZ
7. T.V, a digital stereo &Camcorder
8. Headphones of High quality

Suggested Software:

The software consisting of the prescribed topics elaborated above should be procured and used.

1. Oxford Advanced Learner‘s Compass, 3rd Edition
2. DELTA‘s key to the Next Generation TOEFL Test: Advanced Skill Practice.
3. Lingua TOEFL CBT Insider, by Dreamtech

4. TOEFL &GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)
5. The following software from 'train2success.com'~ Preparing for being Interviewed ~ Positive Thinking ~ Interviewing Skills ~ Telephone Skills ~ Time Management

Books Recommended:

1. Technical Communication by Meenakshi Raman &Sangeeta Sharma, Oxford University Press2009.
2. AdvancedCommunicationSkillsLaboratoryManualbySudhaRani,D,Pearson Education2011.
3. Technical Communication by PaulV.Anderson.2007.CengageLearningpvt.Ltd.NewDelhi.
4. BusinessandProfessionalCommunication:KeysforWorkplaceExcellence.KellyM. Quintanilla& ShawnT. Wahl.Sage SouthAsiaEdition.SagePublications.2011.
5. The Basics of Communication :A Relational Perspective. Steve Duck & David T.McMahan. Sage South AsiaEdition.SagePublications.2012.
6. English Vocabulary inUseseries,CambridgeUniversityPress2008.
7. Management Shapers Seriesby Universities Press (lndia) Pvt Ltd., Himayatnagar, Hyderabad2008.
8. HandbookforTechnicalCommunicationbyDavidA.McMurrey&JoanneBuckley.2012.
9. Cengage Learning.
10. Communication Skills by Leena Sen, PHI LearningPvtLtd.,NewDelhi,2009.
11. HandbookforTechnicalWritingbyDavidAMcMurrey&JoanneBuckelyCENGAGELearning2008.
12. Job Huntingby Colm Downes,Cambridge University Press2008.

13. Master Public Speaking by Anne Nicholls, JAICOPublishingHouse,2006.

14. EnglishforTechnicalCommunicationforEngineeringStudents,AyshaVishwamohan,TataMc
15. Graw-Hil 2009.
16. Books onTOEFL/GRE/GMAT/CAT/IELTSby Barron's/DELTA/Cambridge University Press.
17. InternationalEnglishforCallCentresbyBarryTomalinandSuhashiniThomas, Macmillan Publishers, 2009.

DISTRIBUTION ANDWEIGHTAGEOFMARKS: Advanced Communication Skills Lab Practical's:

1. ThepracticalexaminationsfortheACSLaboratorypracticeshallbeconductedaspertheUniversity norms prescribed for the core engineering practical sessions

2. For the English Language lab sessions, there shall be continuous evaluation during the year for25 sessional marks and 50EndExaminationmarks.Ofthe25marks,15 marks shall be awarded for day to day work and 10marks to be awarded by conducting Internal Lab Test (s).The End Examination shall be conducted by the teacher concerned, by inviting the External Examiner from outside .In case of the non-availability of the External Examiner, other teacher of the same department can act as the External Examiner

Mini Project: As a part of Internal Evaluation.

1. Seminar/ Professional Presentation

2. A Report on the same has outcome based education prepared and presented .

*Teachers may use their discretion to choose topics relevant and suitable to the needs of students. *Not more than two students to work one mini project. *Studentsmaybeassessedbytheirperformancebothinoralpresentationandwritten report.

Learning Outcomes: Accomplishment to f sound vocabulary and its proper use contextually. Flair in Writing and felicity in written expression. Enhanced job prospects. Effective Speaking Abilities

DIGITAL SIGNAL PROCESSING LAB

III B.Tech -II Semester **L T P C**

Course Code: A3EC36 **- - 3 2**

COURSE OVERVIEW:
This course builds on the theory of digital signal processing. Opportunities are provided to work on specific applications of digital signal processing involving filtering, de-convolution, spectral estimation, and a variety of other techniques. Students may also suggest their own laboratory topics. Laboratory work involves developing signal processing systems on a personal computer and using them with both real and simulated data. Questions related to hardware realizations are also considered

PREREQUISITE(S): Digital Signal Processing subject knowledge.

COURSE OBJECTIVES:

Simulation and implementation on DSP processor

1. To verify properties of a discrete system.
2. To practice various transforms on digital signals.
3. To implement the design of digital filters.
4. To verify basic properties of multi rate systems.

COURSE OUTCOMES:

After going through this course the student will be able to
1. Apply knowledge of digital filter design for various applications.
2. Analyze various signals in transform domain
3. Apply multirate concepts in sampling rate conversion applications
4. Implement real time experiments on DSP processors

The programs shall be implemented in soft ware (using MATLAB/ Lab view/ C programming/OCTAVE or Equivalent) and hardware (using TI/Analog devices/Motorola/ Equivalent DSP processors).

1. Generation of Various Signals and sequences
2. Operations on signals and Sequences such as addition, Multiplication, scaling, Shifting, folding, computation of energy and average power.
3. Convolution between Signals and sequences

4. Auto Correlation and Cross Correlation between Signals and sequences.
5. Verification of Linearity and Time Invariance properties of a given Continuous/Discrete System
6. Generation of Sinusoidal waveform / signal based on recursive difference equations.
7. To find DFT/IDFT of given DT signal.
8. To find frequency response of a given system given in (Transfer Function/Differential equation form).
9. Implementation of FFT of given sequence.
10. Determination of Power Spectrum of a given signal(s).
11. Implementation of LPF, HPF, BPF, BSF FIR filter for a given sequence.
12. Implementation of LPF IIR filters for a given sequence.
13. Generation of Sinusoidal signal through filtering.
14. Implementation of Decimation and Interpolation Process.
15. Implementation of sampling rate I/D converters.
16. Noise removal: Add noise above 3 KHz and then remove, interference suppression using 400 Hz tone.
17. Impulse response of first order and second order systems.

ELECTRICAL SIMULATION LAB

III B.Tech -II Semester **L T P C**

Course Code: A3EE40 **- - 3 2**

COURSE OVERVIEW:

1. Expose students to automated measurements of 3-phase power.
2. Learn use of open-circuit and short-circuit tests to determine transformer Characteristics
3. Determine synchronous machine characteristics, and synchronization of machine to the power line voltage and frequency.
4. Learn to design solutions for power system problems.

PREREQUISITE(S): Basic Circuit theory, power systems and power electronics.

COURSE OBJECTIVES:

The course should enable the students to:

I. Simulate transmission lines using PSCAD to analyze faults in transmission lines
II. Demonstrate load flow studies using methods.
III. Analyze transient state stability in power systems.

COURSE OUTCOMES:

Upon successful completion of this course

1) Students will have a better understanding of the merits and demerits of critical analytical
2) Solution methods which are the basis for valid techniques in solving power system problems.

SYLLABUS

1. PSPICE SIMULATION OF NODAL ANALYSIS FOR DC CIRCUITS

2. PSPICE SIMULATION OF D.C. CIRCUIT FOR DETREMINING THEVININ'S EQUIVALENT

3. PSPICE SIMULATION OF D.C. NETWORK WITH SUB CIRCUIT

4. PSPICE SIMULATION OF TRANSIENT AND PARAMETRIC ANALYSIS OF SERIES RLC CIRCUITS USING STEP AND PULSE INPUT

5. PSPICE SIMULATION OF TRANSIENT AND PARAMETRIC ANALYSIS OF SERIES RLC CIRCUITS USING SINE INPUT

6. ANALYSIS OF THREE PHASE CIRCUIT REPRESENTING GENERATOR TRANSMISSION LINE AND LOAD

7. PSPICE SIMULATION OF MAXIMUM POWER TRANSFER THEOREM FOR DC CIRCUITS

8. PSPICE SIMULATION OF RECIPROCITY THEOREM FOR DC CIRCUITS

9. PSPICE SIMULATION OF SUPERPOSITIO THEOREM FOR DC CIRCUITS

10. PSPICE SIMULATION OF AC CIRCUITS.

Any two simulation experiments with PSPICE/PSIM

1.Single-phase full converter using RLE loads and single-phase AC

2.voltage controller using RLE loads.

3.Resonant pulse commutation circuit and Buck chopper.

4.Single- phase Inverter with PWM control

REFERENCE BOOKS

1. Simulation of Electric and Electronic circuits us ing PSPICE, M.H.Rashid, PHI.

2. PSPICE ND user's manual – Microsim, USA.

3.PSPICE reference guide – Microsim, USA.

3.MATLAB and its Tool Books user's manual and – Mathworks, USA.

IV B.TECH I SEMESTER

SYLLABUS

POWER SYSTEMS OPERATION AND CONTROL

IV B.Tech -I Semester

	L T P C
Course Code:A3EE29	**3 1 - 3**

COURSE OVERVIEW:

To understand and analyze circuit breakers and relays, protection against overvoltage relays, Protection against transformers and transmission lines.

PREREQUISITE(S): Basic knowledge on power system protection and control

Course Objectives:

1. To understand and analyze circuit breakers and relays.
2. To understand and analyze protection against overvoltage relays
3. To understand and analyze protection against transformers and transmission lines

COURSE OUTCOMES:

After going through this course the student will be able to

1. To understand and analyses various power system operation and control methods.
2. To understand and analyze circuit breakers and relays.
3. To understand and analyze protection against overvoltage relays
4. To understand and analyze protection against transformers and transmission lines

SYLLABUS

UNIT – I INTRODUCTION TO ECONOMIC OPERATION OF POWER SYSTEMS:

Optimal operation of Generators in Thermal Power Stations, heat rate Curve, Cost Curve, Incremental fuel and Production costs, input-output characteristics, Optimum generation allocation with line losses neglected. Optimum generation allocation including the effect of transmission line losses, Loss Coefficients, General transmission line loss formula.

UNIT – II HYDROTHERMAL SCHEDULING:

Optimal scheduling of Hydrothermal System: Hydroelectric power plant models, Scheduling problems-Short term hydrothermal scheduling problem.

UNIT – III MODELLING OF TURBINE, GENERATOR AND AUTOMATIC CONTROLLERS:

Modeling of Turbine: First order Turbine model, Block Diagram representation of Steam Turbines and Approximate Linear Models. Modeling of Generator (Steady State and Transient Models): Description of Simplified Network Model of a Synchronous Machine (Classical Model), Description of Swing Equation and State-Space II-Order Mathematical Model of Synchronous Machine.

MODELLING OF GOVERNOR:

Mathematical Modeling of Speed Governing System. Derivation of small signal transfer function.

MODELLING OF EXCITATION SYSTEM:

Fundamental Characteristics of an Excitation system, Transfer function, Block Diagram Representation of IEEE Type-1 Model.

