ACADEMIC REGULATIONS
COURSE STRUCTURE
AND
DETAILED SYLLABUS

ELECTRICAL & ELECTRONICS ENGINEERING

for

B.TECH. FOUR YEAR DEGREE COURSE

(Applicable for the batches admitted from 2015-2016)

COLLEGE CODE: C4

JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES

(UGC-AUTONOMOUS)

Affiliated to Jawaharlal Nehru Technological University Hyderabad

Narasampet, Warangal – 506 332

Telangana State, India

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NARSAMPET, WARANGAL – 506 332. T.S.
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Academic Regulations-2015 of B.Tech (Regular) Programme under Choice Based Credit System (CBCS)

(Effective for the students admitted into I-Year from the Academic year 2015-2016)

1. Award of B.Tech. Degree

A student will be declared eligible for the award of the B.Tech. Degree if he fulfills the following academic regulations:

i. Pursued a course of study for not less than four academic years and not more than eight academic years.

ii. Register for 192 credits and secure 186 credits with an exemption of 6 credits in elective subjects only.

Students, who fail to fulfill all the academic requirements for the award of the degree within eight academic years from the year of their admission, shall forfeit their seat in B.Tech course unless extension is granted by College Academic Council (CAC) to complete the course for a further period.

2. Courses of Study

The following courses of study are offered at B.Tech level:

Branch Code	Branch
01	Civil Engineering
02	Electrical and Electronics Engineering
03	Mechanical Engineering
04	Electronics and Communication Engineering
05	Computer Science and Engineering

3. Credits:

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 table.

	For I-Year-I/II Semester		II,III,IV Years per Semester	
	Periods/Week	Credits	Periods/Week	Credits
Lecture	04	04	04	04
	03	03	03	03
	02	02	02	02
Tutorial	02	01	02	01
Practical	03	02	03	02
Drawing	02T & 04D	04	03	02
Mini Project	-	-	-	03
Comprehensive Viva Voce	-	-	-	03
Seminar	-	-	02	03
Major Project	-	-	15	12

4. Subject/Course Classification:

All the Subjects/Courses offered for the B.Tech are broadly classified as (a) Foundation Courses (FC), (b) Core Courses (CC) and (c) Elective Courses (EC).

i. Foundation Courses (FC) are further categorized as
   a. BSH (Basic Sciences, Humanities and Social Sciences),
   b. ES (Engineering Sciences).

ii. Core Courses (CC) and Elective Courses (EC) are categorized as PS (Professional Subjects), which are further subdivided as
   a. PC (Professional/Departmental Core) subjects,
   b. PE (Professional/Departmental Elective)
   c. OE (Open Electives)
   d. PW (Project Work)

iii. Minor Courses (1 or 2 Credit Courses, belonging to BSH/ES/PC as per relevance); and

iv. Mandatory Courses (MC-non-credit oriented).

4.1 Course Nomenclature: The Curriculum Nomenclature or Course-Structure Grouping for B.Tech programme is given below:

S. No.	Broad Course Classification	Course Group/ Category	Course Description	Range of Credits
1.	Foundation Courses (FC)	BSH-Basic Sciences, Humanities and Social Sciences	Includes Mathematics, Physics and Chemistry subjects and subjects related to Humanities, Social Sciences and Management	20%-30%
2.		ES-Engineering Sciences	Includes Fundamental Engineering Subjects	15%-20%
3.	Core Courses (CC)	PC-Professional Core	Includes Core subjects related to Parent Discipline/ Department/ Branch of Engineering	35%-40%
4.	Elective Courses (EC)	PE-Professional Electives	Includes Elective subjects related to Parent Discipline/ Department/ Branch of Engineering	10%-15%
5.		OE- Open Electives	Elective subjects which include inter disciplinary subjects or subjects in an area outside the Parent Discipline/ Department/ Branch of Engineering	5%-20%
6.	Core Courses	PW- Project Work	B.Tech Major Project Work	10%-15%
7.		Mini Project	Industrial Oriented Training/ Internship/ Mini Project	
8.		Seminar	Seminar based on Core contents related to Parent Discipline/ Department/ Branch of Engineering	
9.	Minor Courses		One or two credit courses (subset of BSH)	Included
10.	Mandatory Courses (MC)		Mandatory Courses (Non-Credit)	---
Total credits for B.Tech. Programme				**192 (100%)**

5. Course Registration :

5.1 Each student, on admission shall be assigned to a Faculty Advisor/Counselor who shall advise her/him about the academic programmes and counsel on the choice of courses in consideration with the academic background and student's career objectives.

5.2 Faculty advisor shall be only from the engineering departments. With the advice and consent of the Faculty Advisor the student shall register for a set of courses he/she plans to take up for each Semester.

5.3 The student should meet the criteria for prerequisites to become eligible to register for that course.

5.4 A student shall be permitted to register the prescribed credits per semester with a variation of ± 4 credits excluding Laboratories/Seminar/Project. However, registration for Repeat courses of previous semesters (Odd to Odd and Even to Even semesters) is allowed in excess of this limit.

5.5 If a student finds that he/she has registered for more courses than possible to study in a semester, he/she can drop one or more courses before the end of 3rd week of the semester.

5.6 A student is allowed to register for more than 192 credits in completion of B.Tech programme. However, additional credits scored shall not be considered for award of division and also not considered for calculation of Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA). For such extra subject(s) registered a letter grade alone will be indicated in the Grade card as a performance measure.

6. Subjects / Courses to be offered:

6.1 Students shall have to register for the courses during the preparation and practical examinations of the previous semester. However for the first year, the students have to register for courses one week after the commencement of class work.

6.2 The maximum number of students to be registered in each course shall depend upon the physical facilities available.

6.3 The information on list of all the courses offered in every department specifying the credits, the prerequisites, a brief description of syllabus or list of topics and the time slot shall be made available to the student in time.

6.4 In any department, preference for registration shall be given to those students of that department for whom the course is a core course.

6.5 The registration for the inter departmental and/or open elective courses shall be on first come first served basis, provided the student fulfills prerequisites for that course, if any. The number of students to be registered shall be based on the class room and laboratory capacity. Every effort shall be made by the Department/Centre to accommodate as many students as possible.

6.6 More than one teacher may offer the same course in any semester.

6.7 No course shall be offered unless there is a minimum of 20 students or one third of the class strength specified.

7. Programme Pattern:

i. The entire course of study is of four academic years. All years shall be on semester pattern i.e two semesters per year. For each semester there shall be a minimum of 90 instruction days.

ii. A student is eligible to appear for the end examination in a subject, but absent at

it or has failed in the end examination may appear for that subject at the supplementary examination.

iii. There shall be no branch transfers after the completion of admission process.

8. Distribution and Weightage of Marks:

8.1 The Performance of a student in each semester shall be evaluated subject-wise with a maximum of 100 marks for theory and 100 marks for practical subjects. In addition, Industry oriented mini- project, Seminar, Comprehensive Viva-Voce and Major Project Work shall be evaluated for 100, 100, 100 and 200 marks respectively.

8.2 For theory subjects the distribution shall be 30 marks for Internal Evaluation and 70 marks for the End-Examination.

8.3 For theory subjects, during the semester there shall be 2 mid-term examinations (internal exams) and two assignments carrying 5 marks each.

8.4 Each mid-term examination of 90 minutes consists of Part-A (objective type) for 10 marks and Part-B (subjective paper) for 15 marks. Mid-term examination paper shall contain 5 questions out of which the student has to answer 3 questions of each 5 marks. First mid-term examination shall be conducted for first 2.5 units (50%) of syllabus and second mid-term examination shall be conducted for remaining 2.5 units (50%) of syllabus. Objective type may be with multiple choice questions, true/false, match type questions, fill in the blanks etc.

8.5 First Assignment should be submitted before the conduct of the first mid-term examination and the second Assignment should be submitted before the conduct of the second mid-term examination. The assignments shall be as specified by the concerned subject teacher.

8.6 The first mid-term examination marks and first assignment marks make first set of internal evaluation and second mid-term examination marks and second assignment marks make second set of internal evaluation marks, and the better of these two sets of marks shall be taken as the final mid-term marks secured by the student towards internal evaluation in that theory subject.

8.7 If a student is absent for any test/assignment, he is awarded zero marks for that test/assignment. However a candidate may be permitted on genuine grounds provided he has taken permission before the mid-term examinations from the Head of the Department. Moreover he has to apply for makeup examinations within a week after completion of mid-term examinations. A subcommittee will be constituted by the College Academic Council to look into such cases. The subcommittee constituted by the College Academic Council may conduct improvement for the internal examinations for theory subjects for the interested candidates.

8.8 The details of the Question Paper pattern for theory examination is as follows:

(i) The end semesters exam will be conducted for 70 Marks which consist of two parts viz. Part-A for 20 Marks and Part-B for 50 Marks.

(ii) Part-A is compulsory question which consist of 5 Sub-questions, one from each unit, carrying 4 Marks each.

(iii) Part-B consist of 5 questions (numbered from 2 to 6) carrying 10 marks each. Each of these questions, there will be an either or choice(i.e There will be two questions from each unit and student will answer any one question).

8.9 For practical subjects there shall be a continuous internal evaluation during the semester for 30 sessional marks and 70 end examination marks. Out of the 30 sessional marks, day-to-day work in the laboratory shall be evaluated for 20 marks and internal examination for practical shall be evaluated for 10 marks conducted by the concerned laboratory teacher. The end examination shall be conducted with one external examiner and one internal examiner. The external examiner shall be appointed from the panel of examiners as recommended by the Board of Studies in respective Branches.

8.10 For the subject having design and/or drawing, (such as Engineering Graphics Engineering Drawing, Machine Drawing) and estimation, the distribution shall be 30 marks for internal evaluation (20 marks for day-to-day work and 10 marks for internal test) and 70 marks for end examination.

8.11 There shall be a mini project preferably suggested by the industry of their specialization, to be taken up during the vacation after III year II semester examination. However, the mini project and its report shall be evaluated in IV Year I-Semester. The mini project shall be submitted in a report form and should be presented before the committee, which shall be evaluated for 100 marks. The committee consists of an External Examiner, Head of the Department, Supervisor of mini project and a senior faculty member of the department. There shall be no internal marks for mini project.

8.12 There shall be a seminar presentation in IV year II semester. For the seminar, the student shall collect the information on a specialized topic and prepare a technical report, showing his understanding over the topic, and submit to the department, which shall be evaluated by the departmental committee consisting of Head of the Department, seminar supervisor and a senior faculty member. The seminar report and presentation shall be evaluated for 100 marks. There shall be no external examination for seminar.

8.13 There shall be comprehensive Viva-Voce in IV Year II-Semester. The Comprehensive Viva-Voce will be conducted by a Committee consisting of (i) Head of the Department (ii) two Senior Faculty Members of the Department. The Comprehensive Viva-Voce is aimed to assess the student's understanding in various subjects he/she studied during the B.Tech Programme. The Comprehensive Viva-Voce is evaluated for 100 marks by the Committee. There are no internal marks for the Comprehensive Viva-Voce.

8.14 Out of a total of 200 marks for the major project work, 60 marks shall be for internal evaluation and 140 marks for the end semester examination. The end semester examination (Viva-Voce) shall be conducted by a committee. The committee consists of an External Examiner, Head of the Department and the Project Supervisor. The internal evaluation shall be on the basis of two seminars given by each student on the topic of his major project.

8.15 The topics for industry oriented mini project, seminar and major project work shall be different from each other.

9. Attendance Requirements:

9.1 A student shall be eligible to appear for the end examinations if he acquires a minimum of 75% of aggregate attendance in all the subjects.

9.2 Condonation of shortage of attendance in each subject up to 10% on genuine grounds in each semester may be granted by the College Academic Council on recommendation by the Principal.

9.3 Shortage of attendance below 65% shall in no case be condoned.

9.4 Student falling short of attendance as specified above will be detained.

9.5 A student will not be promoted to the next semester unless he satisfies the attendance requirement of the present semester. They may seek-re-admission for that semester when offered next. They may seek re-registration for all those subjects registered in that semester in which he got detained, by seeking re-admission for that semester as and when offered; in case there are any professional electives and/or open electives, the same may also be re-registered if offered. However, if those electives are not offered in later semesters, then alternate electives may be chosen from the same set of elective subjects offered under that category. A stipulated fee decided by the College Academic Council shall be payable towards condonation of shortage of attendance.

10. Minimum Academic Requirements:

The following academic requirements have to be fulfilled in addition to the attendance requirements mentioned in item no.09.

10.1 A student shall be deemed to have fulfilled the minimum academic requirements and earned the credits allotted to each theory or practical or design or drawing subject or project if he secures not less than 35% of marks in the end examination and a minimum of 40% of marks in the sum total of the internal evaluation and end examination taken together.

10.2 A student shall be promoted from I Year to II Year unless he fulfills the minimum academic requirements of 24 credits out of 48 credits of I Year from all examinations and secures prescribed minimum attendance in I Year.

10.3 A student shall be promoted from II year to III year only if he fulfills the academic requirement of 36 credits out of 72 credits from one regular and one supplementary examinations of I Year and one regular and one supplementary examination of II year I semester irrespective of whether or not the candidate takes the examination and secures prescribed minimum attendance in II Year II Semester.

10.4 A student shall be promoted from III year to IV year only if he fulfills the academic requirements of 60 credits out of 120 credits secured from all the examinations both regular and supplementary conducted up to end of III Year I semester irrespective of whether or not the candidate takes the examination and secures prescribed minimum attendance in III Year II Semester

a) Two regular and two supplementary examinations of I Year
b) Two regular and two supplementary examinations of II Year I semester
c) Two regular and one supplementary examinations of II Year II Semester.
d) One regular and one supplementary examination of III Year I semester.

10.5 A student should earn all credits with an exemption of 6 credits in elective subjects. The marks obtained in the subjects excluding the subjects exempted shall be considered for the final calculation of CGPA and SGPA.

10.6 Student who fails to earn credits with an exemption of 6 credits as indicated in the Programme structure within 8 academic years from the year of admission Shall forfeit his seat in B.Tech. Programme unless an extension is given by College Academic Council to complete the Programme for a further period of 2Years.