UNIT – IV LOAD FREQUENCY CONTROL:

Necessity of keeping frequency constant. Definitions of Control area, Single area control. Block diagram representation of an isolated power system, Steady state analysis, Dynamic response, uncontrolled case. Load frequency control of 2-area system, uncontrolled case and controlled case, tie-line bias control

LOAD FREQUENCY CONTROLLERS:

Proportional plus Integral control of single area and its block diagram representation, steady state response, Load Frequency Control and Economic dispatch control.

UNIT – V REACTIVE POWER CONTROL:

Principle of Reactive Power control, Reactive Power compensation in transmission systems, different types of compensating equipment for transmission systems. Load compensation, Specifications of load compensator. Uncompensated and compensated transmission lines: shunt and Series Compensation.

DEREGULATION: Introduction to Deregulation.

TEXT BOOKS:

1. J. Nagrath, D. P .Kothari (2006), Modern Power System Analysis, 3rd edition, McGraw Hill higher Education, New Delhi, India.

2. P. S. R. Murthy (2008), Power System operation and Control, 1st edition, Tata McGraw Hill Publishers, New Delhi.

REFERENCE BOOKS:

1. HadiSaadat (2010), Power System Analysis, Revised Edition, PSA Publishers, New Delhi

2. O. I. Elgerd (2007), Electric Energy systems Theory, 2nd edition, Tata McGraw hill Publications, New Delhi.

POWER SYSTEM ANALYSIS

IV B.Tech -I Semester **L T P C**

Course Code: A3EE30 **4 1 - 4**

COURSE OVERVIEW:

Power systems are complex networks of generators and loads interconnected via transmission lines and various types of equipment and apparatus (transformers, switchgear, etc). An overview of modern power systems meeting present and future challenges involves understanding the fast changing structure of this system, the behavior of its components under steady state, and dynamic and transient conditions. The course helps with an understanding to evaluate the response of this complex system to variation of loads, and to determine how this system can be controlled to supply the loads reliably, while it is economical and safe to the environment

PREREQUISITE(S): Basic knowledge on power systems.

COURSE OBJECTIVES:

The course should enable the students to:

I. Illustrate the formation of [Z] bus of a power system network.
II. Compute power flow studies by various numerical methods.
III. Discuss the symmetrical component theory, sequence networks and short circuit calculations.
V. Analyze power system for steady state and transient stability and suggest methods to improve.

Course Outcomes: At the end of the Course the student would be able to:
•Apply the load flow application to various power system problems like minimization of transmission line losses, minimization of the total fuel cost etc.,
•Analyze the economic dispatch problem in thermal power plant
•Design a power system solution based on the problem requirements and realistic constraint

SYLLABUS

UNIT – I POWER SYSTEM NETWORK MATRICES

Graph Theory: Definitions, bus incidence matrix, Y bus formation by direct and singular transformation methods, numerical problems; Formation of Z Bus: Partial network, algorithm for the modification of Z bus matrix for addition of element from a new bus to reference bus, addition of element from a new bus to an old bus, addition of element between an old bus to reference bus and addition of element between two old busses (Derivations and Numerical Problems), modification of Z bus for the changes in network (Numerical Problems).

UNIT – II POWER FLOW STUDIES AND LOAD FLOWS

Load flows studies: Necessity of power flow studies, data for power flow studies, derivation of static load flow equations; Load flow solutions using Gauss Seidel method: Acceleration factor, load flow solution with and without PV buses, algorithm and flowchart; Numerical load flow solution for simple power systems (Max. 3 buses): Determination of bus voltages, injected active and reactive powers (Sample one iteration only) and finding line

flows / losses for the given bus voltages; Newton Raphson method in rectangular and polar coordinates form: Load flow solution with or without PV busses derivation of Jacobian elements, algorithm and flowchart, decoupled and fast decoupled methods, comparison of different methods, DC loads flow.

UNIT – III SHORT CIRCUIT ANALYSIS PER UNIT REPRESENTATION

Per unit system: Equivalent reactance network of a three phase power system, numerical problems; Symmetrical fault analysis: Short circuit current and MVA calculations, fault levels, application of series reactors, numerical problems; Symmetrical component theory: Symmetrical component transformation, positive, negative and zero sequence components, voltages, currents and impedances.

Sequence networks: Positive, negative and zero sequence networks, numerical problems; Unsymmetrical fault analysis: LG, LL, LLG faults with and without fault impedance, numerical problems.

UNIT – IV STEADY STATE STABILITY ANALYSIS

Steady state stability**:** Elementary concepts of steady state, dynamic and transient stabilities, description of steady state stability power limit, transfer reactance, synchronizing power coefficient, power angle curve and determination of steady state stability and methods to improve steady state stability.

UNIT-V TRANSIENT STATE STABILITY ANALYSIS

Swing equation: Derivation of swing equation, determination of transient stability by equal area criterion, application of equal area criterion, critical clearing angle calculation, solution of swing equation, point by point method, methods to improve stability, application of auto reclosing and fast operating circuit breakers.

TEXT BOOKS:

1. I J Nagrath & D P Kothari, “Modern Power system Analysis”, Tata McGraw-Hill Publishing Company, 2nd Edition.

2. C L Wadhwa, “Electrical Power Systems”, New age International, 3rd Edition.

3. M A Pai, “Computer Techniques in Power System Analysis”, TMH Publications.

REFERENCE BOOKS:

1. K Umarao, “Computer techniques and models in power systems”, I K International Pvt. Ltd.

2. HadiSaadat, “Power System Analysis”, 2nd Edition, TMH. Edition, 2003.

3. Grainger and Stevenson, “Power System Analysis”, Tata McGraw Hill.

4. J Duncan Glover and M S Sarma., THOMPSON, “Power System Analysis and Design”, 3rd Edition.

5. Abhijit Chakrabarthi and SunitaHaldar, “Power system Analysis Operation and control”, 3rd Edition, PHI, 2010.

WEB REFERENCES:

1. https://www.worldcat.org/title/computer-methods-in-power-system-analysis/.../600788826
2 https://www.sjbit.edu.in/.../COMPUTER%20%20TECHNIQUES%20IN%20POWER%20%20SYS
3. https://www.books.google.com › Technology & Engineering › Electrical
4. https://www.nptel.ac.in/courses/108105067/
5. https://www.jntusyllabus.blogspot.com/2012/01/computer-methods-power-systems-syllabus.html

E-TEXT BOOKS:

1. https://www.scribd.com/.../Computer-Methods-in-Power-System-Analysis-by-G-W-St...
2. https://www.academia.edu/8352160/Computer_Methods_and_Power_System_Analysis_Stagg
3. https://www.uploady.com/#!/download/ddC9obmVTiv/NwO1AnQrlmogeJjS
4. https://www.materialdownload.in/article/Computer-Methods-in-Power-System-Analysis_159/
5. https://www.ee.iitm.ac.in/2015/07/ee5253

UTILIZATION OF ELECTRICAL ENGINEERING

IV B.Tech -I Semester **L T P C**

Course Code: A3EE31 **4 - - 4**

COURSE Overview:

Understand and analyze the various concepts behind renewable energy resources. To introduce the energy saving concept by different ways of illumination. To understand the different methods of electric heating and electric welding.To introduce knowledge on Solar Radiation and Solar Energy Collectors To introduce concepts of Wind Energy and its utilization

PREREQUISITE(S): Basic knowledge on engineering physics.

COURSE OBJECTIVE:

Study of illumination Electrical heating and welding, direct energy conversion, UPS standby power systems and lifts and Electrical safety engineering

COURSE OUTCOMES:

- The student gains knowledge on the major utilization loads, drives and electrical safety.
- Ability to understand and analyze power system operation, stability, control and protection.
- Ability to handle the engineering aspects of electrical energy generation and utilization

SYLLABUS

UNIT – I ELECTRIC DRIVES:

Type of electric drives, choice of motor, starting and running characteristics, speed control, temperature rise, particular applications of electric drives, types of industrial loads, continuous, intermittent and variable loads, load equalization.

UNIT – II ELECTRIC HEATING and WELDING:

Advantages and methods of electric heating, resistance heating induction heating and dielectric heating. Electric welding, resistance and arc welding, electric welding equipment, comparison between A.C. and D.C. Welding.

UNIT – III ILLUMINATION:

Introduction, terms used in illumination, laws of illumination, polar curves, photometry, integrating sphere, sources of light.

TYPES OF LAMPS:

Discharge lamps, MV and SV lamps, comparison between tungsten filament lamps and fluorescent tubes, Basic principles of light control, Types and design of lighting and flood lighting.

UNIT – IV ELECTRIC TRACTION - I:

System of electric traction and track electrification. Review of existing electric traction systems in India. Special features of traction motor, methods of electric braking-plugging rheostat braking and regenerative braking.

UNIT – V ELECTRIC TRACTION - II:

Mechanics of train movement. Speed-time curves for different services, trapezoidal and quadrilateral speed time curves. Calculations of tractive effort, power, specific energy consumption for given run, effect of varying acceleration and braking retardation, adhesive weight and braking retardation adhesive weight and coefficient of adhesion.

TEXT BOOKS:

1.G. C. Garg (2005), Utilization of Electrical Power & Electric traction, 8th edition, Khanna publishers, New Delhi.

2. N. V. Suryanarayana (2005), Utilization of Electrical Power including Electric drives and Electric traction, 1st edition
New Age International (P) Ltd., New Delhi.

REFERENCE BOOKS:

1. Partab (2007), Art & Science of Utilization of electrical Energy, 2nd edition, Dhanpat Rai & Sons, New Delhi.

2. C. L. Wadhwa (2005), Generation, Distribution and Utilization of Electrical Energy, 2nd edition, New Age International (P) Ltd., New Delhi.

OPEN ELECTIVES-III

ENERGY AUDIT AND MANAGEMENT
(OPEN ELECTIVE -3)

IV B.Tech -I Semester **L T P C**

Course Code: A3EE32 **3 - - 3**

COURSE OVERVIEW

Energy management is the proactive, organized and systematic coordination of procurement, conversion, distribution and use of energy to meet the objectives of resource conservation, climate protection and cost savings. In this course students will develop the skills needed to evaluate the energy losses of residential, commercial, or industrial buildings, processes and/or systems to mitigate energy inefficiencies. Learners are taught different levels or types of energy audits and related procedures to residential, commercial, or industrial buildings audits. Students will learn the basic principles of energy management as it relates to energy audit short falls, energy system planning, energy policy development, pre and post deployment system auditing, energy savings and cost reduction strategies for residential, commercial, or industrial buildings, communities and businesses.