10.7 A student shall register for all subjects covering 192 credits as specified and

listed (with the relevant course/subjects classifications as mentioned) in the course structure, put up all the attendance and academic requirements and securing a minimum of P Grade (Pass Grade) or above in each subject, and earn 186 credits securing Semester Grade Point Average (SGPA)≥4.5 in each semester, and Cumulative Grade Point Average (CGPA) ≥ 4.5 at the end of each successive semester, to successfully complete the B.Tech Programme.

10.8 When a student is detained due to shortage of attendance in any semester, he may be re-admitted into that semester, as and when offered, with the Academic Regulations of the batch into which he gets readmitted. However, no grade allotments of SGPA/CGPA calculations will be done for that entire semester in which he got detained.

10.9 When a student is detained due to lack of credits in any year, he may be readmitted in the next year, after fulfillment of the academic requirements, with the academic regulations of the batch into which he gets readmitted.

10.10 A student is eligible to appear in the end semester examination in any subject/course, but absent at it or failed (thereby failing to secure P Grade or above), may reappear for that subject/course at the supplementary examinations as and when conducted. In such cases, his internal marks assessed earlier for that subject/course will be carried over, and added to the marks to be obtained in the supplementary examination, for evaluating his performance in that subject.

11. Grading Procedure

11.1 Marks will be awarded to indicate the performance of each student in each Theory Subject, or Lab/Practicals or Seminar or Project or Mini-Project, Minor Course etc., based on the % of marks obtained in End examination, both taken together as specified in item no. 07 above and a corresponding Letter Grade shall be given.

11.2 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.

Grades and Grade Points

% of Marks obtained in a course	Letter Grade	Grade Point
>=80 to 100	OS (Outstanding)	10
>= 70 to <80	A+ (Excellent)	9
>= 60 to <70	A (Very Good)	8
>= 55 to <60	B+ (Good)	7
>= 50 to <55	B (Above Average)	6
>= 45 to <50	C (Average)	5
>= 40 to <45	P (Pass)	4
Less than 40	F (Fail)	0
0	Ab (Absent)	0

11.3 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, as and when offered. In such cases, his Internal Marks in those Subject(s) will remain same as those he obtained earlier.

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

11.5 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 the Semester, when he is detained (as listed in Item No. 10.8-10.9).

11.6 A student earns Grade Point (G.P.) 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'(C.P.) are computed by multiplying the Grade Point with Credit Points (C.P.) for that particular Subject/Course.

Credit points (C.P.) = Grade Points (G.P.) X Credits …….. For a Course

11.7 The student passes the Subject/Course only when he gets G.P.≥4 (P Grade above).

11.8 The Semester Grade Point Average (SGPA) is calculated by dividing the Sum of Credit Points (∑C.P.) 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

$$\left\{\sum_{i=1}^{N} C_i G_i\right\} / \left\{\sum_{i=1}^{N} C_i\right\}$$ …. For each semester

Where "*i*" is the subject indicator index (taken into account all subjects in a semester), '*N*' is the number of subjects 'REGISTERED' for the Semester (as specifically required and listed under the Course Structure of the parent Department), and C_i is the number of Credits allotted to the i^{th} subject and G_i is represents the Grade Points (G.P.) corresponding to the Letter Grade awarded for that i^{th} Subject.

11.9 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 (with an exemption of 6 credits in electives subjects) in all 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.

$$\left\{\sum_{j=1}^{M} C_j G_j\right\} / \left\{\sum_{j=1}^{M} C_j\right\}$$

….for all 'S' semesters registered (i.e., upto and inclusive of 'S' semester, S≥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 upto and inclusive of the semester S (obviously *M*>*N*), '*j*' is the subject indicator index takes into account all subjects from 1 Subject and $\boldsymbol{G_i}$ represents the Grade Points (GP) corresponding to the Letter Grade awarded for that j^{th} 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.

11.10 For Merit Ranking or Comparison purpose or any other listing only the rounded off values CGPAs will be used.

11.11 For calculation listed in item no.11.6-11.10**,** 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.

12. Passing Standards:

12.1 A student shall be declared successful or 'passed' in a Semester only when he gets a SGPA≥4.5 (at the end of that particular Semester); and a student shall be declared successful or 'passed' in the B.Tech Programme, only when he gets a CGPA≥4.5; subject to the condition that he secures a GP≥4 (P Grade or above) in every registered Subject/Course in each Semester (during the B.Tech Programme) for the Degree Award, as required.

12.2. In spite of securing P Grade or above in some (or all) Subjects/Courses in any Semester, if a Student receives a SGPA<4.5 and /or CGPA<4.5 at the end of such a Semester, then he may be allowed on the following specific recommendations of the Head of the Department and subsequent approval from the Principal.

i.) To go into the next subsequent Semester (Subject to fulfilling all other attendance and academic requirements as listed under items no.9-10);

ii.) To 'improve his SGPA of such a Semester (and hence CGPA to 4.5 or above', by reappearing for one or more as per student's choice or the same subject (s)/courses(s) in which he has secured P Grade (s) in that semester,at the supplementary examinations to be held in the next subsequent semester(s).

In such cases, his internal marks in those subject(s) will remain same as those he obtained earlier. The newly secured letter grades will be recorded and taken into account for calculation of SGPA and CGPA, only if there is an improvement.

12.3. A Student shall be declared successful or 'passed' in any Mandatory (non-credit)Subject/Course, if he secures a 'Satisfactory Participation Certificate' for that course.

12.4 After the Completion of each semester, a Grade Card or Grade Sheet (or Transcript) shall be issued to all the Registered Students of that Semester, indicating the Letter Grades and Credits earned. It will show the details of the Courses Registered (Course Code, Title, Number of Credits, Grade earned etc.), credits earned, SGPA and CGPA.

13. Declaration of Results:

13.1 Computation of SGPA and CGPA are done using the procedure listed in item no.11.6 – 11.10.

13.2 For Final % of Marks equivalent to the computed final CGPA, the following formula may be used:

% of Marks = (Final CGPA – 0.5) X 10

14. Award of Degree under CBCS:

14.1 A student will be declared eligible for the award of the B.Tech. Degree if he fulfills the following academic regulations:

i. Pursued a course of study for not less than four academic years and not more

than eight academic years.

ii. Register for 192 credits and secure 186 credits with an exemption of 6 credits in elective subjects only.

iii. Secures Cumulative Grade Point Average (CGPA) ≥4.5.

iv. Students, who fail to fulfill all the academic requirements for the award of the degree within eight academic years from the year of their admission, shall forfeit their seat in B.Tech course unless extension is granted for a further period by College Academic Council (CAC) to complete the course.

14.2 A student who qualifies for the Award of the Degree as per **item 13.2** shall be placed in the following classes.

Award of Division:

S.No	Division	CGPA
1	First Class with Distinction	≥7.5
2	First Class	≥6.5 but less than 7.5
3	Second Class	≥5.5 but less than 6.5
4	Pass Class	≥4.5 but less than 5.5

14.3 A student with final CGPA (at the end of the Course) < 4.5 will not be eligible for the Award of the Degree.

15. Withholding of Results:

If the student has not paid fees to University/College at any stage or has pending dues against his name due to any reason whatsoever, 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 with held in such cases.

16. 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 subject/course (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).

Details of Transitory regulations:

B.Tech (R15) CBCS program approved under Item No: 16 of Academic Regulations**.**

Admission with advance standing: These may arise in the following cases:

1) When a student seeks transfer from other college to Jayamukhi Institute of Technological Sciences (JITS) and desires to pursue study at JITS in an eligible branch of study.

2) When students of JITS get transferred from one regulation to another regulation or from previous syllabus to revised syllabus.

3) When as student after long discontinuity rejoins the college to complete his Programme of study for the award of a degree.

4) When a student is not able to pursue his/her existing Programme of study but wishes to get transferred to another Programme of study. These admissions may be permitted by

the Academic Council of JITS as per the norms stipulated by the statutory bodies and the Govt. of Telangana. In all such cases for admission, when needed, permissions from the statutory bodies are to be obtained and the Programme of study at JITS will be governed by the transitory regulations given below.

I. Transitory Regulations: For students admitted under advance standing, these transitory regulations will provide the modus operandi. At the time of such admission, based on the Programme pursued (case by case)

1. Equivalent courses completed by the student are established by the Chairman, BOS concerned.
2. Marks/Credits are transferred for all such equivalent courses and treated as successfully cleared in the Programme study prescribed by JITS.
3. A Programme chart of residual courses not cleared will be derived and a Programme of study with duration specified will be prescribed for pursuing at JITS.
4. Marks obtained in the previous system if the case be, are converted to grades and accordingly CGPA is calculated. All other modalities and regulations governing shall be the same as those applicable to the stream of students with whom such a candidate is merged.
5. The students those who are on rolls to be provided one chance to write the internal exams in the **subjects not studied**, as per the clearance letter (equivalence) issued by Chairman, BOS.
6. After the revision of the regulations, the students of the previous batches will be given two subsequent chances for passing in their failed subjects, one supplementary and the other regular. If the students cannot clear the subjects in the given two chances, they shall be given equivalent subjects as per the revised regulations which they have to pass in order to obtain the required number of credits.

II. Transitory Regulations for the students who have discontinued the programme:

1) 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 subject/course (or equivalent subjects/courses, as the case may be,

2) The student is permitted to register for 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).

Scope:

1. The academic regulations should be read as a whole, for the purpose of any interpretation.
2. In case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Principal is final.
3. JITS 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 date of notified.

17. General:

i. Where the words “he”, “him”, “his”, occur in the regulations, they include “she”, “her”, “hers”.
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, College Academic Council is final.

Note: The College may change or amend the academic regulations or syllabi at any time and the changes or amendments made shall be applicable to all the students with effect from the dates notified by the College Authorities.

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

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

1. The students have to acquire all credits (Total 144) from II to IV year of B.Tech. Program (Regular) for the award of the degree. Register all credits and secure all credits with the exemption of 6 credits in elective subjects.

2. Student, who fails to fulfill the requirements for the award of the degree in six consecutive academic years from the year of admission, shall forfeit his seat unless extension is granted by the College Academic Council to complete the Programme for a further period.

3. The same attendance regulations are to be adopted as that of B.Tech. (Regular).

4. **Promotion Rule:**

   i. A Student shall be promoted from II Year to III Year if he fulfills the minimum academic requirements of 24 credits of out of 48 credits of II Year from all examinations and secures prescribed minimum attendance in II Year.

   ii. A student shall be promoted from III year to IV year only if he fulfills the academic requirements of 36 credits out of 72 credits secured from the following examinations, whether the candidate takes the examination or not, and secure prescribed minimum attendance in III Year II Semester.

      a) Two regular and Two Supplementary examinations of II Year I Semester
      b) Two regular and one supplementary examinations of II Year II Semester.
      c) One regular and one supplementary examination of III Year I Semester.

5. All other regulations as applicable for B.Tech. IV year degree course (Regular) will hold good for B.Tech. (Lateral Entry Scheme)

Note: The College may change or amend the academic regulations or syllabi at any time and the changes or amendments made shall be applicable to all the students with effect from the dates notified by the College Authorities.

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MALPRACTICES RULES
DISCIPLINARY ACTION FOR / IMPROPER CONDUCT IN EXAMINATIONS

	Nature of Malpractices/Improper Conduct	**Punishment**
	If the candidate:	
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. The Hall Ticket of the candidate is to be cancelled.
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 practicals 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 University 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 University 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 Chief Superintendent/Assistant Superintendent / 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 officer-in charge 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 officer-incharge, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other	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.

	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.	
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 University 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.
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 referred to Examination Result Processing Committee (ERPC) further action to award suitable Punishment.	

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

ELECTRICAL & ELECTRONICS ENGINEERING

COURSE STRUCTURE
(Applicable from the batch admitted from 2015-16 onwards)

I YEAR **I SEMESTER**

S.No.	Code	Subject	L	T	P	Credits
1	AJ1001	Mathematics- I	4	0	0	4
2	AJ1013	English	3	0	0	3
3	AJ1008	Engineering Physics	4	0	0	4
4	AJ1010	Engineering Chemistry	3	0	0	3
5	AJ1303	Engineering Graphics	2	0	4	4
6	AJ1014	English Language Communication Skills Lab	0	0	3	2
7	AJ1011	Physical Sciences Lab	0	0	3	2
8	AJ1307	Engineering Workshop & IT Work Shop	0	0	3	2
		Total	**16**	**0**	**13**	**24**

I YEAR **II SEMESTER**

S.No.	Code	Subject	L	T	P	Credits
1	AJ2002	Mathematics – II	3	1	0	4
2	AJ2012	Environmental Studies	3	0	0	2
3	AJ2004	Numerical Methods	3	0	0	2
4	AJ2201	Electrical Circuits – I	3	1	0	4
5	AJ2401	Basic Electronics Engineering	4	1	0	4
6	AJ2501	Problem solving and Computer Programming	4	0	0	4
7	AJ2402	Basic Electronics Lab	0	0	3	2
8	AJ2502	Problem solving and Computer Programming Lab	0	0	3	2
		Total	**20**	**3**	**6**	**24**

JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
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ELECTRICAL & ELECTRONICS ENGINEERING

COURSE STRUCTURE
(Applicable from the batch admitted from 2015-16 onwards)

II YEAR **I SEMESTER**

S.No.	Code	Subject	L	T	P	Credits
1	AJ3003	Mathematics-III	4	0	0	4
2	AJ3205	Electromagnetic fields	3	1	0	3
3	AJ3206	Electrical circuits-II	4	1	0	4
4	AJ3208	Electrical Machines-I	4	1	0	4
5	AJ3508	OOP & Data Structures	3	0	0	3
6	AJ3207	Electrical Circuits Lab	0	0	3	2
7	AJ3509	OOP & Data Structures Lab	0	0	3	2
8	AJ3209	Electrical Machines-I Lab	0	0	3	2
		Total	**18**	**3**	**9**	**24**
9	AJMC02	*Value Education ,Human Rights and Legislative Procedures	3	0	0	0

II YEAR **II SEMESTER**

S.No.	Code	Subject	L	T	P	Credits
1	AJ4210	Power systems-I	4	0	0	4
2	AJ4211	Electrical Machines-II	4	1	0	4
3	AJ4404	Switching Theory and Logic Design	3	1	0	3
4	AJ4417	IC Applications	3	0	0	3
5	AJ4110	Fluid Mechanics and Hydraulic Machinery	4	0	0	4
6	AJ4112	Fluid Mechanics and Hydraulic Machinery Lab	0	0	3	2
7	AJ4246	Basic Electrical Simulation Lab	0	0	3	2
8	AJ4421	IC & HDL Simulation Lab	0	0	3	2
		Total	**18**	**2**	**9**	**24**
9	AJMC01	*Gender Sensitization	0	0	3	0

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COURSE STRUCTURE
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III YEAR **I SEMESTER**

S.No.	Code	Subject	L	T	P	Credits
1	AJ5214	Control Systems	4	1	0	4
2	AJ5216	Power system-II	3	1	0	3
3	AJ5217	Electrical Machines-III	4	1	0	4
4	AJ5219	Power Electronics	3	1	0	3
5	AJ5E02 AJ5129 AJ5361	**Open Elective-I** 1.Managerial Economics and Financial Accountancy 2. Disaster Management and Mitigation 3. Thermal Sciences	3	0	0	3
6	AJ5220 AJ5221 AJ5222	**Professional Elective-I** 1. Renewable Energy Sources 2. Energy Storage Systems 3. Electrical Engineering Materials	3	0	0	3
7	AJ5215	Control Systems Lab	0	0	3	2
8	AJ5218	Electrical Machines-II Lab	0	0	3	2
		Total	**20**	**4**	**6**	**24**

III YEAR **II SEMESTER**

S.No.	Code	Subject	L	T	P	Credits
1	AJ6223	Switch Gear and Protection	4	0	0	4
2	AJ6224	Power Semi conductor Drives	4	1	0	4
3	AJ6226	Electrical & Electronics Instrumentation	4	1	0	4
4	AJ6416 AJ6511 AJ6E06	**Open Elective-II** 1.Computer Organization 2.Data Base Management Systems 3. Intellectual Property Rights	3	0	0	3
5	AJ6228 AJ6229 AJ6230	**Professional Elective-II** 1. Utilization of Electrical Energy 2. Power System Reliability 3. Electrical Estimation and Costing	3	0	0	3
6	AJ6225	Power Electronics Lab	0	0	3	2
7	AJ6227	Electrical Measurements Lab	0	0	3	2
8	AJ6015	Advanced English Communication skills Lab	0	0	3	2
		Total	**18**	**2**	**9**	**24**
9	AJMC03	Energy Studies	3	0	0	0

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ELECTRICAL & ELECTRONICS ENGINEERING
COURSE STRUCTURE
(Applicable from the batch admitted from 2015-16 onwards)

IV YEAR **I SEMESTER**

S.No.	Code	Subject	L	T	P	Credits
1	AJ7231	Power system Operation & control	4	1	0	4
2	AJ7423	Microprocessors & Microcontrollers	4	0	0	4
3	AJ7E01 AJ7424 AJ7530	**Open Elective-III** 1.Management Science 2.Digital Signal Processing 3.Cloud computing and IoT	3	0	0	3
4	AJ7232 AJ7247 AJ7244	**Professional Elective-III** 1.Computer Methods in Power Systems 2. Advanced Power System Protection 3. Modern Power Electronic Converters	3	1	0	3
5	AJ7234 AJ7235 AJ7236	**Professional Elective-IV** 1. Electrical Distribution Systems 2. High Voltage Engineering 3.Digitl Control Systems	3	1	0	3
6	AJ7430	Microprocessors & Microcontrollers Lab	0	0	3	2
7	AJ7233	Simulation of Electrical Systems Lab	0	0	3	2
8	AJ7281	Industrial Oriented Mini Project	0	0	0	3
		Total	**17**	**3**	**6**	**24**

IV YEAR **II SEMESTER**

S.No.	Code	Subject	L	T	P	Credits
1	AJ8237 AJ8238 AJ8239	**Professional -V** 1. Fundamentals of HVDC and FACTs Devices 2. Extra high Voltage AC Transmission 3.Power Quality	3	0	0	3
2	AJ8240 AJ8241 AJ8242	**Professional -VI** 1. Neural Networks and Fuzzy logic 2. Linear Systems Analysis 3.Advanced Control Systems	3	0	0	3
3	AJ8282	Technical Seminar	0	6	0	3
4	AJ8283	Comprehensive Viva-Voce	0	0	0	3
5	AJ8284	Major Project	0	0	15	12
		Total	**6**	**6**	**15**	**24**

JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES

(UGC-AUTONOMOUS)

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LIST OF OPEN ELECTIVES (COLLEGE LEVEL)

Department of ECE			
Sr.No.	**Subject code**	**Name of the Open Elective Subject**	**Preferable Semester**
1.	AJ5418	Electronic Measurements and Instrumentation	V
2.	AJ5416	Computer Organization	V
3.	AJ5417	IC Applications	V
4.	AJ6446	Instrumentation	VI
5.	AJ6447	Electromagnetic Theory	VI
6.	AJ6448	Image and Video Processing	VI
7.	AJ7449	Bio-medical Instrumentation	VII
8.	AJ7424	Digital Signal Processing	VII
9.	AJ7440	Wireless Sensor Networks	VII
Department of EEE			
10.	AJ5212	Electrical Technology	V
11.	AJ5220	Renewable Energy Sources	V/VI
12.	AJ5221	Energy Storage Systems	V/VI
13.	AJ5222	Electrical Engineering Materials	V/VI
14.	AJ6240	Neural Networks & Fuzzy Logic	VI/VII
Department of CSE			
15.	AJ5511	Data Base Management Systems	V/VI
16.	AJ5521	Computer Networks	V/VI
17.	AJ6529	Network Security	VI/VII
18.	AJ6530	Cloud Computing and IoT	VI/VII
19.	AJ6531	Natural Language Processing	VI/VII
20.	AJ6532	Artificial Intelligence and Robotics	VI/VII
21.	AJ7553	Big-Data Management	VII
Department of ME			
22.	AJ5360	Material Science	V
23.	AJ6365	Strength of Materials	VI
24.	AJ5361	Thermal Sciences	V
25.	AJ5362	Engineering Mechanics	V
26.	AJ7366	Finite Element Analysis	VII
27.	AJ7363	Optimization Techniques and Its Applications	VII
28.	AJ6364	Project Planning and Management	VI
Department of CE			
29.	AJ5129	Disaster Management and Mitigation	V/VI
30.	AJ5130	Environmental Impact Assessment	V/VI
31.	AJ5131	Basics of Civil Engineering	V/VI
32.	AJ6132	Quantity Surveying and Costing	VI
33.	AJ7133	Construction Project Management	VII
		Department of MBA	
34.	AJ_E01	Management Science	V/VII
35.	AJ_E02	Managerial Economics and Financial Analysis	V/VI
36.	AJ_E03	Total Quality Management	V/VI

37.	AJ_E04	Global Marketing	VI/VII
38.	AJ_E05	Green Marketing	VI/VII
39.	AJ_E06	Intellectual Property Rights	V/VI
40.	AJ_E07	Supply Chain Management	V/VI
41.	AJ_E08	Statistical Quality Control	VI/VII
42.	AJ_E09	Financial Analysis and Reporting	V/VI
43.	AJ_E10	Micro, Small and Medium Enterprises Management	V/VI
Note: '_' ***represents the subject code with semester of the respective B.Tech branch***			

Note: The syllabus of Open Electives is given separately in the Annexure

JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
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ELECTRICAL & ELECTRONICS ENGINEERING

LIST OF PROFESSIONAL ELECTIVES

Professional Elective-I:

S.No.	Subject Name	Subject Code	Preferred Semester
1.	Renewable Energy Sources	AJ5220	V
2.	Energy Storage Systems	AJ5221	V
3.	Electrical Engineering Materials	AJ5222	V

Professional Elective-II:

S.No.	Subject Name	Subject Code	Preferred Semester
1.	Utilization of Electrical Energy	AJ6228	VI
2.	Power System Reliability	AJ6229	VI
3.	Electrical Estimation and Costing	AJ6230	VI

Professional Elective-III:

S.No.	Subject Name	Subject Code	Preferred Semester
1.	Computer Methods in Power Systems	AJ7232	VII
2.	Advance Power System Protection	AJ7247	VII
3.	Modern Power Electronic Converters	AJ7244	VII

Professional Elective-IV:

S.No.	Subject Name	Subject Code	Preferred Semester
1.	Electrical Distribution Systems	AJ7234	VII
2.	High Voltage Engineering	AJ7235	VII
3.	Digital Control Systems	AJ7236	VII

Professional Elective-V:

S.No.	Subject Name	Subject Code	Preferred Semester
1.	Fundamentals of HVDC and FACTs devices	AJ8237	VIII
2.	Extra high Voltage AC Transmission	AJ8238	VIII
3.	Power Quality	AJ8239	VIII

Professional Elective-VI:

S.No.	Subject Name	Subject Code	Preferred Semester
1.	Neural Networks And Fuzzy Logic	AJ8240	VIII
2.	Linear Systems Analysis	AJ8241	VIII
3.	Advanced Control Systems	AJ8242	VIII

B.TECH

I YEAR
I & II SEMESTER
SYLLABUS

JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

(AJ1001) MATHEMATICS-I

B.Tech I Year I-SEM: Common to all branches

L	T	P	C
4	0	0	4

Course Objective:

The main aim of teaching Engineering Mathematics-I is to emphasize the relevance of fundamentals and applications of Mathematics in Engineering field. Mathematics is the basic of all branches of modern business and science and technology. It deals with using the constructive results of mathematics to solve a problem in applied science or Engineering field.

It helps the students in choosing a technique that improve the quality and efficiency of actual computation.

UNIT–I:

Differential equations of first order and their applications:

Exact equations, equations reducible to exact equations, linear equations, Bernoulli's equations, Applications: Orthogonal Trajectories, Newton's Law of Cooling, Natural Law of Growth and Decay.

UNIT-II:

Linear differential equations of higher order:

Definition, complete solution, operator D, Rules for finding the complementary function, Inverse operator, Rules for finding the particular integral, working procedure, Method of variation of parameters.

UNIT – III:

Differential calculus:

Fundamental theorems: Rolle's Theorem, Lagrange's Mean Value Theorem (proof with geometrical interpretation), Cauchy's Mean Value Theorem and Taylor's Theorem (without proof). Expansions of functions: Maclaurin's series, Taylor's series.

Functions of two or more variables: Jacobians, Maxima and Minima of functions of two variables.

UNIT – IV:

Multiple integrals:

Double integrals, change of order of integration, double integrals in polar coordinates. Triple integrals, Change of variables .

UNIT – V:

Laplace Transforms:

Introduction, definition: Conditions for existence, transforms of elementary functions, properties of Laplace transforms, transforms of periodic functions. Transforms of derivatives, transforms of integrals, multiplication by t^n, division by t. Evaluation of integrals by Laplace

transforms. Inverse transforms other methods of finding inverse transforms, convolution theorem and application to differential equations. Unit step function, unit impulse function.

Learning Outcomes:

1. By learning the first order differential equations student can able to find the solutions of many applications in engineering field.
2. By studying the higher order differential equation many of the transcendental equations are solvable very easily.
3. By studying the mean value theorems student can find roots of the algebraic and transcendental equations.
4. By studying the applications of integration the student able to study find area, surface and volume of a revolution.
5. The students understand how to find the solution of initial and boundary value problem without finding general solution by Laplace technique.

Recommended Text Books:

1. B. S. Grewal: Higher Engineering Mathematics, Khanna Publications, 43rd edition,2014.
2. R. K. Jain and S. R. K. Iyengar: Advanced Engineering Mathematics, Narosa Publishing House, 2014

Reference Books:

1. Erwyn Kreyszig : Advanced Engineering Mathematics, John Wiley and Sons, 8th Edition.
2. 2. T. K. V. Iyengar: Engineering Mathematics-I, S. Chand and Company.
3. A textbook of Engineering Mathematics Vol-I by P.B.Bhaskara Rao, S.K.V.S. Rama chary.
4. A textbook of Engineering Mathematics Vol-I by C. Shankaraiah, VGS Book Link.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

(AJ1013) ENGLISH

B.Tech., I-Year I-Sem: EEE, ECE, CIVIL & MECH	**L**	**T**	**P**	**C**
	3	**0**	**0**	**3**

Introduction:

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire communicative competence, the syllabus has been designed to develop linguistic and communicative competencies of Engineering students. The prescribed books and the exercises are meant to serve broadly as students' handbooks.

In the English classes, the focus should be on the skills of reading, writing, listening and speaking and for this the teachers should use the text prescribed for detailed study. For example, the students should be encouraged to read the texts/selected paragraphs silently. The teachers can ask comprehension questions to stimulate discussion and based on the discussions students can be made to write short paragraphs/essays etc.

The text for non-detailed study is for extensive reading/reading for pleasure. Hence, it is suggested that they read it on their own the topics selected for discussion in the class. The time should be utilized for working out the exercises given after each section, as also for supplementing the exercises with authentic materials of a similar kind for example, from newspaper articles, advertisements, promotional material etc.. However, the stress in this syllabus is on skill development, fostering ideas and practice of language skills.

Course Objectives:

- To improve the language proficiency of the students in English with emphasis on LSRW skills.
- To equip the students to study academic subjects more effectively using the theoretical and practical components of the English syllabus.
- To develop the study skills and communication skills in formal and informal situations.

SYLLABUS:

Listening Skills:

Objectives

- To enable students to develop their listening skill so that they may appreciate its role in the LSRW skills approach to language and improve their pronunciation
- To equip students with necessary training in listening so that they can comprehend the speech of people of different backgrounds and regions

Students should be given practice in listening to the sounds of the language to be able to recognise them, to distinguish between them to mark stress and recognise and use the right intonation in sentences.

- Listening for general content
- Listening to fill up information
- Intensive listening
- Listening for specific information

Speaking Skills:

Objectives

1. To make students aware of the role of speaking in English and its contribution to their success.
2. To enable students to express themselves fluently and appropriately in social and professional contexts.

- Oral practice
- Describing objects/situations/people
- Role play – Individual/Group activities (Using exercises from all the **six** units of the prescribed text: ***Skills Annexe: Functional English for Success*.)**
- Just A Minute(JAM) Sessions.

Reading Skills:

Objectives

To develop an awareness in the students about the significance of silent reading and comprehension.