PREREQUISITES: Management science and Electrical engineering Fundamentals

COURSE OBJECTIVES:

To understand the energy utilization pattern including wastage and its management.

COURSE OUTCOMES:

1. Student will be able to Carry out the energy audit in any type of building and suggest the relevant and appropriate conservation measures.
2. Suggest the renewable energy systems for the buildings

SYLLABUS

UNIT-1
Introduction: Basic elements and measurements - Mass and energy balances - Scope of energy auditing industries - Evaluation of energy conserving opportunities.

UNIT-2
Energy Audit Concepts: Need of Energy audit - Types of energy audit - Energy management (audit) approach - understanding energy costs - Bench marking - Energy performance - Matching energy use to requirement - Maximizing system efficiencies - Optimizing the input energy requirements - Duties and responsibilities of energy auditors - Energy audit instruments - Procedures and Techniques.

UNIT-3
Principles and Objectives of Energy Management: Design of Energy Management Programmes - Development of energy management systems – Importance - Indian need of Energy Management - Duties of Energy Manager - Preparation and presentation of energy audit reports - Some case study and potential energy savings.

UNIT-4
Thermal Energy Management: Energy conservation in boilers - steam turbines and industrial heating systems - Application of FBC - Cogeneration and waste heat recovery - Thermal insulation - Heat exchangers and heat pumps - Building Energy Management.

UNIT-5

Electrical Energy Management: Supply side Methods to minimize supply-demand gap - Renovation and modernization of power plants - Reactive power management - HVDC - FACTS - Demand side - Conservation in motors - Pumps and fan systems - Energy efficient motors.

*Note: A case study involving audit may be taken up and a report suggesting improvements which can be considered as a part of assignment.

REFERENCES BOOKS:

1. Energy Management: W.R.Murphy, G.Mckay 109
2. Energy Management Principles: C.B.Smith
3. Efficient Use of Energy: I.G.C.Dryden d. Energy Economics A.V.Desai e. Hamies, Energy Auditing and Conservation; Methods Measurements, Management and Case study, Hemisphere, Washington, 1980. f. Guide book for National Certification Examination for Energy Managers and Energy Auditors (Could be downloaded from www.energymanagertraining.com).

ENERGY STORAGE SYSTEMS
(OPENELECTIVE- 3)

IV B.Tech -I Semester **L T P C**

Course Code: A3EE33 **3 - - 3**

COURSE OVERVIEW:

This course is an introductory subject in the field of electric power systems and electrical to mechanical energy conversion. Electric power has become increasingly important as a way of transmitting and transforming energy in industrial, military and transportation uses. Electric power systems are also at the heart of alternative energy systems, including wind and solar electric, geothermal and small scale hydroelectric generation

PRE-REQUISITIES: Knowledge on renewable and non-renewable energy sources

COURSE OBJECTIVE:

1. It introduces solar energy its radiation, collection, storage and application.

2. It also introduces the Wind energy, Biomass energy, geothermal energy and ocean energy as alternative energy Sources

COURSE OUTCOME:

1. After going through this course the student gets a thorough knowledge on,various types of renewable energy sources i.e. solar, wind, bio-mass, geothermal, ocean, hybrid energy systems

2. principles of direct energy conversion, with which he/she can able to apply the above conceptual things to real-world electrical and electronics problems and applications.

SYLLABUS

UNIT-I

Principles of solar radiation: Role and potential of new and renewable source, the solar energy option, Environmental impact of solar power, physics of the sun, the solar constant, extraterrestrial and terrestrial solar radiation, solar radiation on titled surface, instruments for measuring solar radiation and sun shine, solar radiation data.

UNIT-II

Solar Energy Collection, Storage & Applications: Collection: Flat plate and concentrating collectors, classification of concentrating collectors, orientation and thermal analysis, advanced collectors.
Storage & Applications: Different methods, Sensible, latent heat and stratified storage, solar ponds. Solar Applications- solar heating/cooling technique, solar distillation and drying, photovoltaic energy conversion.

UNIT-III

Wind Energy: Sources and potentials, horizontal and vertical axis windmills, performance characteristics, Betz criteria. Bio-Mass: Principles of Bio-Conversion, Anaerobic/aerobic digestion, types of Blo-gas digesters, gas yield, combustion characteristics of bio-gas, utilization for cooking, l.C.Engine operation and economic aspects.

UNIT-IV
Geothermal Energy: Resources, types of wells, methods of harnessing the energy, potential in India.
Ocean Energy: OTEC, Principles utilization, setting of OTEC plants, thermodynamic cycles. Tidal and wave energy: Potential and Conversion techniques, mini-hydel power plants, and their economics.

UNIT-V
Direct Energy Conversion: Need for DEC, Carnot cycle, limitations, and principles of DEC.

TEXT BOOKS:

1. Non-Conventional Energy Sources, G.D. Rai, Khanna Publishers.
2. Introduction to renewable energy, Vaughn Nelson, CRC Press (Taylor & Francis).

REFERENCE BOOKS:

1. Renewable Energy Resources, Twidell & Wier, CRC Press (Taylor & Francis).
2. Renewable Energy Sources and Emerging Technologies, D. P. Kothari, K. C. Singal, Rakesh Ranjan, PHI Learning Private Limited.
3. Fundamentals of Renewable Energy Systems, D. Mukherjee, S. Chakrabarti, New Age International.
4. Renewable Energy Power for a sustainable Future, Godfrey Boyle, Oxford University Press.
5. Renewable energy resources, Tiwari and Ghosal, Narosa publications.
6. Renewable Energy Technologies, Ramesh & Kumar, Narosa publications.
7. Non-Conventional Energy Systems, K Mittal, Wheeler publications.

PROFESSIONAL ELECTIVES- II

POWER ELECTRONIC APPLICATIONS IN POWER SYSTEMS
(PROFESSIONAL ELECTIVE-II)

IV B.Tech -I Semester **L T P C**

Course Code: A3EE34 **3 - - 3**

COURSE OVERVIEW:

To understand about Static Power Converters,High voltage AC and DC Control, Over Voltages Faults and Protection.

PREREQUISITE(S): Knowledge about AC, DC Converters, Filters

COURSE OBJECTIVES:

1. Analyze performance of static power converters and their application in HVDC systems.
2. Outline various control schemes for HVDC converters.
3. Explain the operation of multi terminal DC systems.
4. Understand converter faults over voltage and over current protection of converters.

COURSE OUTCOMES:

After going through this course the student will be able to

1. Analyze performance of static power converters and their application in HVDC systems.
2. Outline various control schemes for HVDC converters.
3. Explain the operation of multi terminal DC systems.
4. Understand converter faults over voltage and over current protection of converters.

SYLLABUS

UNIT -1 INTRODUCTION

Introduction of HVDC systems: General consideration, power handling capabilities of HVDC lines basic conversion principles, static converter configuration.

UNIT -2 STATIC POWER CONVERTERS

Static power converters: 3-pulse, 6-pulse, and 12-pulse converters, converter station and terminal equipment, commutation process, rectifier and inverter operation, equivalent circuit for converter, special features of converter transformers, harmonics in HVDC Systems, harmonic elimination, AC and DC filters.

UNIT -3 CONTROLS OF HVDC CONVERTERS AND SYSTEMS

Constant current, constant extinction angle and constant ignition angle control Individual phase control and equidistant firing angle control DC power flow control: Interaction between HV AC and DC systems, voltage interaction harmonic instability problems and DC power modulation

UNIT -4 MULTI TERMINAL DC SYSTEMS AND OVER VOLTAGES

Multi terminal DC systems: Series parallel and series parallel systems their operation and control, over voltages due to disturbances on DC side, over voltages due to DC and AC side line faults

UNIT -5 CONVERTER FAULTS AND PROTECTION

Converter faults and protection scheme: Over current protection, valve group, and DC line protection over voltage protection of converters, surge arresters

TEXT BOOKS:

1.E W Kimbark, "Direct Current Transmission", Wiely Inter Science – New York,1st Edition, 1971 .

2.J Arillaga, "HVDC Transmission", Peter Peregrinus Ltd, 1st Edition, 1983

3.KR Padiyar," High Voltage Direct Current Transmission", Wiely Esatern Ltd New Delhi, 1st Edition,1992

REFERENCE BOOKS:

1.KR Padiyar, "High Voltage Direct Current Transmission", Wiely Esatern Ltd, 1st Edition, 1992.

2.KR Padiyar, "HVDC Power Transmission Systems", New Age International, 1st Edition, 2015.

3.E Uhlman," Power Transmission by Direct Current", Springer Verlag, 1st Edition, 1975

WEB REFERENCES

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https://www.aar.faculty.asu.edu/classes
https://www.facstaff.bucknell.edu/
https://www.electrical4u.com
https://www.iare.ac.in

POWER QUALITY
(PROFESSIONAL ELECTIVE - 2)

IV B.Tech -I Semester **L T P C**

Course Code: A3EE35 **3 - - 3**

COURSE OVERVIEW:

To understand about Flickers and Transient Voltages, Sag, interruptions, Wave Form Distortion and Power Quality Monitoring.

PREREQUISITE(S): Basics about power systems, Voltage Regulations

COURSE OBJECTIVES:

1. Analyze performance of Flickers and Transient Voltages.
2. Outline various Sag and Wave Form Distortions.
3. Explain Power Quality Monitoring.
4. Understand interruptions, Wave Form Distortion.

COURSE OUTCOMES:

After going through this course the student will be able to
1. Analyze performance of Flickers and Transient Voltages.
2. Outline various Sag and Wave Form Distortions.
3. Explain Power Quality Monitoring.
4. Understand interruptions, Wave Form Distortion.

SYLLABUS

UNIT – I INTRODUCTION:
Importance of power quality, terms and definitions of power quality as per IEEE std. 1159 such as transients, short and long duration voltage variations, interruptions, short and long voltage fluctuations, imbalance, flickers and transients. Symptoms of poor power quality: Definitions and terminology of grounding, Purpose of groundings, Good grounding practices and problems due to poor grounding.

UNIT – II FLICKERS AND TRANSIENT VOLTAGES:
RMS voltage variations in power system and voltage regulation per unit system, complex power. Principles of voltage regulation, Basic power flow and voltage drop, Various devices used for voltage regulation and impact of reactive power management. Various causes of voltage flicker and their effects, Short term and long term flickers. Various means to reduce flickers. Transient over voltages, sources, impulsive transients, switching transients, Effect of surge impedance and line termination, control of transient voltages.