- To develop the ability of students to guess the meanings of words from context and grasp the overall message of the text, draw inferences etc.
- Skimming the text
- Understanding the gist of an argument
- Identifying the topic sentence
- Inferring lexical and contextual meaning
- Understanding discourse features
- Scanning
- Recognizing coherence/sequencing of sentences

NOTE : *The students will be trained in reading skills using the prescribed text for detailed study.*
They will be examined in reading and answering questions using 'unseen' passages which may be taken from authentic texts, such as magazines/newspaper articles.

Writing Skills:

Objectives:

- To develop an awareness in the students about writing as an exact and formal skill
- To equip them with the components of different forms of writing, beginning with the lower order ones. Writing sentences
- Use of appropriate vocabulary
- Paragraph writing
- Coherence and cohesiveness
- Narration / description
- Note Making
- Formal and informal letter writing
- Describing graphs using expressions of comparison

TEXTBOOKS PRESCRIBED:
For Detailed Study

- First Textbook entitled **"*Skills Annexe -Functional English for Success*",** Published by Orient Black Swan, Hyderabad

- The Second Textbook entitled **"*Epitome of Wisdom*",** published by Maruthi Publications, Hyderabad.
-

The course content and study material is divided into **Five Units.**

Unit – I:

- Chapter entitled '***Wit and Humour****'* from 'Skills Annexe' -Functional English to Success Published by Orient Black Swan, Hyderabad
- Chapter entitled **'*Mokshagundam Visvesvaraya'*** from *"Epitome of Wisdom",* Published by Maruthi Publications, Hyderabad.

and

L- Listening for sounds,. Stress and intonation
S-Greeting and taking leave, Introducing Oneself and Others (formal and informal situations)
R-Reading for subject/theme
W- Writing paragraphs
G-Types of Nouns and Pronouns
V- Homonyms, homophones synonyms, antonyms

Unit –II

- Chapter entitled "***Advances in Science and Technology"*** from "***Skills Annexe - Functional English for Success***" Published by Orient Black Swan, Hyderabad.
- Chapter entitled **'*Three Days to See'*** from ***"Epitome of Wisdom",*** Published by Maruthi Publications, Hyderabad.

and

L-Listening for themes and facts
S-Apologizing, interrupting, requesting and making polite conversations
R- Reading for theme and gist
W-describing people, places, objects&events

G- Verb forms
V- Word Formation - Noun, verb, adjective and adverb

Unit III

- Chapter entitled ***Convocation Speech*** from ***"Epitome of Wisdom"*** Published by Maruthi Publications, Hyderabad.
- **Letter Writing –** Letters application with resume, E-mails, Letters of Enquiry,/apology/complaint and so on.

- **Report Writing –** Styles, Formats of Reports and Technical Report Writing

Unit –IV

- Chapter entitled **'*Risk Management'*** from **"*Skills Annexe -Functional English for Success*"** Published by Orient Black Swan, Hyderabad.
- Chapter entitled **'*Leela's Friend'*** by R.K. Narayan from ***"Epitome of Wisdom",*** Published by Maruthi Publications, Hyderabad.

and

L-Listening for main points and sub-points for note taking
S-Giving instructions and directions; speaking of hypothetical situations
R- Reading for details Sivakasi: *Who to Blame for the Frequent Fire Accidents in India's Largest Fireworks Industry Hub*? By Amritha Gayatri from *Skills Annexe*

W- Note-making, Information Transfer, Punctuation

G – Present tense
V – Synonyms and Antonyms

Unit –V

- Chapter entitled '***Human Values and Professional Ethics'*** from "***Skills Annexe - Functional English for Success"*** Published by Orient Black Swan, Hyderabad.
- Chapter entitled ***'The Last Leaf'*** from ***"Epitome of Wisdom",*** Published by Maruthi Publications, Hyderabad.

and

L-Listening for specific details and information
S- Narrating, expressing opinions and telephone interactions
R- Reading for specific details and information –*What I Cherish Most* by V. S. Srinivasa Shastri from *Skills Annexe* and *Choose How to Start Your Day* from Epitome of Wisdom are for reading comprehension
W-Writing e-mails

G- Past and future tenses
V- Vocabulary - idioms and Phrasal verbs

* Exercises from the texts not prescribed shall also be used for classroom tasks.

Course Outcomes

- Use of correct English Language in functional context
- Enrichment of comprehension and fluency
- At the end of the course, the students would be able to use the basic language skills of Listening, Speaking, Reading and Writing which make them good at professional communication
- Gaining confidence in using language in varied situations

Suggested Reading:

1. ***Contemporary English Grammar Structures and Composition*** by David Green, MacMillan Publishers, New Delhi. 2010.
2. **Technical Communication** by Daniel Riordan. 2011. **Cengage Publications. New Delhi.**
3. **Technical communication by Meenakshi Raman, OUP, 2004.**
4. Handbook of English Grammar and Usage**, Mark Lester and Larry Beason, Tata Mc Graw –Hill.**
5. *An Interactive Grammar of Modern English,* Shivendra K. Varma and Hemalatha Nagarajan, Frank Bros & Co
6. Spoken English**, R.K. Bansal & JB Harrison, Orient Longman.**
7. Effective Technical Communication**, M Ashraf Rizvi, Tata Mc Graw –Hill.**
8. Examine Your English – **Margaret Maison.**
9. Communication Skills by Pushpa Latha, OUP
10. A Text Book of English for Engineers and Technologists, Orient Longman, 1999.
11. English for Engineering Students by Veena Selvam, Sujatha, 2004.
12. English for Employability-**K. Purushotham, Orient Blackswan** (with CD).

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

(AJ1008) ENGINEERING PHYSICS

B.Tech. I Year I Sem: EEE, CSE & ECE

L	T	P	C
4	0	0	4

Objectives:

- Physics is the mother of engineering and technology. Without the applications of concepts of physics there can be no technological developments. Hence physics is the foundation on which stands the elaborate structure of technology. The main purpose of teaching physics to engineering under graduates is to acquaint the budding engineers with a thread of development. The aim of Physics is to provide an adequate exposure and develop insight about the basic principles of physics along with the engineering applications. The acquaintance of basic physics principles would help the engineers to understand the tools and techniques used in the industry and provide the necessary foundations for inculcating innovative approaches.

UNIT-I:

Crystallography, Crystal Structures & Band Theory of Solids:

Crystallography & Crystal Structures: Space lattice, lattice point, unit cell, Bravias lattices, Crystal systems. Atomic radius, Co-ordination number and packing fraction of S.C.C., B.C.C & F.C.C. Planes & Crystal directions, Miller indices, Inter-planar spacing of orthogonal, Crystal structure of diamond.

Band theory of solids: Schrodinger time independent wave equation and significance of wave function. Electrons in a periodic potential, Bloch theorem, Kronig-Penny model (Qualitative treatment), E-k curve, Origin of band formation in solids, Classification of materials into conductors, semi conductors and insulators.

UNIT-II:

Semi-conductor Physics & Semi-conductor Devices.

Semi-conductor Physics: density of energy states, Calculation of carrier concentration in intrinsic semiconductors and extrinsic semi conductors (N-type), Direct and Indirect band gap semi conductors, Hall effect & its applications.

Semi-conductor devices: Energy diagram of P-N diode, I-V characteristics of P-N junction diode, LED, photo diode & solar cell.

UNIT-III:

Dielectrics & Magnetic Materials

Dielectrics: Electric dipoles, Dipole moment, Polarizability, Electric susceptibility, Displacement vector, Electronic, ionic and orientational polarizations and calculations of electronic and ionic polarizabilities, Internal fields in solids,Clausius Mossotti equation Piezo-electricity, Ferro electricity & Pyro electricity (qualitative only),structure of $BaTiO_3$.

Magnetic materials: Origin of magnetic moment, Bohr magneton, Classification of dia, para and ferro magnetic materials on the basis of magnetic moment, Hysteresis curve, Soft and hard magnetic materials , Properties of anti-ferro and ferri magnetic materials and their applications in engineering.

UNIT-IV:

Lasers & Fibre Optics

Lasers: Characteristics of lasers, Spontaneous and stimulated emission of radiation, Einstein's coefficients ,Population inversion, Lasing action. Helium neon laser, diode laser , Applications of lasers in engineering and medicine.

Fibre Optics: Acceptance angle and acceptance cone, Numerical aperture, Step index and graded index fibres, Applications of optical fibres in communication systems.

UNIT-V:

Super-conductivity & Nano Science

Super-conductivity: Zero resistance, Critical temperature, Perfect dia-magnetism, Meissner effect, Critical field (H_c),BCS theory (qualitative treatment), Type-I & Type -II super conductors,Magenetic Levitation Applications.

Nano Science: Nano scale, Surface to volume ratio, Quantum confinement, Top-down method: Bottom-up fabrication, sol-gel method, chemical vapour deposition method, Characterization by SEM & TEM (principles)- Applications in medicine, engineering & science.

Outcomes:

1. The student learns about crystalline materials and their structures.
2. The student learns about classification of solids by band theory.
3. The student learns how to calculate number of charge carriers in a semi conductor.
4. The student learns about fabrication of semi conductors into devices.
5. The student learns about dielectrics and magnetic materials along with their engineering applications.
6. The student learns about lasers, their construction and applications in engineering field.
7. The student learns about super conductors, classifications and their applications.
8. The student learns about nano materials and their fabrication methods along with their characterisation by XRD & SEM.

Text Books:

1. Engineering Physics, P.K Palanisamy, Scitech Publications
2. Engineering Physics, V. Rajandran, Tat Mc. Graw Hill Book Publishers.
3. A Text Book of Engg Physics – M. N. Avadhanulu & P. G. Khsirsagar, S. Chand & Co. (for acoustics).
4. Applied Physics for Engineers – P. Madhusudana Rao, Academic Publishing Company, 2013.

Reference Books:

1. Solid State Physics – M.Armugam, Anuradha Publications.
2. Modern Physics – R. Murugeshan & K. Siva Prasath, S. Chand & Co. (for Statistical Mechnaics).
3. Introduction to Solid State Physics, C. Kittel (Wiley Eastern).
4. Solid State Physics, A.J. Dekker (Macmillan).
5. Applied Physics, Mani Naidu Pearson Edition.
6. Engineering Physics, K. Vijay Kumar, T. Sreekanth, S. Chand Publications.
7. Engineering Physics, D.K. Bhattacharya, Poonam Tandon, Oxford University Press

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

(AJ1010) ENGINEERING CHEMISTRY

B.Tech., I-Year I-Sem: Common to all branches	**L**	**T**	**P**	**C**
	3	**0**	**0**	**3**

Course Objectives:

The purpose of these courses is to emphasize the relevance of fundamentals and applications of chemical sciences in the field of engineering. Thus, the courses have been conceived in such a way that they take into account appropriate combinations of old and new emerging concepts in the chemical sciences area and their current and potential uses in engineering. The Courses attempt to address the principles of general chemistry and specific topics relevant to various engineering disciplines, wherein the students can apply this learning in their respective areas of expertise.

The syllabus has sought to fulfill the objective of making the student of engineering and technology realize that chemistry like other subjects is the real base of their profession and that therefore they must have a good understanding of chemistry before they can use it in their profession.

UNIT- 1:
Electro Chemistry
Ohm's law, conductance, specific, equivalent and molar conductance, units and their relation. Numerical Problems. EMF: Electrochemical and Electrolytic cells, Galvanic cell, Electro chemical series, measurement of emf and single electrode potential, Nernst's equation and its applications.

UNIT- 2:
Electrodes and Battery Chemistry
Introduction, Types of electrodes: Reference electrodes (SHE, SCE and QH). Determination of PH. Numerical Problems. Batteries: Primary cells-Dry cell, Secondary cells - Pb-Acid storage cell, Fuel cells- Hydrogen-Oxygen fuel cell.

UNIT–3:
Corrosion and Its control
Introduction, Causes of corrosion, Types of corrosion- Dry and Wet corrosion (Galvanic & concentration). Factors affecting on corrosion, Corrosion controlling methods- Cathodic protection and Surface coatings (anodic and Cathodic), Methods of applications of metal coatings- Hot dipping and electroplating.

UNIT-4:
Polymer Chemistry
Introduction, Functionality of Monomers, classification of polymers, Types of polymerization, Mechanism of polymerization: Chain and step. Plastics: Chemistry of Thermoplastic resins (PE, PVC & PS) and thermosetting resins (Nylon & Bakelite).

UNIT – 5:

Water Chemistry

Introduction, Types of hardness, units and Numerical problems, Estimation of hardness of water-EDTA method. Boiler Troubles, caustic embrittlement & Boiler corrosion. Treatment of Boiler feed water- Zeolite and Ion-exchange process.

Course Outcomes:

- Applications of electrochemistry understanding different types of cells, their representation, knowledge of electrode potentials, utilization of electrical energy and its conversation into different energies.
- Applicability of electrodes in different fields of analysis.
- Understanding the utility of batteries as a source of energy in many electronic gadgets & their types.
- Enhancement of power generation by making of fuel cells. Knowledge of need for alternate source of energy.
- Deterioration of metal under the influence of environment, Mechanism of corrosion, Factors affecting corrosion, Prevention of corrosion using various methods & A basic knowledge of surface coatings.
- Improving the properties of plastics by various additives, Integral role of various polymers in our life style & Applicability of plastic in automobile and textile industry.
- Knowledge of hardness of water and its effects, Industrial utility of water especially for steam generation, Removal Methodologies of hardness.

Text Books:

1. Text Book of Engineering Chemistry by C. Parameshwara Murthy. B.S. Publications.
2. Text Book of Engineering Chemistry by Y. Bharathi kumari and Jyotsna Cherikuri, VGS Publications.
3. Text Book of Engineering Chemistry by Shashi Chawla
4. Text Book of Engineering Chemistry by B. Ramadevi & Ch. Venkata Ramana Reddy, CENGAGE Learning 2012.