UNIT – III VOLTAGE SAG, SWELLS AND INTERRUPTIONS:
Definitions of voltage sag and interruptions, Voltage sags versus interruptions. Economic impact of voltage sag, Major causes and consequences of voltage sags, Voltage sag characteristics, Voltage sag assessment. Influence of fault location and fault level on voltage sag, Areas of vulnerability.
LIMITS AND MEASURES FOR VOLTAGE SAG:
Assessment of equipment sensitivity to voltage sags, Voltage sag limits for computer equipment, CBEMA, ITIC, SEMI F 42 curves. Representation of the results of voltage sags analysis, Voltage sag indices, Mitigation measures for voltage sags, such as UPS, DVR, SMEs, CVT etc., utility solutions and end user solutions.

UNIT – IV WAVEFORM DISTORTION:

Definition of harmonics, inter-harmonics, sub-harmonics. Causes and effect of harmonics, Voltage versus current distortion. Overview of Fourier analysis, Harmonic indices, A.C. quantities under non-sinusoidal conditions. Triplen harmonics, characteristics and non characteristics harmonics, harmonics series and parallel resonances, Consequences of harmonic resonance. Principles for controlling harmonics, Reducing harmonic currents in loads. K-rated transformer. Harmonic study procedure. Computer tools for harmonic analysis, Locating sources of harmonics, Harmonic filtering, passive and active filters. Modifying the system frequency response

UNIT – V POWER QUALITY MONITORING:

Need of power quality monitoring and approaches followed in power quality monitoring. Power quality monitoring objectives and requirements. Initial site survey. Power quality Instrumentation. Selection of power quality monitors, selection of monitoring location and period. System wide and discrete power quality monitoring. Setting thresholds on monitors, data collection and analysis. Selection of transducers. Harmonic monitoring , Transient monitoring, event recording and flicker monitoring.

TEXT BOOKS:

1. M. H. J. Bollen (2000), *Understanding Power Quality Problems, voltage sag and interruptions*, 1st edition,IEEE Press, New Delhi.

2.Roger. C. Dugan, Mark. F. McGranagham, Surya Santoso, H. Wayne Beaty (2008), *Electrical Power Systems Quality*, 2nd edition, Tata McGraw Hill Publications, New Delhi.

REFERENCE BOOKS:

1. J. Arrillaga, M. R. Watson, S. Chan (2007), *Power system quality assessment*, 1st edition, John Wiley and sons, New Delhi.

HIGH VOLTAGE ENGINEERING
(PROFESSIONAL ELECTIVE –2)

IV B.Tech -I Semester **L T P C**

Course Code: A3EE36 **3 - - 3**

COURSE OVERVIEW:

To learn various insulating materials that deal with high voltage engineering and testing of various electrical materials at high voltage.

PREREQUISITE(S): Introduction to protection systems and circuit breakers

COURSE OBJECTIVES:

I. Study the various insulating materials that deal with high voltage engineering.
II. Understand the testing of various electrical materials at high voltage engineering.
III. Study of over voltages and currents phenomenon and its measurements.

COURSE OUTCOMES:

After going through this course the student will be able to

I. Study the various insulating materials that deal with high voltage engineering.
II. Understand the testing of various electrical materials at high voltage engineering.
III. Study of over voltages and currents phenomenon and its measurements.

SYLLABUS

UNIT – I INTRODUCTION TO HIGH VOLTAGE TECHNOLOGY AND APPLICATIONS:

Electric Field Stresses, Gas / Vacuum as Insulator, Liquid Dielectrics, Solids and Composites, Estimation and Control of Electric Stress, Numerical methods for electric field computation, Surge voltages, their distribution and control, Applications of insulating materials in transformers, rotating machines, circuit breakers, cable power capacitors and bushings.

UNIT – II BREAK DOWN IN GASEOUS, LIQUID DIELECTRICS AND SOLID DIELECTRICS:

Gases as insulating media, collision process, Ionizationprocess, Townsend's criteria of breakdown in gases, Paschen's law.Liquid as Insulator, pure and commercial liquids, breakdown in pure and commercial liquids. Intrinsic breakdown,electromechanical breakdown, thermal breakdown, breakdown of solid dielectrics in practice, Breakdown in composite dielectrics, solid dielectrics used in practice.

UNIT – III GENERATION OF HIGH VOLTAGES AND CURRENTS:

Generation of High Direct Current Voltages, Generation of High alternating voltages, Generation of Impulse Voltages, Generation of Impulse currents, Tripping and control of impulse generators.

MEASUREMENT OF HIGH VOLTAGES AND CURRENTS:

Measurement of High Direct Current voltages, Measurement of HighVoltages alternating and impulse,Measurement of High Currents-direct, alternating and Impulse, Oscilloscope for impulse voltage and current measurements.

UNIT – IV OVER VOLTAGE PHENOMENON AND INSULATION CO-ORDINATION:

Natural causes for over voltages – Lightning phenomenon, Overvoltage due to switching surges, system faults and other abnormal conditions, Principles of Insulation Coordination on High voltage and Extra High Voltage power systems.

UNIT – V NON-DISTRUCTIVE TESTING OF MATERIAL AND ELECTRICAL APPARATUS:

Measurement of D.C Resistivity, Measurement of DielectricConstant and loss factor, Partial discharge measurements.

HIGH VOLTAGE TESTING OF ELECTRICAL APPARATUS:

Testing of Insulators and bushings, Testing of Isolators and circuit breakers, Testing of cables, Testing of Transformers, Testing of Surge Arresters, Radio Interference measurements.

TEXT BOOKS:

1. M. S. Naidu, V. Kamaraju (2009), High Voltage Engineering, 4th edition, Tata McGraw Hill Publications,New Delhi.

2. E. Kuffel, W. S. Zaengl, J. Kuffel (2000), High Voltage Engineering: Fundamentals, 2nd edition, Elsevier Publishers, New York, USA.

REFERENCE BOOKS:

1.C. L. Wadhwa (2007), High Voltage Engineering, New Age Internationals (P) Limited, New Delhi.

2.Ravindra Arora Wolfgang Mosch (2011), High Voltage Insulation Engineering, 1st edition, New Age International (P) Ltd., New Delhi.

ANALYSIS OF LINEAR SYSTEMS

(PROFESSIONAL ELECTIVE-2)

IV B.Tech –I Semester **L T P C**

Course Code: A3EE37 **3 - - 3**

COURSE OVERVIEW:

Basic properties of signals and systems, linearity, stability, step and impulse response, superposition integral, block diagrams, Fourier series and Fourier transform for discrete and continuous time signals.

COURSE OBJECTIVES:

1. To understand about state variables.

2. To learn the applications of Laplace transforms and sampling theorems.

PREREQUISITES(S):

Knowledge on Engineering Mathematics and control systems.

COURSE OUTCOMES:

1. Understanding State variable analysis

2. The skills to apply Engineering Mathematics in problem solving.

3. Should have the ability to extend his/her knowledge of Engineering Mathematics further on his/her own.

SYLLABUS

UNIT-I STATE VARIABLE ANALYSIS

Choice of state variables in Electrical networks-Formulation of state equations for Electrical networks Equivalent source method. Network topological method - Solution of state equations-Analysis of simple networks with state variable approach.

UNIT–II FOURIER SERIES AND FOURIER TRANSFORM REPRESENTSATION

Introduction, Trigonometric form of Fourier series, Exponential form of Fourier series, Wave symmetry, Fourier integrals and transforms, Fourier transform of a periodic function , Properties of Fourier Transform , Parseval's theorem , Fourier transform of some common signals, Fourier transform relationship with Laplace Transform.

UNIT-III APPLICATIONS OF FOURIER SERIES AND FOURIER TRANSFORM REPRESENTATION

Introduction, Effective value and average values of non sinusoidal periodic waves, currents, Power Factor, Effects of harmonics, Application in Circuit Analysis, Circuit Analysis using Fourier Series.

UNIT – IV LAPLACE TRANSFORM APPLICATIONS

Application of Laplace transform Methods of Analysis – Response of RL, RC, RLC Networks to Step, Ramp, and impulse functions, Shifting Theorem – Convolution Integral – Applications

UNIT-V TESTING OF POLYNOMIALS

Elements of realisability-Hurwitz polynomials-positive real functions-Properties-Testing-Sturm's Test, examples.

UNIT-VI NETWORK SYSNTHESIS

Network synthesis: Synthesis of one port LC networks-Foster and Cauer methods-Synthesis of RL and RC one port networks-Foster and Cauer methods

UNIT-VII SAMPLING

Sampling theorm – Graphical and Analytical proof for Band Limited Signal impulse sampling, natural and Flat top Sampling, Reconstruction of signal from its samples, effect of under sampling – Aliasing, introduction to Band Pass sampling, Cross correlation and auto correlation of functions, properties of correlation function, Energy density spectrum, Power density spectrum, Relation between auto correlation function and Energy / Power spectral density function.

UNIT-VIII Z-TRANSFORMS

Fundamental difference between continous and discrete time signals, discrete time complex, exponential and sinusoidal signals, periodicity of discrete time complex exponential, concept of ZTransform of a discrete sequence. Distinction between Laplace, Fourier and Z-Transforms. Region of convergence in Z-Transforms, constraints on ROC for various classes of signals, Inverse Z-Transform properties of Z-Transforms.

TEXT BOOKS:

1. Signals, Systems and Communications by B.P. Lathi, BS Publications 2003.
2. Network Analysis and Synthesis – Umesh Sinha- Satya Prakashan Publications

REFERENCE BOOKS:

1. Linear System Analysis – A N Tripathi, New Age International
2. Network and Systems – D Roy Chowdhary, New Age International
3 Engineering Network Analysis and Filter Desgin- Gopal G Bhisk & Umesh
4. Linear system anlysis by A.Cheng, Oxford publishers.

POWER SYSTEMS LAB

IV B.Tech -I Semester **L T P C**
Course Code: A3EE38 **- - 3 2**

COURSE OVERVIEW:

This lab course includes experiments to study various aspects of power systems: measurement of the characteristics data of a transmission line and an assessment of its voltage drop and losses; synchronization and steady state operation of a generator connected to an infinite bus system; load characteristics of a synchronous motor and effect of field excitation on reactive power load; effect of voltage levels on power transmission and effects of various load types on power plants; load flow data preparation and system study; system analysis of symmetrical and unsymmetrical faults; Transient stability data preparation and system study.

PRE-REQUISITE: Knowledge on Power systems

COURSE OVERVIEW:
This course deals with power system transmission and distribution parameters.

COURSE OBJECTIVES:

The course should enable the students to:

I. Determine the parameters, surge impedance loading and reactive power compensation of transmission lines.
II. Understand the concept of various transmission line protection schemes.
III. Simulate and study feeder protection and generator protection circuits

COURSE OUTCOMES:

At the end of the lab the student will be able to understand the experiments on power system transmission and distribution parameters.