Reference Books:

1. Elementary principles of Physical Chemistry by P.W. Atkins, Oxford University Press.
2. Physical Chemistry by Puri & Sharma
3. Engineering Chemistry by Jain & Jain
4. Engineering Chemistry by Shashi Chawla.
5. Polymer Chemistry by Gourikar.
6. Physical Chemistry Glastone.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES

(UGC-AUTONOMOUS)

(AJ1303) ENGINEERING GRAPHICS

B.Tech. I Year I SEM: CSE, EEE **L T P C**

2 0 4 4

COURSE OBJECTIVES:

1. Use various engineering drawing instruments.
2. Learn the basic conventions of drawings, dimensioning, scales and conic sections like
   Ellipse, parabola and hyperbola.
3. Learn projections of points, lines viewed in different positions
4. Learn projections of plane surfaces and solids viewed in different positions.
5. Gain knowledge of sections of solids and their usage in real time applications.

UNIT – I **[16]**

INTRODUCTION TO ENGINEERING DRAWING: Principles of Engineering Drawing and their significance-Drawing Instruments and their use. Principle of Dimensioning. Geometrical Constructions of regular polygons.

Conic Sections: Ellipse, parabola & Hyperbola (General Method only)

Cycloidal Curves: Cycloid, Epi – cycloid & hypo – cycloid**.**

Involutes: Circle, square, pentagon & hexagon.

UNIT-II **[16]**

ORTHOGRAPHIC PROJECTIONS IN FIRST ANGLE PROJECTION:

Principles of Orthographic Projections – Conventions – First and Third Angle Projections-Projections of Points- Projections of lines inclined to one plane and parallel to other.

PROJECTIONS OF PLANES: Ortho Graphic Projections of Regular Planes-Surface inclined to both the principal planes.

UNIT-III **[15]**

PROJECTIONS OF RIGHT REGUALR SOLIDS: Prism, Cylinder, Pyramid, Cone -Axis inclined to both the principal planes.

UNIT-IV **[15]**

SECTIONS AND SECTIONAL VIEWS: Right Regular Solids – Prism, Cylinder, Pyramid, Cone & Auxiliary views.

UNIT-V **[16]**

ISOMETRIC PROJECTIONS: Principles of Isometric Projection – Isometric Scale – Isometric Views – Conventions – Plane Figures, Simple and Compound Solids – Isometric projection of objects having non-isometric lines.

TEXT BOOKS

1. Engineering Drawing. N.D.Bhatt

REFRENCES:

1. Engineering Drawing – Besant, Agrawal, TMH
2. Engineering Drawing by K.Venu Gopal & V.Prabu Raja New Age publications.
3. Engineering Graphics. P I Varghese Tata McGraw Hill Education Pvt. Ltd.

COURSE OUTCOMES:

The students will be able to

1. Understand and draw the different types of conic sections
2. Analyze the projections of points, straight lines, plane surfaces, solids at different positions and angles.
3. Convert orthographic views into isometric views and vice versa.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

(AJ1014)ENGLISH LANGUAGE COMMUNICATION SKILLS LAB

B.Tech., I Year I Sem: EEE, ECE, CIVIL & MECH

L	T	P	C
0	0	3	2

The **Language Lab** focuses on the production and practice of sounds of language and familiarises the students with the use of English in everyday situations and contexts.

Course Objectives:

- To facilitate computer-aided multi-media instruction enabling individualized and independent language learning
- To sensitize the students to the nuances of English speech sounds, word accent, intonation and rhythm
- To bring about a consistent accent and intelligibility in their pronunciation of English by providing an opportunity for practice in speaking
- To improve the fluency in spoken English and neutralize mother tongue influence
- To train students to use language appropriately for interviews, group discussion and public speaking

Syllabus:

English Language Communication Skills Lab shall have two parts:

a. Computer Assisted Language Learning (CALL) Lab

b. Interactive Communication Skills (ICS) Lab

The following course content is prescribed for the **English Language Communication Skills Lab**

Exercise-I

CALL Lab: Introduction to Phonetics – Speech Sounds – Vowels and Consonants

ICS Lab: Ice-Breaking Activity and JAM Sessions

Intensive Practice in Articles, Prepositions, Word Formation- Prefixes & Suffixes, Synonyms & Antonyms with Software/Handouts

Exercise-II

CALL Lab: Structure of Syllables - Past Tense Marker and Plural Marker – Weak Forms and Strong Forms - Consonant Clusters.

ICS Lab: Situational Dialogues – Role-Play- Expressions in Various Situations – Self-introduction and Introducing Others – Greetings – Apologies – Requests – Social and Professional Etiquette - Telephone Etiquette.

Concord (Subject in agreement with verb) and Words Often Misspelt- Confused/Misused

Exercise-III

CALL Lab: Minimal Pairs- Word Accent and Stress Shifts- Listening Comprehension.

ICS Lab: Descriptions- Narrations- Giving Directions and Guidelines.

Sequence of Tenses, Question Tags and One Word Substitutes.

Exercise-IV

CALL Lab: Intonation and Common Errors in Pronunciation.

ICS Lab: Extempore- Public Speaking
Active and Passive Voice, –Common Errors in English, Idioms and Phrases

Exercise-V
CALL Lab: Neutralization of Mother Tongue Influence and Conversation Practice
ICS Lab: Information Transfer- Oral Presentation Skills
Reading Comprehension and Job Application with Resume Preparation.

Minimum Requirement of Infrastructural Facilities for ELCS Lab:

1. Computer Assisted Language Learning (CALL) Lab:
The Computer Aided Language Lab for 40 students with 40 systems, one master console, LAN facility and English language software for self- study by learners.
System Requirement (Hardware Component):
Computer network with LAN with minimum 60 multimedia systems with the following specifications:

i) P – IV Processor
   a) Speed – 2.8 GHZ
   b) RAM – 512 MB Minimum
   c) Hard Disk – 80 GB
ii) Headphones of High Quality

2. Interactive Communication Skills (ICS) Lab :
The Interactive Communication Skills Lab: A spacious room with movable chairs and audio-visual aids with a Public Address System, a T. V., a digital stereo –audio & video system, camcorder etc.
Prescribed Lab Manual: A Manual entitled "***English Language Communication Skills (ELCS) Lab Manual- cum- Work Book****"*, published by Cengage Learning India Pvt. Ltd, New Delhi. 2013.

- *In addition to the prescribed lab manual, all the listening and speaking activities mentioned in Text-1 and Text-2 can be conducted in the English Language Communication Skills Lab.*

Suggested Software:

- **Macmilan Dictionary Modern English** (with CD)**.**
- **Oxford Advanced Learners' Dictionary** (with CD).
- **Cambridge Advanced Learners' English Dictionary with CD.**
- **Grammar Made Easy by Darling Kindersley**
- **Punctuation Made Easy by Darling Kindersley**
- Clarity Pronunciation Power – Part I
- Clarity Pronunciation Power – part II
- **Oxford Advanced Learner's Compass, 8th Edition**
- ***DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice.***
- Lingua TOEFL CBT Insider, by Dreamtech
- TOEFL & GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)
- **English in Mind (Series 1-4), Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge**
- **English Pronunciation in Use** (Elementary, Intermediate, Advanced) Cambridge University Press
- Raman, M & Sharma, S. 2011. Technical Communication, OUP
- Sanjay Kumar & Pushp Lata. 2011. Communication Skills, OUP

Suggested Reading:

1. Rama Krishna Rao, A. *et al. English Language Communication Skills – A Reader cum Lab Manual Course Content and Practice.* Chennai: Anuradha Publishers
2. Suresh Kumar, E. & Sreehari, P. 2009. *A Handbook for English Language Laboratories.* New Delhi: Foundation
3. *Speaking English Effectively* 2nd Edition by Krishna Mohan and N. P. Singh, 2011. Macmillan Publishers India Ltd. Delhi.
4. Hancock, M. 2009. *English Pronunciation in Use. Intermediate.* Cambridge: CUP
5. Spoken English: A Manual of Speech and Phonetics by R. K. Bansal & J. B. Harrison. 2013. Orient Blackswan. Hyderabad.
6. *Spoken English* (CIEFL) in 3 volumes with 6 cassettes, OUP.
7. *A Textbook of English Phonetics for Indian Students* by T.Balasubramanian (Macmillan)
8. English Skills for Technical Students by Amaresh Mukherjee, 2002.
9. Learning English – A communicative approach, Orient Longman, 2005.
10. A Practical Course in English Pronunciation by J.Sethi, 2004..

Course Outcomes:

- Better Understanding of nuances of language through audio- visual experience and group activities
- Neutralization of accent for intelligibility

Speaking with clarity and confidence thereby enhancing employability skills of the students

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

(AJ1011) PHYSICAL SCIENCES LAB

B.Tech., I Year I Sem: EEE, CSE & ECE

L	T	P	C
0	0	3	2

OBJECTIVES:

This course on Physical Sciences lab has been designed with 12 experiments in Physics and Chemistry. The objective of the course is that the student will have exposure to various experimental skills which is very essential for an engineering student. The experiments are selected from various areas of physics and chemistry like Physical Optics, Lasers, Fiber optics, Electricity, Conductometry, Potentiometry, etc... The student is also exposed to various tools like Screw Gauge, Vernier callipers, Physical balance, Spectrometer, Microscope, Viscometer, and stalagmometer, etc…

CYCLE-1

1. Determination of energy gap of semiconductor material of p-n junction diode.
2. Determination of frequency of electrical vibrator by using Melde's experiment.
3. Determination of wavelength of LASER by using diffraction grating.
4. Determination of rigidity modulus of a given wire using Torsional pendulum.
5. R-C circuit analysis.
6. Determination of Numerical aperture of a given optical fiber.

CYCLE-2

1. Estimation of ferrous iron by Dichrometry.
2. Estimation of hardness of water by EDTA method.
3. Conductometric titration of strong acid vs. strong base.
4. Titration of strong acid vs. strong base by potentiometry.
5. Determination of viscosity of sample oil by Ostwald's viscometer.
6. Determination of Surface tension of lubricants.

Laboratory Manuals:

1. Laboratory Manual Of Engineering Physics By Dr. Y.Aparna And Dr K. Venkateswara Rao (V.G.S Publishers)
2. Practical Engineering Chemistry by K. Mukkanti, etal' B'S' Publications, Hyderabad.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

(AJ1307) ENGINEERING WORKSHOP & IT WORKSHOP

B.Tech. I Year I SEM: EEE **L T P C**
0 0 3 2

COURSE OBJECTIVES:

1. Know the usage of various tools and their application in carpentry, tin smithy.
2. Know the usage of various tools and their application in black smithy, foundry, welding and house wiring.
3. Make lap joint and dove tail joint in carpentry.
4. Make scoop, funnel and tray like items in tin smithy.
5. Use one – way, two-way switches, parallel and series connections in house wiring.
6. Know the basics of welding.

UNIT – I

TRADES FOR EXERCISES: (Ten exercises are required to perform from the following trades)

1. Carpentry 2
2. Fitting 2
3. Tin – Smithy 2
4. Black Smithy 1
5. House – wiring 2
6. Plumbing 1

UNIT - II

TRADES FOR DEMONSTRATION & EXPOSURE

1. Demonstration of Power tools
2. Welding.

UNIT – III

IT WORKSHOP I: Computer hardware, identification of parts, Disassembly, Assembly of computer to working condition, simple diagnostic exercises.

IT WORKSHOP II: Installation of operating system windows and Linux simple diagnostic exercises**.**

TEXTBOOKS:

1. Workshop Manual – P.Kannaiah / K.L.Narayana/SciTech Publishers.
2. Workshop Manual – Venkat Reddy/BS Publication / 6th Edition.

COURSE OUTCOMES:

The students will be able to

1. Know the fundamental knowledge of various trades and their usage in real time applications.
2. Gain knowledge of Welding, Black smithy, Fitting, and house wiring.
3. Understand the basis for analyzing power tools in construction and wood working, electrical engineering and mechanical engineering.
4. Use basic concepts of computer hardware for assembly and disassembly.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

(AJ2002) MATHEMATICS – II

B.Tech I-Year II-Sem: Common to all branches

L	T	P	C
3	1	0	4

Course Objective:

The main aim of this subject is to improve the mathematical knowledge of the student. When the student study the mathematics-II he should get the impression that mathematics is a systematic science of practical importance, resting on a relatively small number of basic concepts and involving powerful unifying methods. He should soon convince himself of the necessity for applying mathematical procedures to engineering problem.

By studying the mathematics the students translating the given physical information into mathematical model. This model may be a differential equation, a system of equation or some other mathematical expression.

Unit-I :

Matrices-I

Rank of matrix, elementary transformations, elementary matrices, inverse from elementary matrices, Normal form of a matrix, consistency of linear system of equations.

Unit-II:

Matrices-II

Eigen values and Eigen vectors, properties of Eigen values, Cayley-Hamillton theorem, reduction to diagonal form, similarity transformation.Complex matrices.

Unit – III:

Fourier series:

Introduction, Euler's formulae, conditions for a Fourier expansion, functions having points of discontinuity, change of interval, odd and even functions-expansions of odd or even periodic functions, half-rang series..

Unit - IV:

Vector Calculus:

Definition of vectors, Scalar and Vector point functions-vector operator del., Del applied to scalar point functions-Gradient.Del applied to a vector point functions- Divergence and Curl –Irrotational and solenoidal fields. Integration of vectors: Line integration- Circulation-Work. Surface Integral- Green's theorem in the plane, Stokes's theorem. Volume integral, Divergence theorem.

Unit – V:

Partial differential equation:

Introduction, Formation of partial differential Equations, solutions of a partial order differential equations.linear equations of first order, non-linear Equations of first order. Method of separation of variables-Vibrations of a stretched string-Wave equation.

Learning Outcomes:

1. The student learns about the rank of the matrix and solving of system of simultaneous linear equations.
2. The student learns about how to find the eigen values and eigen vectors of different engineering fields and they use concept of matrices in the development of programming languages.

3. By studying the Fourier series & Fourier transforms students are able to solve the problem related to theory of circuits and many applications in electronics engineering and communication engineering.
4. The concept of vector integrations (Green's, Gauss & Stoke's theorems), students are able to convert double integration into line integrations and triple integrations.
5. By studying the partial differential equation students are able to solve the many applications of mechanical and civil Engineering.

Recommended Text Books:

1. B. S. Grewal : Higher Engineering Mathematics, Khanna Publications, 43rd edition,2014.
2. R.K.Jain and S.R.K.Iyengar : Advanced Engineering Mathematics, Narosa Publishing House, 2014.

Reference Book:

1. T.K.V.Iyengar:Mathematical Methods, S.Chand and Company.
2. Erwyn Kreyszig : Advanced Engineering Mathematics, John Wiley and Sons, 8th Edition.
3. A textbook of Engineering Mathematics Vol-I by P.B.Bhaskara Rao, S.K.V.S. Rama chary
4. A textbook of Engineering Mathematics Vol-I by C. Shankaraiah, VGS Book Link
5. Schaum's Outline of Advanced Calculus, Third Edition (Schaum's Outline Series)

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

(AJ2012) ENVIRONMENTAL STUDIES

B.Tech., I Year II Sem: EEE & ECE

L	T	P	C
3	0	0	2

Course Objectives:

1. Understanding the importance of ecological balance for sustainable development.
2. Understanding the impacts of developmental activities and mitigation measures.
3. Understanding the environmental policies and regulations.

UNIT-I:

Ecosystems

Definition, Scope and Importance of ecosystem. Classification, structure and function of an ecosystem, Food chains, food webs and ecological pyramids. Flow of energy, Biogeochemical cycles, Bioaccumulation, Biomagnification, 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. **Energy resources:** growing energy needs, renewable and non renewable 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: habital 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 air quality standards. **Water pollution:** Sources and types of pollution, drinking water quality standards. **Soil Pollution:** Sources and types, Impacts of modern agriculture, degradation of soil. **Noise Pollution:** Sources and Health hazards, standards, **Solid waster:** Municipal Solid Waste management, composition and characteristics of e-Waste and its management. **Pollution control technologies:** Wastewater Treatment methods: Primary, secondary and Tertiary.

UNIT-V

Global Environmental Problems and Global Efforts: Climate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS). Deforestation and desertification. International conventions / Protocols: Earth summit, Kyoto protocol and Montreal Protocol.

Course Outcomes:

After undergoing the course the student would be able to know about

1. Understanding of Ecosystem,
2. Natural resources
   Depletion of natural resources & prevention of natural resources.
3. Biodiversity
   Protection, sharing of the biodiversity.
4. Environmental pollution
   Understanding of water, soil, noise, air pollutions and their control measurements.

SUGGESTED TEXT BOOKS:

1. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission.
2. Environmental Studies by R. Rajagoplalan, 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.
5. Text book of Environmental Science and Technology – Dr. M. Anji Reddy 2007, BS Publications.
6. The syllabus of Environmental Studies prescribed by UGC/JNTUH is approved for adoption.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

(AJ2004) NUMERICAL METHODS

B.Tech I Year II-Sem: EEE & ECE

L	T	P	C
3	0	0	2

Course Objective:

The main aim of the numerical methods to examine the constructive abstract methods of mathematics when illustrated with suitable numerical techniques. Numerical methods which were developed for purely theoretical reasons suddenly becomes of great importance in engineering mathematics. It follows that the most important objective and purpose in engineering mathematics seems to be that the student become familiar with mathematical thinking's.

Unit – I:
Solutions of algebraic and transcendental equations:

Introduction, solution of algebraic and transcendental equations- Bisection Method, Regular-Falsi method, Newton-Raphson's method.

Unit – II:
Finite differences and Interpolation:
Finite differences, Relation between the operators, To find one or more missing terms, Newton's interpolation formulae, central difference interpolation formula-Gauss interpolation formulae. Interpolation with un-equal intervals-Lagrange's Interpolation formula.

Unit – III:
Curve Fitting:
Introduction, Method of Least squares-Derivation of normal equations- Fitting a polynomial function (straight line and parabola),fitting an Exponential function, fitting a power function.

Unit – IV:
Numerical Differentiation and Integrations:
Numerical differentiation, formulae for derivatives. Numerical Integration: Newton-Cotes quadrature formula-Trapezoidal rule, Simpson's $1/3^{rd}$ rule, Simpson's $3/8^{th}$ rules.

Unit – V:
Numerical solutions of ordinary Differential Equations:
Introduction, Euler's Method, Modified Euler's Method, Runge's method, Runge-kutta method..

Course Outcomes:

1. The students can learn about the algebraic and transcendental equation and they find the roots of the equation by iterative methods.
2. The students can interpretive the large data of interpolation through formulae of interpolation.
3. Students learn how to fit the curve by using least squares method.
4. By studying Trapezodial rule and simpson's rule to improve the differentiation and integration techniques.
5. By studying the Runge-kutta methods student can able to bring out approximate solutions of first order ordinary differential equations and can be extended to higher order.

Recommended Text Books:

1. B.S.Grewal : Higher Engineering Mathematics, Khanna Publications,43rd edition,2014.
2. S.R.K. Iyengar and R.K.Jain: advanced engineering mathematics,fourth edition,2014.

Reference Book:

1. Erwyn Kreyszig : Advanced Engineering Mathematics, John Wiley and Sons, 8th Edition.
2.T.K.V.Iyengar: Mathematical Methods, S.Chand and Company.
3. R.K.Jain and S.R.K.Iyengar : Advanced Engineering Mathematics, Narosa Publishing House, 2008
4. Mathematical Methods by P.B. Bhaskar Rao, S.K.V.S.Rama Chary, M.Bhujanya Rao, B.S.Publications
5. Mathematical Methods by K.V. Suryanarayana Rao, by Scitech Publications

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

(AJ2201) ELECTRCAL CIRCUITS-I

B.Tech I-Year II-Sem: EEE

L	T	P	C
3	1	0	4

Course Objectives:

- The course introduces the basic concept of circuit analysis which is the foundation for all subjects of the Electrical Engineering discipline. The emphasis of this course is laid on the basic analysis of circuits which includes Single phase circuits, magnetic circuits and theorems.

UNIT-I:

Introduction to Electrical circuits:

Essence of electricity, Electric field electric current, potential difference, E.M.F, electric power Ohm's law, R-L-C parameters, Voltage and Current sources, dependent and independent sources, Source Transformation, Voltage & Current relationship for passive elements for different input signals (square, ramp, saw-tooth, triangular).

KCL, KVL, network reduction techniques, series, parallel, series-parallel, Star-Delta, Delta-Star transformations. Nodal analysis, Mesh analysis, Super node and Super mesh for DC excitations.

UNIT-II:

Single phase AC Circuits:

R.M.S, average values and from factor for different periodic wave forms-steady state analysis of R, L, C (in different combination) with sinusoidal excitation –concept of reactance, impedance, susceptance and admittance. Phase and phase difference, concept of power factor, real and reactive power, J-notation, complex and polar forms of representation, complex power.

UNIT-III:

Locus diagram and Resonance:

Locus diagram: Series R-L, R-C, R-L-C and parallel combination with variation of various parameters. Resonance: Series, parallel circuits, concept of bandwidth and Q-factor.

UNIT-IV:

Network Theorems (with D.C and A.C Excitation)

Super position, Reciprocity, Norton's, Thevenin's, Maximum power transfer, Milliman's Tellegen's and compensation theorems and Problems.

UNIT-V:

Magnetic circuits:

Magnetic circuits, Faraday's laws of electromagnetic induction – concept of self and mutual inductance, Dot convention, coefficient of coupling, composite magnetic circuits, analysis of series and parallel magnetic circuits.

Text books:

1. Engineering Circuit Analysis by William Hayt and Jack E. Kemmerly, McGraw Hill Company, 6^{th} edition.
2. Network Analysis by A.Sudhakar and Shyammohan S Palli, Tata MC Graw Hill
3. Electrical Circuits by A.Chakrabarthy, Dhanpat Rai & Sons.

Reference Books:

1. Network Analysis by M.E. Van Valkenberg.
2. Linear Circuit Analysis (time domain, Phasor and Laplace transform approaches) Second edition by Raymond A. Decarlo and Penmin – L in, Oxford University Press. Second edition, 2004.
3. Electrical Circuits Theory by K.Rajeswaram, Pearson Education, 2004.
4. Basic Circuits Analysis by D.R. Cunningham & J.A. Stuller, Jaico Publications.

Course Outcomes:

- After going through this course the student gets a thorough knowledge on basics of circuit concepts, electrical parameters, single phase AC circuits, magnetic circuits, resonance, and network theorems with which he/she can able to apply the above conceptual things to real-world problems and applications.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

(AJ2401) BASIC ELECTRONICS ENGINEERING

B.Tech I-Year II-Sem: EEE & ECE

L	T	P	C
4	1	0	4

Objectives:
This is a fundamental course, which provides basic knowledge and essential to be learned by every circuit branch student. This course will focus:

- to familiarize the student with electronic measuring meters and instruments.
- to understand the principles and working of PN Diode as a Rectifier and Circuit element a Regulator..
- to understand basic principles and working of BJT,FET and Special Devices.

UNIT-I:

Electronic Measuring Instruments-Principles and Operation: Voltmeter, Ammeter, Power supply (RPS, SMPS) and Cathode Ray Oscilloscope**.**

UNIT - II:

P-N Junction Diode: Qualitative Theory of P-N Junction, P-N Junction as a Diode, Diode Current Equation, Volt- Ampere Characteristics, Diode Equivalent Circuits, Breakdown Mechanisms. Zener Diode Characteristics.
Rectifiers and Filters: Half Wave and Full Wave Rectifiers, Rectifier with L, C,L-Section and Pi-Section filters, Regulators.

UNIT-III:

Bipolar Junction Transistor : The Junction Transistor, Transistor Current Components, Transistor as an Amplifier, Transistor Construction, Transistor Configurations, Limits of Operation, BJT Hybrid Model, Comparison of CB, CE and CC Amplifier Configurations.

UNIT-IV:

Transistor Biasing and Stabilization: Operating Point, The DC and AC Load lines, Need for Biasing, Fixed Bias, Collector Feedback Bias, Voltage Divider Bias, Bias Stability, Stabilization Factors, Bias Compensation using Diodes and Thermisters, Thermal Runaway, Thermal Stability

UNIT-V:

Field Effect Transistor: Construction, principle of operation, symbol and Volt-Ampere characteristics of JFET and MOSFET, The JFET Small Signal Model.
Special Purpose Devices and Their Operations: Varactor Diode,Tunnel Diode,Photo Diode, LED,UJT,DIAC,TRIAC & SCR.

TEXT BOOKS:

1. Electronic Devices and Circuits – S.Salivahanan, N.Suresh Kumar, A.Vallavaraj, TMH.
2. Electronic Devices and Circuits – David A. Bell, Oxford University Press.

REFERENCE BOOKS:

1. Electronic Devices and Circuits – J. Millman, C.C. Halkias, Satyabratha Jit,TMH.
2. Electronic Devices and Circuits – R.L. Boylestad and Louis Nashelsky, , PEI/PHI.
3. Electronic Devices and Circuits - K. Lal Kishore, BSP.

Course Outcomes:

At the end of the course, the student will be able to:

- Understand and Analyse the different types of diodes, operation and its characteristics
- Design and analyse the DC bias circuitry of BJT and FET
- Design biasing circuits using diodes and transistors.
- To analyze and design diode application circuits, amplifier circuits and oscillators employing BJT, FET devices.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)
(AJ2501)PROBLEM SOLVING AND COMPUTER PROGRAMMING

B.Tech., I Year II Sem: EEE

L	T	P	C
4	0	0	4

Objectives:
To provide the necessary knowledge on general engineering problem solving methodologies and to provide necessary foundations for step by step computer program development and to present the basic concepts in C programming language and to prepare the students to write modular and readable C Programs. Also the Course introduces the essential concepts like abstract data types, user defined data types, to analyze the performance of algorithms and how to use such knowledge for later processing with the help of files and aims to train the students to write working programs to solve problems.

Syllabus Content

Unit-1:
Meaning of Problem Solving – Polya's 4 Steps: Understanding the problem, Devising a plan, Carrying out the Plan, Looking back–Examples.
Introduction to programming, Algorithms and Flowcharts. Basics of C Language. Input and Output. Elementary problems and program writing.

Unit-2:
Control Statements in C: Conditional Execution and Selection, Iterative and Repetitive Execution, Termination. Nested Loops.
Arrays and Strings: Working with One-Dimensional Arrays, String Manipulation. Working with Multidimensional Arrays, Manipulating String Arrays.
Functions: Prototypes and Definition, Working with Functions, Passing Parameters To Functions. Introduction to Recursion. Scope and Storage Classes.

Unit-3:
Pointers in C: Preliminary Concepts–One-Dimensional Arrays and Pointers, Pointers and Strings, Pointer Arithmetic, Pointers to Pointers, Arrays of Pointers, Pointers to an Array, Multidimensional Arrays and Pointers, Pointers to Functions, Arrays of Function Pointers, Dynamic Memory Handling and Problems.

Unit-4:
User Defined Data Types and Variables. Structures, Unions, Enumeration Types, Bitwise Operators, Command-Line Arguments, C Preprocessor, Memory Models and Pointers.

Unit-5:
Files In C: Using Files in C, Working with Text Files, Working with Binary Files, Direct File Input and Output. Files of Records, Random Access into Files of Records–File Management Functions.

Text Book:

1. Programming in C, Pradip Dey& Manas Ghosh, 2ndEd, Oxford University Press,2013 (Chapters 1, 2, 3, 4, 5 excluding 5.2.6, 6.1 to 6.8, 6.10.1, 7, 8, 9, 11)
2. Programming in C–A complete introduction to the C programming language, Stephen G. Kochan 3rdEd., Sams Publishing,2005
3. The C programming language,Brian W.Kernighan,Dennis M.Ritchie,Second edition,Prentice Hall Software Series

Reference Books:

1. How to Solve it-A New Aspect of Mathematical Method-G.Polya, 1945, Princeton University Press, (Pages 1-29)
2. How to Solve it by Computer–R.G. Dromey, Prentice Hall of India, 1999, (Pages 1- 39)
3. Computer Programming, E. Balaguruswamy, McGraw Hill India (Pvt Ltd), 2014 (Pages 1.1 to 6.19)
4. Problem Solving and Program Design in C, Jeri R. Hanly, Elliot B. Koffman,7thEdition, Pearson Education, 2013.
5. C Programming–A Modern Approach,K. N. King, 2ndEdition, W. W. Norton & Company; New York, 2008.