LIST OF EXPERIMENTS

Expt. 1 ABCD PARAMETERS AND PERFORMANCE OF TRANSMISSION LINE
Measurement of ABCD parameters and determination of regulation of a transmission line at different power factors
Expt. 2FERRANTI EFFECT AND SHUNT COMPENSATION
Study of Ferranti effect and study of shunt compensation to counter act voltage rise on no load
Expt. 3 SURGE IMPEDANCE LOADING, REACTIVE POWER COMPENSATION AND CONTROL IN A TRANSMISSION LINE
Determination of surge impedance loading (SIL); study of reactive power compensation to obtain zero regulation at different loads for the improvement with tap changing transformer in a transmission line.
Expt. 4 STRING EFFICIENCY OF INSULATORS
Determination of string efficiency in a string of insulators
Expt. 5 SEQUENCE COMPONENTS OF A TRANSMISSION LINE
Determination of positive, negative and zero sequence components of a three phase transmission line.
Expt. 6 SEQUENCE COMPONENTS OF 3-Φ ALTERNATOR
Determination of positive, negative and zero sequence components of three phase alternator
Expt. 7 TRANSMISSION LINE EFFICIENCY AND IMPEDANCE RELAY
Determination of transmission line efficiency and regulation and Study of impedance relay (distance relay).
Expt. 8 ELECTROMAGNETIC INDUCTION DISC TYPE OVERCURRENT RELAY
Determination of tripping characteristics of electromagnetic induction disc type over current relay.

Expt. 9 CHARACTERISTICS OF AN MCB

Plotting the Characteristics of an MCB (miniature circuit breaker).

Expt. 10 SINGLE PHASE OVER CURRENT / EARTH FAULT RELAY

Plotting the characteristics of single phase over current / earth fault relay (Numerical MC 12A).

Expt. 11 STUDIES OF CHARACTERISTICS OF FUSE AND THERMAL OVERLOAD PROTECTION

Study and plotting of characteristics of fuse and tripping of bimetallic thermal overload protection and plotting the characteristics

Expt. 12 EARTH FAULT PROTECTION

Open delta connection of secondary's of three PTs to detect earth fault protection and connection of secondary's of three current transformers to detect earth fault

Expt. 13 FEEDER PROTECTION

Study the protection schemes of a feeder under various fault conditions

Expt. 14 GENERATOR PROTECTION

Study the three phase alternator protection using numerical type power system protection relays

REFERENCE BOOKS:

1. Paithankar, S R Bhide, "Fundamentals of Power System Protection", PHI, 1st Edition, 2003.
2.C L Wadhwa, "Electrical Power Systems", New Age international (P) Limited, 6rd Edition, 2010.
3.VK Mehta, "Principles of power systems", S Chand Publications, 4th Edition, 2009

WEB REFERENCES:

https://www.ee.iitkgp.ac.in
https://www.citchennai.edu.in
https://www.iare.ac.in
https://www.deltaww.com

POWER SYSTEM COMPUTER AIDED DESIGN LAB

IV B.Tech -I Semester **L T P C**

Course Code: A3EE39 **- 1 3 2**

COURSE OVERVIEW:

1. Expose students to automated measurements of 3-phase power.
2. Learn use of open-circuit and short-circuit tests to determine transformer Characteristics
3. Determine synchronous machine characteristics, and synchronization of machine to the power line voltage and frequency.
4. Learn to design solutions for power system problems.

PREREQUISITE(S):

Basic measurement techniques, theory of transformers and synchronous machines, AC circuits analysis and basics of 3-phase power and per unit analysis.

COURSE OBJECTIVES:

The course should enable the students to:

I. Simulate transmission lines using PSCAD to analyze faults in transmission lines
II. Demonstrate load flow studies using methods.
III. Analyze transient state stability in power systems.

COURSE OUTCOMES:

Upon successful completion of this course, students will have a better understanding of the merits and demerits of critical analytical solution methods which are the basis for valid techniques in solving power system problems

LIST OF EXPERIMENTS

Expt. 1 MODELING OF SURGE ARRESTERS
Switching over voltages and modeling of surge arresters using PSCAD
Expt. 2 MODELING OF HVDC TRANSMISSION LINE
Obtaining parameters of a HVDC transmission line and modeling it in PSCAD
Expt. 3 REACTIVE POWER AND POWER FACTOR CORRECTION
Familiarization with PSCAD and Understanding of Reactive Power and Power Factor Correction in AC Circuits
Expt. 4 TRANSIENT STABILITY
Study of transient stability in a typical power system
Expt. 5 FAULT ANALYSIS
Symmetrical fault analysis of a simple ac system using PSCAD
Expt. 6 TWO AREA POWER SYSTEM
Two Area Power System – Initializing the simulation to a specific load flow.
Expt. 7 MODELING OF TWO-AREA POWER SYSTEM
Two-area system model for a transient study
Expt. 8 TRANSIENT RECOVERY VOLTAGE
Transient Recovery Voltage under fault and normal switching conditions and use of multiple run
Expt. 9 FAST FRONT STUDIES-LIGHTNING STRIKE
Study the over voltages at transformer terminals during lightning stroke.
Expt. 10 SINGLE MACHINE INFINITE BUS
Simulate one machine infinite bus to measure active and reactive powers at steady state

Expt. 11 LOAD FLOW
Initializing the machine to a load flow
Expt. 12 SIMULATIONS OF FAULTS
Analyze symmetrical faults
Expt. 13 LOAD FREQUENCY CONTROL
Determination dynamic response of the given two - area load frequency control problem
Expt. 14 FAULT ANLAYSIS
Analysis of unsymmetrical faults using PSCAD

REFERENCE BOOKS:
1. M A Pai, "Computer Techniques in Power System Analysis", TMH Publications, 1st Edition, 2010

2. Grainger, Stevenson , "Power System Analysis", Tata McGraw Hill, 1st Edition, 2010

WEB REFERENCES:

1. https://www.ee.iitkgp.ac.in
2. https://www.iare.ac.in

Course Home Page:

SOFTWARE: Power System Computer Aided Designing (PSCAD)
HARDWARE: 36 No. of Desktop Computers

POWER SEMI CONDUCTOR DRIVES LAB

IV B.Tech- I Semester **L T P C**

Course Code:A3EE27 **- - 3 2**

COURSE OVERVIEW:

This course deals with control of single phase and three phase motors using electronic devices.

PRE-REQUISITIES:

Knowledge of semiconductor materials, gained from the graduate course on semiconductor material and to identify the properties needed for use in high electric fields and high currents and to understand why certain materials are used when fabricating power semiconductor devices

COURSE OBJECTIVES:

The main objective of this course is to know the students about the speed control of DC motors using Thyristors.

COURSE OUTCOMES:

The course should enable the students to:

1. To understand about Cycloconverters and its uses.

2. To apply thyristors for Different speed control methods of DC motors.

3. To design Choppers and converters.

SYLLABUS

LIST OF EXPERIMENTS:

1. Speed Control of DC Motor using single phase Half Converter.
2. Speed Control of DC Motor using single phase Full Converter.
3. Speed Control of DC Motor using Three phase Half Controlled Bridge Converter
4. Speed Control of DC Motor using Chopper.
5. Study of SCR to drive small load.
6. Speed Control of single phase AC Motor using SCR.
7. Single phase cycloconverter fed AC Motor.
8. Three phase AC Induction Motor drive with VVVF control.
9. Speed Measurement and closed loop control using PMDC Motor.
10. Thyristorised drive for PMDC motor with speed measurement and closed loop control.
11. Study of series inverter for light load
12. Speed control of PMDC motor using MOSFET based Buck Boost Converter

INDUSTRIAL ORIENTED MINI PROJECT

IV B.Tech- I Semester **L T P C**

Course Code:A3EE41 **- - 2 1**

COURSE OVERVIEW:

A series of exercises and experiments covering bottom-up structural design and top-down behavioral design using Verilog and System Verilog (IEEE Std. 1800) for circuit description and design verification. Lab exercises emphasize use of professional compilation and simulation tools for design validation.

PREREQUISITE(S) :

Students need a thorough understanding of Boolean algebra, combinational and sequential digital circuits and number systems (binary, hexadecimal).

COURSE OBJECTIVE: The main objective of this course is to train the students to meet the industrial needs.

COURSE OUTCOMES:

After completing this course the students should be able to:

1. The ability to code and simulate any digital function in Verilog HDL.
2. Know the difference between synthesizable and non-synthesizable code.
3. Understand library modeling, behavioral code and the differences between then.
4. Understand the differences between simulator algorithms.
5. Learn good coding techniques per current industrial practices.
6. Understand logic verification using Verilog simulation.

Relationship to Student Outcomes:

This supports the achievement of the following student outcomes:

1. An ability to apply knowledge of mathematics, science, and engineering to the analysis of electrical and computer engineering problems.

2. An ability to design and conduct scientific and engineering experiments, as well as to analyze and interpret data.
3. An ability to design systems which include hardware and/or software components within realistic constraints such as cost, manufacturability, safety and environmental concerns.
4. An ability to identify, formulate, and solve electrical and computer engineering problems.
5. An ability to communicate effectively through written reports and oral presentations.
6. An ability to use modern engineering techniques for analysis and design.
7. An ability to analyze and design complex devices and/or systems containing hardware and/or software components.

IV B.TECH II SEMESTER

SYLLABUS

MANAGEMENT SCIENCE

IV B.Tech -II Semester **L T P C**

Course Code: A3HS15 **3 - - 3**

COURSE OVERVIEW:

This course covers many approaches to solving business problems from managerial point of view. Various optimization techniques are surveyed with an emphasis on the why and how of these types of models as opposed to a detailed theoretical approach. Students develop optimization models which relate to their areas of interest. Spreadsheets are used extensively to accomplish the mathematical manipulations. Emphasis is placed on input requirements and interpretation of results.

PRE-REQUISITES: Nil

COURSE OBJECTIVES:

1 .Understand the principles, functions, theories and practices of different management areas and to provide them with practical exposure to cases of success/failure in business.

2 . Expose with a systematic and critical understanding of organizational theory, structures and design.

3. Comprehend conceptual models of strategic management and to familiarize with the tools of operations and project management.

4 . Understand the role of human relations in the management of operations and to provide basic insights into contemporary management practices.

COURSE OUTCOMES:

After going through this course the student will be able to

1 .After going through this course the student will be able to function effectively in multidisciplinary teams to Accomplish a common goal of organizations.