Course Outcomes:

1: A strong foundation in core Computer Science and Engineering, both theoretical and applied concepts.
2: An ability to apply knowledge of mathematics, science, and engineering to real-world problems.
3: Ability to model, understand, and develop complex software for System Software as well as Application Software.
4: A broad education necessary to understand the impact of Computer Science and Engineering solutions in the scientific, societal, and human contexts.

Learning Outcomes:

1. Understanding how problems are posed and how they can be analyzed for obtaining solutions.
2. Understanding the fundamentals of C programming.
3. Learning of sequencing, branching, looping and decision making statements to solve scientific and engineering problems.
4. Implementing different operations on arrays and creating and using of functions to solve problems.
5. Ability to design and implement different types of file structures using standard methodology.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(Autonomous)

(AJ2402) BASIC ELECTRONICS LAB

B.Tech I-Year II-Sem: EEE & ECE

L	T	P	C
0	0	3	2

Course Objectives:

- To provide the knowledge of passive and active components, Identification and specifications like color coding, tolerance, rating , etc.,
- Familiarization of laboratory instruments such as analog and digital multimeters, function generators, power supplies and CRO and their operations.
- Performing experiments to obtain the characteristics of active devices

PART A: (Only for Viva-voce Examination)

Electronic Workshop Practice (In 3 Lab Sessions):

Identification, Specifications, Testing of R, L, C Components (Color Codes)
Bread Boards, PCB's
Identification, Specifications and Testing of Active Devices, Diodes, BJT's, Low power JFET's, Power Transistors, LED's, LCD's, SCR, and UJT.
Study and operation of

3. Multimeters (Analog and Digital)
4. Function Generator
5. Regulated Power Supplies
6. CRO.

PART B:

1. Forward & Reverse Bias Characteristics of PN Junction Diode
2. Zener diode characteristics & Zener voltage Regulator.
3. Half Wave Rectifier with & without filters.
4. Full Wave Rectifier with & without filters.
5. Input & Output Characteristics of Transistor in CB Configuration.
6. Input & Output Characteristics of Transistor in CE Configuration.
7. Calculation of h-Parameters from CE characteristics.
8. FET characteristics.
9. UJT Characteristics.
10. Design of self bias circuit.

PART C: Equipment required for Laboratories:

1. Regulated Power supplies (RPS) -0-30 V
2. CRO- (20MHz)
3. Function Generators –(0-1 MHz).
4. Multimeters
5. Ammeters(0-200μA, 0-20mA)
6. Voltmeters (0-20V)
7. Electronic Components -Resistors, Capacitors, BJTs.

Course outcomes:

- Upon completion of this course the student will be able to
- Identify circuit components with their color coding and specifications.
- Ability to operate and work with multimeters, function generators, Power supply and CRO
- Ability to perform experiments to perform device characteristics.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

(AJ2502) PROBLEM SOLVING AND COMPUTER PROGRAMMING LAB

B.Tech., I-Year II-Sem: EEE

L	T	P	C
0	0	3	2

Objectives:

To provide the necessary knowledge and practical training on general engineering problem solving methodologies and to provide necessary foundations for step by step computer program development and to present the basic concepts in C programming language and to prepare the students to write modular and readable C Programs. Also the Lab Course implements the essential concepts like abstract data types, user defined data types, to analyze the performance of algorithms and how to use such knowledge for later processing with the help of files and aims to train the students to write working programs to solve problems.

Syllabus Content

1.a Analyze the problem of finding areas of shapes like circle, square, rectangle and triangle. Draw a flow chart.

1.b Analyze the problem of finding the area of a quadrilateral assuming that we know how to find the area of a triangle. Draw a flow chart.

2.a Analyze the problem of finding, in shortest time, the sum of first n natural numbers, sum of squares of first n natural numbers, sum of cubes of first n natural numbers and sum of squares of squares of first n natural numbers. Draw a flow chart.

2.b Analyze the problem of finding the second largest number in a set of n numbers. Draw a flow chart.

3. Write a C program to implement Problems 1.a and 1.b (given above).

4.a Write a C program to find the sum of individual digits of a positive integer.

4.b Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.

4.c Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.

5.a Write a C program to find the roots of a quadratic equation.

5.b Write a C program to find the factorial of a given integer.

5.c Write a C program to find the GCD (greatest common divisor) of two given integers.

6.a Write a C program to solve Towers of Hanoi problem.

6.b Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement)

7.a Write a C program to find both the largest and smallest number in a list of integers.

7.b Write a C program to reverse the elements of an array (i.e., the first value should become last value etc.)

8. Write a C program that uses functions to perform all of the following:
   - i. Reading of a matrix.
   - ii. Printing a matrix in a formatted form.
   - iii. Adding two compatible matrices to produce a result matrix
   - iv. Multiplying two compatible matrices to produce a result matrix.

9. Write a C program that uses functions to perform the following operations:
   - i. To insert a sub-string in to a given main string from a given position.
   - ii. To delete n Characters from a given position in a given string.

iii. Write a C program to determine if the given string is a palindrome or not.

10.a Write a C program using pointer to create a two dimensional matrix, to input values in to the matrix and to display the matrix and its transpose. Free the memory properly.

10.b Write a C program to demonstrate calling of a function (like add,subtract,multiply) using a function pointer.

11.a Write a C program that displays the position or index in the string S where the string T begins, or – 1 if S doesn't contain T.

11.b Write a C program to count the lines, words and characters in a given text.

12. Write a menu driven C program that uses functions to perform the following operations on complex numbers stored in a structure:
    i. Reading a complex number
    ii. Writing a complex number
    iii. Addition of two complex numbers
    iv. Multiplication of two complex numbers

13.a Write a C program which copies one text file to another text file and verify the correctness.

13.b Write a C program which copies one binary file to another binary file and verify the correctness.

13.c Write a command-line C program to reverse the first n characters in a file. (Note: The file name and n are specified on the command line.)

14.a Write a C program to display the contents of a file.

14.b Write a C program to produce reverse of the content of a text fie into another text file and verify the result.

14.c Write a C program to merge two text files into a third text file (i.e., the contents of the first file followed by those of the second are put in the third file) and verify the correctness.

15. Write an interactive C program that will maintain a list (roll,name,totalmarks) of student records. The menu shall have options like
    i. Add a new record
    ii. Delete a record
    iii. Modify a record
    iv. Display a selected record
    v. Display all records
    vi. Quit

16. Write a C Program that removes all comment lines from a C source file.

Text Books

1. Programming in C, Pradip Dey& Manas Ghosh, 2ndEd, Oxford University Press,2013 (Chapters 1, 2, 3, 4, 5 excluding 5.2.6, 6.1 to 6.8, 6.10.1, 7, 8, 9, 11)
2. Programming in C–A complete introduction to the C programming language, Stephen G. Kochan 3rdEd., Sams Publishing,2005
3. The C programming language,Brian W.Kernighan,Dennis M.Ritchie,Second edition,Prentice Hall Software Series

Reference Books:

1. *How to Solve it - A New Aspect of Mathematical Method* - G.Polya, 1945, Princeton University Press, (Pages 1-29)
2. *How to Solve it by Computer* – R.G. Dromey, Prentice Hall of India, 1999, (Pages 1-39)
3. *Computer Programming*, E. Balaguruswamy, McGraw Hill India (Pvt Ltd), 2014 (Pages 1.1 to 6.19)
4. *Problem Solving and Program Design in C*, Jeri R. Hanly, Elliot B. Koffman, 7th

Edition, Pearson Education, 2013.
5. *C Programming – A Modern Approach*, K. N. King, 2nd Edition, W. W. Norton & Company; New York, 2008.

Course Outcomes:

1: A strong foundation in core Computer Science and Engineering, both theoretical and applied concepts.
2: An ability to apply knowledge of mathematics, science, and engineering to real-world problems.
3: Ability to model, understand, and develop complex software for System Software as well as Application Software.
4: A broad education necessary to understand the impact of Computer Science and Engineering solutions in the scientific, societal, and human contexts.

Learning Outcomes:

1. Understanding how problems are posed and how they can be analyzed for obtaining solutions.
2. Understanding the fundamentals of C programming.
3. Learning of sequencing, branching, looping and decision making statements to solve scientific and engineering problems.
4. Implementing different operations on arrays and creating and using of functions to solve problems.
5. Ability to design and implement different types of file structures using standard methodology.

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B.TECH

II YEAR
I & II SEMESTER
SYLLABUS

JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

(AJ3003) MATHEMATICS – III

B.Tech II Year I Sem : ECE & EEE

L	T	P	C
4	0	0	4

Course Objective:

The main aim of teaching Mathematics – III to develop the thinking ideas of students. In this we made the choice with great care, using past and present techniques, research experience and resulting the temptation to include everything which is important in Engineering Mathematics. Hence the student should learn to recognize the guiding principles and ideas behind the scenes which are more important than formal manipulations.

Unit – I: Functions of Complex Variables: Limit- Continuity – Differentiability, Analyticity properties, Cauchy – Riemann equations, harmonic and conjugate harmonic functions, Milne – Thompson method, complex potential functions.

Unit – II: Complex Integration: Line integral – Cauchy's theorem, Cauchy's integral formula and derivatives.

Complex Power Series, Radius of convergence – Expansion in Taylor's series, Maclaurin's series and Laurent series. Types of singular points –Isolated singular point – pole – essential singular point.

Unit – III: Calculus of Residues: Residues-Cauchy's Residue Theorem, Evaluation of integrals of the type

(a) Improper real integrals $\int_{-\infty}^{\infty} f(x)dx$ (b) $\int_{0}^{2\pi} f(\cos\theta, \sin\theta)d\theta$

Unit – IV: Conformal Mapping: Transformation of z-plane to w-plane by a function, conformal transformation Standard transformations – Translation; Magnification and rotation; inversion and reflection, Transformations like e^z, logz, z^2 and Bilinear transformation. Properties of Bilinear transformation.

Unit – V: Z –Transforms and Difference Equations: Z –transformation, shifting theorems, multiplication by n, Initial value theorem, Final value theorem problems, Evaluation of inverse Z-transforms, Convolution theorem, solving of difference equations by using z-transforms.

RECOMMENDED TEXT BOOKS

1) B.S.Grewal : Higher Engineering Mathematics, Khanna publications, 2009.
2) R.K.Jain and S.R.K.Iyengar : Advanced Engineering Mathematics,

3) James Ward Brown, Ruel V. Churchill , Complex Variables and Applications, Narosa publishing house, 2008

REFERENCE BOOK:

1) Erwyn Kreyszig : advanced engineering mathematics, John Wiley and sons, 8th edition.
2) T.K.V.Iyengar: Engineering Mathematic-III, S.Chand and company.

COURSE OUTCOMES:

By studying complex variable the students identifying ordinary point, singular point and regular point for the given ordinary differential equations. by using the z-transforms students find the particular solution of the differential equation without finding the general solution and students are able to solve the applications of differential equations with boundary and initial conditions.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

(AJ3205) ELECTROMAGNETIC FIELDS

B.Tech II Year. I-Semester: EEE

L	T	P	C
3	1	0	3

Pre requisites:
Knowledge of Mathematics, Vector Algebra and Basic concepts Engineering Physics.

Objectives:
The objective of this course is
- To introduce the concepts of electric field and magnetic fields and their applications
- To utilize the concepts in the development of power transmission and telecommunication lines and electrical machines.

UNIT-I

Electrostatics:
Types of Co-ordinate systems: Rectangular, Cylindrical, Spherical system.
Electrostatic Fields – Coulomb's Law – Electric Field Intensity (EFI) – EFI due to a line and a surface charge – Work done in moving a point charge in an electrostatic field – Electric Potential – Properties of potential function – Potential gradient – Guass's law – Application of Guass's Law – Maxwell's first law, div $\mathbf{D} = _{v}$ – Laplace's and Poison's equations – Solution of Laplace's equation in one variable. Electric dipole – Dipole moment – potential and EFI due to an electric dipole – Torque on an Electric dipole in an electric field.

UNIT-II

Dielectrics & Capacitance:
Behavior of conductors in an electric field – Conductors and Insulators – Electric field inside a dielectric material – polarization –Boundary conditions –Conductor and Dielectric Boundary conditions– Capacitance – Capacitance of parallel plates, spherical and co-axial 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

Magneto Statics:
Static magnetic fields – Biot-Savart's law – Magnetic field intensity (MFI) – MFI due to a straight current carrying filament – MFI 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 Law & Applications:
Ampere's circuital law and its applications viz. MFI 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**.

UNIT – IV

Force in Magnetic fields and Magnetic Potential:
Force in Magnetic fields: 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.

Magnetic Potential and Concept of Inductance: Scalar magnetic potential and its limitations – vector magnetic potential and its properties –vector Poisson's equations - Self and Mutual inductance – Neumann's formulae – determination of self-inductance of a solenoid and toroid - mutual inductance between a straight long wire and a square loop wire in the same plane – energy stored and energy density in a magnetic field.

UNIT – V

Time Varying Fields:

Time varying fields – Faraday's laws of electromagnetic induction– Maxwell's fourth equation: Curl (**E**) = – **B**/ t – Statically and Dynamically induced EMFs – Simple problems - Modification of Maxwell's equations for time varying fields– Integral and point forms – Concept of Displacement current, Modified form of Ampere's Law for TV fields, Power in EM Fields and Poynting theorem.

TEXT BOOKS

1. "Engineering Electromagnetics" by William H. Hayt & John. A. Buck Mc. Graw-Hill Companies, 7^{th} Editon.2009.
2. "Electromagnetic Fields" by Matthew.N.O.Sadiku, Oxford Publications
3. Elements of Electromagnetic Fields by S. P. Seth, Dhanpat Rai Publications.

REFERENCE BOOKS:

1. "Introduction to ElectroMagnetics" by CR Paul and S.A. Nasar, Mc-Graw Hill Publications
2. " Engineering Electro magnetics" by Nathan Ida, Springer(India) Pvt. Ltd. 2nd Edition
3. "Introduction to Electro Dynamics" by D J Griffiths, Prentice-Hall of India Pvt.Ltd, 2^{nd} edition
4. "Electromagnetics" by Plonsy and Collin
5. "Static and Dynamic Electricity" Smyth.
6. "Electromagnetics" by J P Tewari.
7. "Electromagnetics" by J. D Kraus Mc Graw-Hill Inc. 4^{th} edition 1992.