2. Apply theories to improve the practice of management.

3. Appreciate the management challenges associated with high levels of change in the organizations.

4. Develop global vision and management skills at both a strategic level and interpersonal level.

SYLLABUS

UNIT I

Introduction to management Concepts of management - nature, importance, and functions of management; Taylor‘s scientific management theory; Fayol‘s principles of management; Mayo‘s Hawthorne experiments; Maslow‘s theory of human needs; Douglas McGregor‘s theory X and theory

Y; Herzberg‘s two-factor theory of motivation; System and contingency approach to management; Planning – meaning, significance, and types of plans; Decision making and steps in decision making process; Leadership styles; Social responsibilities of management. Organizing - Meaning, and features; Process of organization; Principles of organization; Elements of organization; Organization chart; Span of control - Graicunas formulae; Centralisation and decentralization; Types of mechanistic and organic structures of organisation - line organization, line and staff organization, functional organization, committee organization, matrix organization, virtual organisation, cellular organisation,

team structure, boundaryless organization, inverted pyramid structure, and lean and flat organization structure; Their merits, demerits and suitability.

UNIT II

Human resources management Concepts of HRM; Basic functions of HR manager - human resource planning (definition; objectives; process), recruitment (definition; sources; techniques), selection (definition; process), induction and orientation, training and development (definition; need; methods), employee exit process, employee relations management, employee compensation and benefits administration, job evaluation (objectives; process; methods), and performance appraisals (objectives; process; methods).

UNIT III

Strategic management Mission; Goals; Objectives; Policy; Strategy; Programmes; Elements of corporate planning process - environmental scanning; value chain analysis, BCG matrix, generic strategy alternatives, SWOT analysis, and steps in strategy formulation and implementation; Balance score card; Capability maturity model (CMM)/ People capability maturity model(PCMM).

UNIT IV

Operations management Plant location; Types of plant layout; Methods of production – job, batch, and mass production; Work study-basic procedure involved in method study and work measurement. Materials management Objectives; Need for inventory control; EOQ, ABC Analysis; Purchase procedure; Value analysis; JIT, Six sigma; TQM; Supply chain management; Stores management and stores records. Marketing Functions of marketing; Marketing mix, and marketing strategies based on product life cycle; Channels of distribution.

UNIT V

Project management – network analysis Network analysis; Programme evaluation review technique - PERT (probability of completing the project within given time); Critical path method - CPM (Identifying critical path); Project cost analysis; Project crashing; Simple problems.

TEXT BOOK:

Management Science by Aryasri; Publisher: Tata McGraw Hill, 2009.

Management by James Arthur, Finch Stoner, R. Edward Freeman, and Daniel R. Gilbert 6th Ed; Publisher: Pearson Education/Prentice Hall.

Principles and Practice of Management - L.M. Prasad; Publisher: Sultan Chand Publications, New Delhi.

REFERENCES:

1. Principles of Marketing: A South Asian Perspective by Kotler Philip, Gary Armstrong, Prafulla Y. Agnihotri, and
Eshan ul Haque , 2010, 13th Edition, Publisher: Pearson Education/ Prentice Hall of India.
2. A Handbook of Human Resource Management Practice by Michael Armstrong, 2010; Publisher: Kogan Page Publishers.
3. Quantitative Techniques in Management by N.D. Vohra, 4th edition, 2010; Publisher: Tata McGraw Hill.
4. Operations Management: Theory and Practice by B. Mahadevan, 2010; Publisher: Pearson Education.
5. Strategic Management by V.S.P. Rao and V. Hari Krishna, 2010; Publisher: Excel Books

PROFESSIONAL ELECTIVES- III

SWITCHED MODE POWER SUPPLY

(PROFESSIONAL ELECTIVE-3)

IV B.Tech -II Semester **L T P C**

Course Code: A3EE42 **3 - - 3**

COURSE OVERVIEW:

The course discusses deriving dynamic models of DC converters for the purpose of controller design. You will also learn how to choose switches for a given converter, how to pick magnetic material, and how to design filters.

COURSE OBJECTIVES:

1. To understand Regulated power supply and Amplifiers.

2. To learn the applications of Integrated Electronics.

PREREQUISITE(S):

Knowledge on Basic Electronics.

COURSE OUTCOMES:

1. Understanding about Modulation and Demodulation.

2. The skills to apply Electronics in integrated circuits.

SYLLABUS

UNIT I: Semiconductor Devices:

Voltage-Current Characteristics of Tunnel Diode, Photo Diode, BJT, JFET, MOS, CMOS, UJT, SCR, DAIC and TRAIC.

Regulated Power Supply:

Concept of regulation, Principles of constant voltage and current regulators, basic Principles of Zener regulator and its working, Transistrorized Series regulator, Regulated power supplies using IC 723,78XX and Switch Mode Power Supply (SMPS).

UNIT II :

Amplifiers: Classification of amplifiers, Operating point and its stability, Biasing of Transistor, Fixed bias, Collector to base bias, Self bias, h-parameter model of BJT, Single Stage and two stage RC coupled amplifiers and their frequency response, hybrid π- model. High frequency response using hybrid π-model.

Feed back Amplifiers :Classifications of Amplifiers (Voltage amplifier, Current amplifier, Transconductance amplifier and Transresistance amplifier), The concept of feed back, Positive and Negative feed back. Advantages of Negative feedback in amplifiers, Emitter follower and Darlington pair.

UNIT III :

Sinusoidal Oscillators (Using BJTs) :
Barkhausen Criterion, Phase shift Oscillator, Wein Bridge Oscillator, Hartley and Colpitts Oscillators, Crystal Oscillator.

Multivibrators : Collector coupled Astable, Monostable, Bistablemultivibrator circuits-Schmitt trigger and its applications.

UNIT IV : Modulation and Detection :

Amplituded Modulation- Analysis of AM signal, Balanced Amplitude Modulator, Square law and Envelope detectors. Frequency Modulation-Analysis of an FM signal, Basic Reactance modulator, FM Discriminator. Phase Modulation.

REFERENCE BOOKS:

1. Integrated Electronics by Millman and Halkias, TMH 2007.
2. Pulse Digital & Switching Waveforms by Millman and Taub, TMH 2001.
3. Microelectronics by Millman& Grable, TMH 200.
4. Fundamentals of electronics by JD Ryder, Wiely
5. Electronics Communications systems By Kennedy, Macgrawill.

DESIGN, ESTIMATION AND COSTING OF ELECTRICAL POWER SYSTEMS

(PROFESSIONAL ELECTIVE-3)

IV B.Tech -II Semester **L T P C**

Course Code: A3EE43 **3 - - 3**

COURSE OVERVIEW:

To understand the Estimating power demand for installation, Estimating capital cost of illustration, Selection of appropriate network and planning space required for installation of equipment and consequently the installation of the equipment.

PREREQUISITE(S):

Knowledge on Ratings of all electrical equipments, House wiring

COURSE OBJECTIVES:

1. Emphasize the estimating and costing aspects of all electrical equipment, installation and designs to analyze the cost viability.
2. Exposure to design and estimation of wiring, design of overhead and underground distribution lines, substations and illuminations design.

3. These techniques should help the students to successfully estimate costing of the products / projects that are part of our every day usage.

COURSE OUTCOMES:

1.After going through this course the student gets a thorough knowledge on, estimating and costing aspects of all electrical equipment, installation and designs to analyze the cost viability, exposure to design and estimation of wiring, design of overhead and underground distribution lines, substations and illuminations.

2. They can able to apply the above conceptual things to real-world electrical and electronics problems and applications.

SYLLABUS

UNIT-I

Design Considerations of Electrical Installations: Electric Supply System, Three phase four wire distribution system, Protection of Electric Installation against over load, short circuit and Earth fault, Earthing, General requirements of electrical installations, testing of installations, Indian Electricity rules, Neutral and Earth wire, Types of loads, Systems of wiring, Service connections, Service Mains, Sub-Circuits, Location of Outlets, Location of Control Switches, Location of Main Board and Distribution board, Guide lines for Installation of Fittings, Load Assessment, Permissible voltage drops and sizes of wires, estimating and costing of Electric installations.

UNIT —II

Electrical Installation for Different Types of Buildings and Small Industries: Electrical installations for residential buildings — estimating and costing of material, Electrical installations for commercial buildings, Electrical installations for small industries.

UNIT—III

Overhead and Underground Transmission and Distribution Lines: Introduction, Supports for transmission lines, Distribution lines — Materials used, Underground cables, Mechanical Design of overhead lines, Design of underground cables.

UNIT-IV

Substations: Introduction, Types of substations, Outdoor substation — Pole mounted type, Indoor substations — Floor mounted type.

UNIT-V

Design of Illumination Schemes: Introduction, Terminology in illumination, laws of illumination, various types of light sources, Practical lighting schemes.

TEXT BOOKS

1. Electrical Design Estimating and Costing, K. B. Raina, S. K. BhattAcharya, New Age International Publisher.

2. Design of Electrical Installations, Er. V. K. Jam, Er. Amitabh Bajaj, University Science Press.

3. Electricity Pricing Engineering Principles and Methodologies, Lawrence J. Vogt, P. E., CRC Press.

REFERENCE BOOKS

1.Code of practice for Electrical wiring installations,(System voltage not exceeding 650 volts), Indian Standard Institution, IS: 732-1983.

2.Guide for Electrical layout in residential buildings, Indian Standard Institution, IS: 4648-1968.

3.Electrical Installation buildings Indian Standard Institution, IS: 2032.

4.Code of Practice for selection, Installation of Maintenance of fuse (voltage not exceeding 650V), Indian Standard Institution, IS: 3106- 1966.

5.Code of Practice for earthling, Indian Standard Institution, lS:3043- 1966.

6.Code of Practice for Installation and Maintenance of induction motors, Indian Standard Institution, IS: 900-1965.

7.Code of Practice for electrical wiring, Installations (system voltage not exceeding 650 Volts), Indian Standard Institution, IS: 2274-1963.

8.Electrical Installation, estimating and costing, Gupta J. B., Katson, Ludhiana.

DIGITAL IMAGE PROCESSING
(PROFESSONAL ELECTIVE –3)

IV B.Tech -I Semester **L T P C**

Course Code: A3EC46 **3 - - 3**

COURSE OVERVIEW:
This course gives comprehensive study of basic Image fundamentals, types of Image Transforms, properties of image transforms, Image Enhancement using spatial domain and Frequency domain. This course explains how the spatial domain enhancement using Histogram processing, Gray Level transformation median filtering and in the frequency domain smoothing and sharpening of the filter. This course brief about the Image Restoration, Image degradation model, Image segmentation thresholding, Region oriented Segmentation. Finally it gives the knowledge about the Image Compression and wavelet based Image processing.

PREREQUISITE(S): Basic knowledge on mathematics & digital electronics

COURSE OBJECTIVES:

1. Provide the Fundamentals of digital Image Processing.
2. Introduce the some advanced topics in digital image processing.
3. Give the students a useful skill base that would allow them to carry out further study should they be interested and to work in the field.
4. This helps the students to transform the signals from one domain into another and analyzed its features in batter manner

COURSE OUTCOMES:

After going through this course the student will be able to
1. Understand Fundamentals of digital Image Processing
2. Gets broad exposure on various applications of image processing in industry, medicine, and defense
3. Learn the techniques in image enhancement and image restoration.
4. Acquire knowledge on the image processing techniques.
5. Conduct independent study and analysis of image processing problems and techniques.

SYLLABUS

UNIT-I DIGITALIMAGEFUNDAMENTALS:
Fundamental Steps in Digital Image Processing, Components of an Image Processing System, Simple Image Formation Model, Image Sampling and Quantization, Relationships between Pixels.

UNIT-II IMAGE TRANSFORMS:
2-DFourierTransform,Properties,FFT,WalshTransform,Hadamard Transform, Discrete CosineTransform, Haar transform, Slant transform, Hotelling transform.

UNIT-III IMAGE ENHANCEMENT IN THE SPATIAL DOMAIN:
Introduction, Gray Level Transformations, Histogram Processing, Arithmetic and Logic Operations, Basics of Spatial Filtering, Smoothing Spatial Filters, Sharpening Spatial Filters.

IMAGE ENHANCEMENT IN FREQUENCY DOMAIN:
Smoothing Frequency-Domain Filters, Sharpening Frequency-Domain Filters, Homomorphic Filtering.

UNIT-IV IMAGE RESTORATION:
Image Degradation/Restoration process, Noise Models, Restoration in the Presence of Noise Only-Spatial Filtering, Periodic Noise Reduction by Frequency Domain Filtering, Inverse Filtering, Minimum Mean SquareError (Wiener) Filtering, Constrained Least SquaresFilters

UNIT-V IMAGECOMPRESSION:
Fundamentals, Image Compression Models, Elements of information Theory, Error Free compression, Lossy Compression.

IMAGE SEGMENTATION:

Detection of Discontinuities, Edge Linking and Boundary Detection, Thresholding, Region-Based Segmentation.

TEXTBOOKS:

1. R.C.Gonzalez,R.E.Woods(2002),*DigitalImageprocessing*,3rd edition,AddisonWesley/Pearson education, NewDelhi, India.

REFERENCE BOOKS:

1. A.K. Jain(1997),*Fundamentals of Digital Image processing*, Prentice Hall of India, NewDelhi.

2. Rafael C.Gonzalez (2004),*Digital Image processing using MATLAB*, Richard E.Woods and Steven Low price Edition ,Pearson Education Asia ,India.

3. William K. Pratt, (2004),*DigitalImage Processing*,3rd edition,JohnWiley & Sons, New Delhi, India.

4. Arthur R. Weeks, Jr. (1996), *Fundamentals of Electronic Image Processing*,PIE Optical Engineering Press, New Delhi, India

FUNDAMENTAL OF VLSI DESIGN

(PROFESSIONAL ELECTIVE-3)

	L	T	P	C
IV B. Tech- I Semester				
Course Code:A3EC32	**3**	**-**	**-**	**3**

COURSE OVERVIEW:

This is an introductory course which covers basic theories and techniques of digital VLSI design in CMOS technology. In this course, we will study the fundamental concepts and structures of designing digital VLSI systems include CMOS devices and circuits, standard CMOS fabrication processes, CMOS design rules, static and dynamic logic structures interconnect analysis, CMOS chip layout, simulation and testing, low power techniques, design tools and methodologies, VLSI architecture.

PREREQUISITE(S): Electronic Devices and circuits, Switching Theory and Logic Design

COURSE OBJECTIVES:

1. To understand the Basic NMOS, CMOS & Bi CMOS circuits and their process technology.
2. To understand the Designing of stick diagrams and layouts for OS transistors.
3. To learn the concepts of modeling of Delay techniques and MOS layers.
4. To learn the concepts of Technology Scaling of MOS transistors.
5. To understand the concepts of testing of combinational and sequential circuits and also the scan of design techniques.

COURSE OUTCOMES:

After going through this course the student will be able to

1. Learn IC Fabrication process steps required for MOS and Ids- Vds relationship.
2. Understand VLSI Design flow for fabrication of a chip, layout design rules, Stick diagrams and scaling of MOS transistor.
3. Learn the time delays, driving large capacitive loads. wiring capacitance, Choice of layers
4. Able to learn different data path subsystems design of combinational circuits.
5. Understand CMOS testing, Design Strategies for Testing.

SYLLABUS

UNIT-I Review of microelectronics and Introduction to MOS technology:

Introduction MOS and related VLSI technology – NMOS-CMOS-BICMOS-Gas Technologies – thermal aspects of processing – production of E beam masks.

UNIT-II MOS and BICMOS circuit design process:

MOS layers – stick diagrams – design rules and layout – 2m meter – 1.2 m meter CMOS rules – Layout diagrams – Symbolic diagrams.

UNIT-III Basic Circuit Concepts:

Sheet resistance – Area capacitance of layers – delay UNIT – wiring capacitances – choice of layers.

UNIT-IV Scaling of MOS circuits:

Scaling models – Scaling function for device parameters – Limitation of Scaling.

Subsystem design process:

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

UNIT-V Test and Testability:

Design for testability built in self test (BIST) – teaching combinational logic – testing sequential logic – practical design for test guide lines – scan design techniques – etc.

TEXT BOOKS:

1. Basic VLSI design by Douglas A, Pucknell, Kamran Eshraghian, Prantice Hall, 1996 3rd edition.

REFERENCE BOOK:

1. Mead, C.A and Conway, L.A., Introduction to VLSI Systems, Wesley – Wesley.

PROFESSIONAL ELECTIVES- IV

ELECTRICAL DISTRIBUTION SYSTEM

(PROFESSIONAL ELECTIVE-4)

IV B.Tech -II Semester **L T P C**

Course Code: A3EE44 **3 - - 3**

COURSE OVERVIEW

Gain the knowledge of the elements of a power distribution system and Enhance power quality of your non-utility power generation describe the close relationship between planning & operations increase power reliability of your system with the knowledge of the impact on it of the electrical power distribution system become familiar with power protection needs of the electrical distribution systems gain new knowledge about power substation, grounding, system & distribution automation & demand side management.

COURSE OBJECTIVES:

1. This course gives the complete knowledge of electrical distribution systems, the design of feeders, substations.

2. It also gives conceptual knowledge on how to determine the performance of a distribution system through its important parameters i.e. voltage drops and power losses and the very important thing that protection of the system by means of protective devices and their co-ordination during the several fault conditions.

3. It also specifies how to improve the voltage profiles and power factor of the system to better value using various voltage control and compensation techniques.

PREREQUISITES: Knowledge on Electrical power Systems

COURSE OUTCOMES:

1. After going through this course the student gets a thorough knowledge on, general aspects of electrical distribution systems, design and analysis of distribution feeders and substations, distribution systems.

2. Analysis through voltage-drop and power loss calculations, operation of protective devices used in distribution systems and their co-ordination, voltage control and power factor improvement through capacitor compensation and distribution system faults analysis.

3.They can able to apply the above conceptual things to real-world electrical and electronics problems and applications

SYLLABUS

UNIT – I

Introduction & General Concepts: Introduction to distribution systems: Load modeling and characteristics. Coincidence factor, contribution factor loss factor – Relationship between the load factor and loss factor. Classification of loads: Residential, commercial, Agricultural and Industrial loads and their characteristics.

UNIT – II

Distribution Feeders & Substations: Design Considerations of Distribution Feeders: Radial and loop types of primary feeders, voltage levels, feeder loading; basic design practice of the secondary distribution system. Substations: Rating of distribution substation, service area within primary feeders. Benefits derived through optimal location of substations.

UNIT — III

Distribution System Analysis: Voltage drop and power-loss calculations: Derivation for voltage drop and power loss in lines, manual methods of solution for radial networks, three phase balanced primary lines.

UNIT -IV

Protective Devices & Co Ordination: Objectives of distribution system protection, types of common faults and procedure for fault calculations. Protective Devices: Principle of operation of Fuses, Circuit Reclosures, and line sectionalizes, and circuit breakers. Coordination of Protective Devices: General coordination procedure.

UNIT – V

Voltage Control & RF Improvement: Equipment for voltage control, effect of series capacitors, line drop Compensation, effect of AVB/AVR. Power- factor control using different types of power capacitors, shunt and series capacitors, effect of shunt capacitors (Fixed and Switched), capacitor allocation – Economic justification — Procedure to determine the best capacitor location.

TEXT BOOK:

1. Electrical Power Distribution Systems,V.Kamaraju , TMH.

2. Electrical Distribution Systems, Dr. S. Siva naga raju, Dr. K.Shankar. Danapathi Ral Publications.

REFERENCE BOOK:

1. Electric Power Distribution System Engineering, Turan Gonen, CRC Press.

2. Electric Power Generation, Transmission and Distribution, SN. Singh,PHI Publishers.

ILLUMINATION ENGINEERING
(PROFESSIONAL ELECTIVE-4)

IV B.Tech -II Semester **L T P C**

Course Code: A3EE45 **3 - - 3**

COURSE OVERVIEW:

To learn and Design interior lighting systems and street lighting system as per Indian standard recommendations and practices.

PREREQUISITE(S): Basics on light properties, semiconductors types and properties

COURSE OBJECTIVES:

I. Classify types of illumination and lighting systems.
II. Calculate the luminance and illumination in case of linear, round and sources.
III. Demonstrate flood lighting and aesthetic lighting and their applications

COURSE OUTCOMES:

After going through this course the student will be able to

I. Classify types of illumination and lighting systems.
II. Calculate the luminance and illumination in case of linear, round and sources.
I. Demonstrate flood lighting and aesthetic lighting and their applications

SYLLABUS

UNIT -1 INTRODUCTION OF LIGHT

Illumination: Types of illumination, day lighting, supplementary artificial lighting and total lighting, quality of good lighting, factors affecting the lighting, shadow, glare, reflection, color rendering and stroboscopic effect, methods of artificial lighting, lighting system, direct, indirect, semi direct and semi indirect, lighting scheme, general and localized, types of lamps, Standard Incandescent bulbs, Halogen Incandescent bulbs, Fluorescent tube, high pressure sodium, low pressure sodium, HP mercury vapor, metal halide, LED, applications, advantages, disadvantages and comparisons

UNIT -2 MEASUREMENT OF LIGHT

Light Measurement: Definition of luminous flux, luminous intensity, lumen, candle power, illumination, mean hemispherical candle power (MHCP), mean spherical candle power (MSCP), MHSCP, lamp efficiency, brightness or luminance, laws of illumination inverse square law and lamberts cosine law, illumination at horizontal and vertical plane from point source, concept of polar curve, calculation of luminance and illumination in case of linear source, round source and flat source

UNIT -3 DESIGN OF INTERIOR LIGHTING

Interior lighting: Definitions of maintenance factor, uniformity ratio, direct ratio, coefficients of utilization and factors effecting it, illumination required for various work planes(as per ISI standards), space to mounting height ratio, types of fixtures and related terms used in interior illumination such as down word light output ratio (DLOR) and down word light output ratio (ULOR).

Lighting design: Selection of lamp and luminance, selection of various factors such as utilization factor, maintenance factor, reflection factor, determination of lamp lumen output taking into account voltage and temperature variation, calculation of wattage of each lamp and number of lamps needed, layout of lamp luminaire, Indian standard recommendation and standard practices for illumination levels in various areas, special features for entrance, stair case, corridor lighting and industrial building.

UNIT -4 DESIGN OF STREET LIGHTING

Street lighting design: Types of street and their level of illumination required, terms related to street and street lighting, types of fixtures used and their suitable application, various arrangements in street lighting, requirements of good street lighting, selection of lamp and luminaries, calculation of their wattage, number and arrangement, calculation of space to mounting height ratio, calculation of illumination available on road

UNIT -5 FLOOD LIGHTING AND AESTHETIC LIGHTING

Flood lighting: Terms related to flood lighting, types of fixtures and their suitable applications, selection of lamps and projector, calculation of their wattage and number, their arrangement, calculation of space to mounting height ratio, recommended method for aiming of lamp; Aesthetic lighting**:** Monument and statue lighting, sports, hospital and auditorium lighting

TEXT BOOKS:

1.DC Pritchard, "lighting", Pearson Education, 6th Edition 1999.

2.M A Cayless, Marsden, "Lamps and lighting", John Wiley and Sons, 1st Edition, 1997

REFERENCE BOOKS:

1.Jack L Lindsay Fies, "Applied illumination engineering", Fairmont Press, 3rd Edition, 2015.

2.Ronald N. Helms, "Illumination Engineering", Prentice Hall, 1st Edition, 1980

WEB REFERENCES:

https://www.lrc.rpi.edu.
https://www.aar.faculty.asu.edu/classes.
https://www.optics.arizona.edu.
https://www.electrical4u.com.
https://www.iare.ac.in

NEURAL NETWORKS AND FUZZY LOGICS
(PROFESSIONAL ELECTIVE-4)

IV B.Tech -II Semester	**L**	**T**	**P**	**C**
Course Code: A3EC59	**3**	**-**	**-**	**3**

COURSE OVERVIEW:

The principal objective of this subject is to introduce students to neural networks and fuzzy theory from an engineering perspective. This is a hands-on subject where students are given integrated exposure to professional practice. In the identification and control of dynamic systems, neural networks and fuzzy systems can be implemented as model-free estimators and/or controllers. As trainable dynamic systems, these intelligent control systems can learn from experience with numerical and linguistic sample data.

PREREQUISITE(S): Basics about Biological systems and training algorithms

COURSE OBJECTIVES:

Upon successful completion of this subject students should be able to:

Develop the skills to gain a basic understanding of neural network theory and fuzzy logic theory
Explore the functional components of neural network classifiers or controllers, and the functional components of fuzzy logic classifiers or controllers.
Develop and implement a basic trainable neural network or a fuzzy logic system for a typical control, computing application or biomedical application.

COURSE OUTCOMES:

1: Describe models of the brain and neuron function with mathematical methods.
2: Design and develop artificial neural networks in software.
3: Describe more complex neural networks and the training methods for the same
4: Compare and analyze various associative memory architectures.

SYLLABUS

UNIT-I INTRODUCTION TO NEURAL NETWORKS:
Introduction, Humans and Computers, Organization of the Brain, Biological Neuron, Biological and Artificial Neuron Models, Characteristics of ANN, McCulloch-Pitts Model, Historical Developments, Applications of ANN.

ESSENTIALS OF ARTIFICIAL NEURAL NETWORKS:
Artificial Neuron Model, Operations of Artificial Neuron, Types of Neuron Activation Function, ANN Architectures, Learning Strategy (Supervised, Unsupervised, Reinforcement), Learning Rules, Types of Application

UNIT–II FEED FORWARD NEURAL NETWORKS:
Introduction, Perceptron Models: Discrete, Continuous and Multi-Category, Training Algorithms: Discreteand Continuous Perceptron Networks, Perceptron Convergence theorem, Credit Assignment Problem, Generalized Delta Rule, Derivation of Back propagation (BP) Training, Summary of Back propagation Algorithm

UNIT III ASSOCIATIVE MEMORIES:
Paradigms of Associative Memory, Pattern Mathematics, Hebbian Learning, General Concepts of Associative Memory (Associative Matrix, Association Rules, Hamming Distance, Bidirectional Associative Memory (BAM) Architecture. Architecture of Hopfield Network: Discrete and Continuous versions,

UNIT – IV CLASSICAL & FUZZY SETS:
Introduction to classical sets – properties, Operations and relations; Fuzzy sets, Membership, Uncertainty, Operations, properties, fuzzy relations, cardinalities, membership functions.

UNIT V FUZZY LOGIC SYSTEM COMPONENTS:
Fuzzification, Membership value assignment, development of rule base and decision making system, Defuzzification to crisp sets, Defuzzification methods.

TEXT BOOK:

1. Neural Networks, Fuzzy logic, Genetic algorithms: synthesis and applications by Rajasekharan and Rai – PHI Publication.

2. Introduction to Neural Networks using MATLAB 6.0 – S.N.Sivanandam, S.Sumathi, S.N.Deepa, TMH,

REFERENCE BOOKS:

1. Neural Networks – James A Freeman and Davis Skapura, Pearson Education, 2002.

2. Neural Networks – Simon Hakins , Pearson Education
3. Neural Engineering by C.Eliasmith and CH.Anderson, PHI
4. Neural Networks and Fuzzy Logic System by Bart Kosko, PHI Publications.

HIGH VOLTAGE DC TRANSMISSION & FACTS
(PROFESSIONAL ELECTIVE – 4)

IV B.Tech -II Semester **L T P C**

Course Code: A3EE46 **3 - - 3**

COURSE OVERVIEW:

Distinguishes the Gaseous, liquid and solid dielectric behavior under High Voltage. To understand the generation methods of High A.C, DC & Impulse Voltages required for various application. To apply the measuring techniques of High A.C., D.C & Impulse voltages and currents. To identify the testing techniques for High Voltage Equipment

PREREQUISITE(S): Power systems

COURSE OBJECTIVES:

I. Understand the various types of over voltages in power system and protection methods.
II. Demonstrate generation of higher voltages and currents in laboratories for testing purposes.
III. Measure over voltages using various advanced techniques.
IV. Analyze nature of breakdown mechanism in solid, liquid and gaseous dielectrics.
V. Design and test the power apparatus and insulation coordination

COURSE OUTCOMES:

Upon the completion of the subject, the student will be able to

1. Know conduction and breakdown will occur in gases, liquids and solids dielectrics and different applications of the insulating materials in electrical power apparatus.
2. Explain the insulation testing of various components in power systems for different types of voltages, namely power frequency A.C, high frequency, switching or lightning impulses, for which generation of high voltages in laboratories is essential
3. Interpret the necessity to measure the voltages and currents accurately, ensuring perfect safety to the personnel and equipment.
4.Detect the necessary condition for all the electrical equipment which are capable of withstanding the over voltages which met in service like natural causes lightning or system originated ones switching or power frequency transient voltages

SYLLABUS

UNIT – I HVDC CONCEPTS:
Economics & Terminal equipment of HVDC transmission systems: Types of HVDC Links, Apparatus required for HVDC Systems. Comparison of AC &DC Transmission, Application of DC Transmission System, Planning & Modern trends in D.C. Transmission.

HVDC CONVERTERS & SYSTEM CONTROL:
Choice of Converter configuration, analysis of Graetz, characteristics of 6 Pulse converters , Cases of two 3 phase converters in star –star mode and their performance. Principal of DC Link Control, Converters Control Characteristics, Firing angle control. Current and extinction angle control, Effect of source inductance on the system, Power Control.

UNIT – II POWER FLOW ANALYSIS & REACTIVE POWER CONTROL IN HVDC:
Modeling of DC Links-DC Network-DC Converter, Controller Equations-Solution of DC load flow. P.U. System for DC quantities-solution of AC-DC Power flow-Simultaneous method, Sequential method. Reactive Power Requirements in steady state, Conventional control strategies. Alternate control strategies, sources of reactive power, shunt capacitors Synchronous Condenser

CONVERTER FAULT & PROTECTION:
Converter faults, protection against over current and over voltage in converter station. Surge arresters, smoothing reactors, DC breakers, Audible noise, space charge field, corona effects on DC lines-Radio interference.

UNIT – III HARMONICS:
Generation of Harmonics, Characteristics harmonics, calculation of AC Harmonics, Non-Characteristics harmonics, adverse effects of harmonics. Calculation of voltage & Current harmonics, Effect of Pulse number on harmonics.

FILTERS: Types of AC filters, Design of Single tuned filters. Design of High pass filters

UNIT – IV FACTS CONCEPTS:
Transmission interconnections, power flow in an AC System, loading capability limits, Power flow and Dynamic stability considerations, importance of controllable parameters Opportunities for FACTS, basic types of FACTS controllers, benefits from FACTS controllers.

UNIT - V STATIC SHUNT COMPENSATORS:
Objectives of shunt compensation, midpoint voltage regulation for line segmentation, End of line voltage support to prevent voltage instability, improvement of transient stability, Power oscillation damping. Methods of controllable var generation: variable impedance type static var generators TCR and TSR, TSC, FC-TCR, TSC-TCR

STATIC SERIES COMPENSATORS:
Concept of series capacitive compensation, improvement of transient stability, power oscillation damping, functional requirements, GTO thyristor controlled series capacitor (GSC), thyristor switched series capacitor (TSSC), and thyristor controlled series capacitor (TCSC).

TEXT BOOKS:

1.K. R. Padiyar (2005), HVDC Power Transmission Systems: Technology and system Interactions, 1st edition, New Age International (P) Ltd, New Delhi.

2.N. G. Hingorani, L. Guygi (2001), Understanding FACTS, 1st edition, IEEE Press, USA.

REFERENCE BOOKS:

1.E. W. Kimbark (2006), Direct Current Transmission, 2nd edition, John Wiley & Sons, New Delhi.

2. K. R. Padiyar (2009), FACTS Controllers in power Transmission and Distribution, 1st edition, New Age International (P), Ltd, New Delhi.