OUTCOMES:

After completion of this course the student will have the knowledge regarding-

- The relation between the electric field and the magnetic field, about the various laws governing the concepts of these fields.
- The behavior of conductors and dielectrics, their boundary conditions, Maxwell's equations with respect to electrostatics and magneto statics.
- The concepts related to time varying fields, about scalar and vector magnetic potential, self and mutual inductance.
- The phenomena of energy stored and energy density in electrostatics and magneto statics, the concepts of conduction, convection and displacement current density, their equations, Power in EM fields and Poynting theorem.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

(AJ3206) ELECTRICAL CIRCUITS-II

B. Tech II-Year I- Semester: EEE

L	T	P	C
4	1	0	4

Pre-Requisites: To learn this course, the students are required to have the basic concepts out of the following subjects:
Electrical Circuits-I, Mathematics-I, Mathematics-II

Objectives:
This course introduces the basic concepts of circuit analysis which is the foundation for all subjects of the Electrical Engineering discipline. The Emphasis of this course is laid on the basic analysis of circuits which includes

- Circuit analysis using Graph theory
- Analysis of Three Phase balanced and unbalanced circuits
- DC and AC Transient analysis
- Concept of s-domain in electrical circuit analysis
- Analyzing Two-Port Networks using various network parameters
- Concept and Design of various types of passive Filters
- Fourier analysis of A.C. Circuits and Fourier Transforms

UNIT – I Network topology
Definitions – Graph – Tree, Basic cut-set and Basic Tie-set matrices for planar networks – Loop and Nodal methods of analysis of Networks with dependent & independent voltage and current sources - Duality & Dual networks.

UNIT – II Three Phase Circuits:
Three phase circuits: Phase sequence – Star and delta connection – Relation between line and phase voltages and currents in balanced systems – Analysis of balanced and Unbalanced 3 phase circuits – Measurement of active and reactive power.

UNIT – III Transient Analysis:
Transient response of R-L, R-C, R-L-C circuits (Series and Parallel combinations) for D.C. and sinusoidal excitations – Initial conditions – Classical method and Laplace transforms methods of solutions.

Transient response of the above circuits for different inputs such as step, ramp, pulse and impulse by using Laplace transforms method.

UNIT – IV Network functions and Network Parameters:
Network functions: Driving point and transfer impedance and admittance functions- poles and zeros of network function–necessary conditions for driving point functions and transfer functions.
Network Parameters: Two port Network parameters – Z, Y, ABCD and Hybrid parameters and their inter-relations– 2-port network parameters using transformed variables.

UNIT – V Filters and Fourier analysis of A.C. Circuits:

Filters - Introduction to filters –low pass – high pass and band pass – RC, RL, filters-constant K and m derived filters and composite filter design

Fourier analysis of A.C. Circuits – Fourier Theorem, consideration of symmetry, exponential form of Fourier series, line and phase angle spectra, Fourier integrals and Fourier transforms properties of Fourier transforms.

TEXT BOOKS:

2. Engineering circuit analysis – by William Hayt and Jack E. Kemmerly, Mc Graw Hill Company, 6^{th} edition.
3. Fundamentals of Electric Circuits by Charles Alexander and Mathhew N.O. Sadiku, 5^{th} Edition, Mc Graw Hill.
4. Electrical Circuits by David .A. Bell Oxford University Press, 7^{th} Edition.
5. Networks and systems by D. Roy Chowdary, New Age International publishers
6. Circuit Theory by A. Chakrabarthy, Dhanpat Rai & Sons.

REFERENCE BOOKS:

1. Network Analysis by Van Valkenburg, PHI.
2. Network Theory by N.C. Jagan & C. Lakshminarayana, B.S Publications.
7. Electric Circuit theory by K. Rajeswaran, Pearson Education, 2004.
8. Network Analysis by C.K. Mithal, Khanna Publishers.

OUTCOMES:

After going through this course the student gets a thorough knowledge on

- Network topology
- Analysis of Balanced and Unbalanced Three-phase systems
- Measurement of power in 3-Phase Systems using wattmeters
- Transient analysis of AC and DC networks; Solution of problem using Differential Equation and Laplace transform approach
- Different types of network functions
- Two–port network parameters
- Operation and design of various filter circuits
- Fourier transforms
- Analysis of AC circuit through Fourier series

With which he/she can be able to apply the above conceptual things to the real world electrical and electronics problems and applications.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

(AJ3208) ELECTRICAL MACHINES – I

II Year B.Tech I-Semester: EEE

L	T	P	C
4	1	0	4

Pre requisites:
Electrical Circuits, Magnetic Fields.

Objectives:

- To introduce the concept of rotating machines and the principle of Electro mechanical energy conversion.
- To understand the functioning of different types of D.C. generators and study their performance.
- To study the working principles of various types of D.C. motors and their load characteristics, starting and methods of speed control.
- To estimate the various losses occurring in D.C. machines and to study the different testing methods to arrive at their efficiency.

UNIT – I Electromechanical Energy Conversion:

Electromechanical Energy Conversion - Forces and torque in magnetic field systems - Energy balance - Energy and force in a singly excited magnetic field system, determination of magnetic force, Co – Energy - Multi excited magnetic field systems.

UNIT – II D.C. Generators Construction & Operation:

D.C. Generators – Principle of operation – Action of commutator – constructional features – armature windings – lap and wave windings – simplex and multiplex windings – use of laminated armature – E.M.F Equation –Problems.

Armature reaction: Cross magnetizing and de-magnetizing AT/pole – compensating winding – commutation – reactance voltage – methods of improving commutation.

UNIT – III Types of D.C Generators & Characteristics:

Methods of Excitation – separately excited and self-excited generators – build-up of E.M.F - critical field resistance and critical speed - causes for failure to self-excite and remedial measures. Load characteristics of shunt, series and compound generators. Applications, Problems with Practical Ratings.

Parallel operation of D.C series generators - Use of equalizer bar and cross connection of field windings - Load sharing**.**

UNIT – IV D.C Motors Operation & Speed control:

D.C Motors – Principle of operation – Back E.M.F. - Torque equation – characteristics and application of shunt, series and compound motors – Armature reaction and commutation. Applications, Problems with Practical Ratings.

Speed control of D.C. Motors: Armature voltage and field flux control methods. DC Motor starters (3 point and 4 point starters).

UNIT – V Testing of D.C. machines:

Losses – Constant & Variable losses – calculation of efficiency – condition for maximum efficiency.

Methods of Testing – direct, indirect and regenerative testing – Brake test – Swinburne's test Hopkinson's test – Field's test-separation of stray losses in a D.C. motor test.

TEXT BOOKS:

8. Electrical Machines – P.S. Bimbra., Khanna Publishers
9. Electric Machines by I. J. Nagrath & D. P. Kothari, Tata Mc Graw – Hill Publishers, 3rd edition, 2004.
10. Theory and Performance of Electrical Machines by J. B. Gupta, S. K. Kataria and Sons.

REFERENCE BOOKS:

1. Performance and Design of D.C Machines – by Clayton & Hancock, BPB Publishers
2. Electric Machinery – A. E. Fitzgerald, C. Kingsley and S. Umans, Mc Graw-Hill Companies, 5th edition
3. Electromechanical Energy Conversion with Dynamics of Machines – by R. D. Begamudre, New Age International (P) Ltd., Publishers, 2nd edition, 1998.
4. Electric Machines – M. V. Deshpande, PHI Learning Pvt.Ltd.

OUTCOMES:

After going through this course the student gets a thorough knowledge on.

- Principle of Energy Conversions.
- Construction and Operation of Generators & Motors.
- Characteristics of Different Generators & Motors, Remedies to overcome the Problems of failure of Generation.
- Applications and Speed control of DC Motors.
- Testing of DC Machines.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

(AJ3508) OBJECT ORIENTED PROGRAMMING & DATA STRUCTURES

II Year B.Tech. I-Sem: EEE **L/T/P/ C**
3/0/0/ 3

Objectives:

To provide a comprehensive working knowledge on the object oriented language C++ and to implement abstract data types, linear and nonlinear data structures for problem solving. To provide a foundation on generic programming based on over loading concepts, inheritance and virtuality. To inculcate ability to grasp the behaviour of data structures such as stacks, queues, trees, hash tables, search trees, graphs and their representation and to apply them in problem solving. To provide a working knowledge on searching and sorting techniques and to write programs to solve problems on arrays, linked lists, stacks, queues, trees, graphs, hash tables and search trees.

Syllabus Content

UNIT-1

C++ Overview- Class Definition, Objects, Class Members, Access Control, Class Scope, Constructors and destructors, parameter passing methods, Inline functions, static class members, this pointer, friend functions, dynamic memory allocation and deallocation (new and delete), exception handling. Function Over Loading, Operator Overloading,

UNIT-2

Generic Programming- Function and class templates, Inheritance basics, base and derived classes, inheritance types, base class access control, runtime polymorphism using virtual functions, abstract classes, streams I/O.

UNIT-3

Basic data structures- The list ADT, Stack ADT, Queue ADT, Implementation using template classes in C++. Linked list operations insertion, deletion and searching. Hash table representation, hash functions, collision resolution-separate chaining, open addressing-linear probing, quadratic probing, double hashing, rehashing, extendible hashing, comparison of hashing and skip lists.

UNIT-4

Search Trees: Binary Search Trees, Definition, ADT, Implementation, Operations- Searching, Insertion and Deletion.

UNIT-5

Graphs: Basic terminology, representations of graphs, graph search methods DFS, BFS, Suffix tries.

Text Books:

1. *Object oriented programming with C++, E. Balagurusamy,* Cengage Learning ,Tata McGraw Hill Education ,3rd Edition.
2. Data structures, Algorithms and Applications in C++, S.Sahni, University Press (India) Pvt.Ltd, 2nd edition, Universities Press Orient Longman Pvt. Ltd.
3. Classic Data structures by Samantha, PHI Learning Pvt.Ltd,2nd Edition.

References:

1. Problem solving with C++, The OOP, Fourth edition, W.Savitch, Pearson education.
2. Data structures and Algorithm Analysis in C++, Mark Allen Weiss, Pearson Education. Ltd., Second Edition.
3. Data structures and algorithms in C++, 3rd Edition, Adam Drozdek,Cengage Learning.
4. Data Structures Using C++, D.s. Malik,Cengage Learning, India Edition.
5. Mastering Algorithms with C,K.Loudon,O'Reilly,SPD PVT.Ltd.
6. An introduction to Data structures and algorithms, J.A.Storer,Springer.
7. *Data Structures: A Pseudocode Approach with C++*, Richard F Gilberg, Behrouz A Forouzan, Cengage Learning
8. Data structures and Algorithms in C++, Michael T.Goodrich, R.Tamassia and Mount, Wiley student edition, John Wiley and Sons.

Course Outcomes:

CO-1: A strong foundation in core Computer Science and Engineering, both theoretical and applied concepts.

CO-2: An ability to apply knowledge of mathematics, science, and engineering to real-world problems.

CO-3: Ability to model, understand, and develop complex software for System Software as well as Application Software.

CO-4: An ability to communicate effectively, both in writing and oral.

CO-5: A recognition of the need for, and an ability to engage in life-long learning.

Learning Outcomes:

1. Understanding of fundamental concepts of abstract data types and general standard data structures.
2. Ability to design linear data structures stacks, queues and linked lists.
3. Ability to design nonlinear data structures, trees and graphs, and to implement their operations.
4. Ability to implement different searching and sorting techniques.
5. Ability to apply different searching and sorting techniques for real world problems..

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

(AJ3207) ELECTRICAL CIRCUITS LAB

II Year B.Tech. I-Semester: EEE

L	T	P	C
0	0	3	2

The following experiments are required to be conducted as compulsory experiments:

1. Verification of Kirchhoff's laws and Tellegen's Theorem
2. Verification of Thevenin's, Norton's and Maximum Power Transfer Theorems.
3. Verification of Superposition and Reciprocity Theorems.
4. Locus Diagrams of RL and RC Series Circuits.
5. Series and Parallel Resonance.
6. Determination of Self, Mutual Inductances and Coefficient of coupling.
7. Determination of Open circuit, Short circuit and ABCD parameters of two port networks.
8. Measurement of active and reactive powers of a 3-phase network using two wattmeter method.

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

1. Verification of Compensation and Millman's Theorems.
2. Verification of RMS value of complex wave.
3. Relation between voltage and current in star and delta networks**.**
4. Verification of Time response of first order (R-C & R-L) and Second order (RLC) networks for periodic non-sinusoidal inputs – Time constant and Steady state error determination.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

(AJ3509) OBJECT ORIENTED PROGRMMING & DATA STRUCTURES LAB

II Year B.Tech. I-Semester: EEE **L/T/P C**
0/0/3 2

Objectives:

To provide a comprehensive working knowledge on the object oriented language C++ and to provide implementation experience on abstract data types, linear and nonlinear data structures for problem solving. To provide a working knowledge on generic programming based on over loading concepts, inheritance and virtuality. To inculcate ability to grasp the behaviour of data structures such as stacks, queues, trees, hash tables, search trees, graphs and their representation and to apply them in problem solving. To provide an application oriented working knowledge on searching and sorting techniques and to write programs to solve problems on arrays, linked lists, stacks, queues, trees, graphs, hash tables and search trees.

Syllabus Content

1. Write a C++ program to demonstrate class.
2. Write a C++ program on constructor.
3. Write a C++ program on inline functions.
4. Write a C++ program on this pointer.
5. Write a C++ program on function overloading.
6. Write a C++ program on operator overloading.
7. Write a C++ program that illustrates how run time polymorphism is achieved.
8. Write a C++ program on Multiple inheritance.
9. Write a C++ program to implement all the functions of a dictionary ADT.
10. Write a C++ program for single linked list operations.
11. Write a C++ program for hashing with quadratic programming.
12. C++ programs using class templates to implement the following using an array.
    a) Stack ADT b) Queue ADT
13. Write C++ programs using class templates to implement the following using a singly linked list.
    a) Stack ADT b) Queue ADT
14. Write C++ programs, using class templates, that use non-recursive functions to traverse the given binary tree in
    a) preorder b) inorder c) postorder.
15. Write C++ programs, using class templates, that use recursive functions to traverse the given binary tree in
    a) preorder b) inorder c) postorder.
16. Write a C++ program using class templates to perform the following operations:
    a) Insert an element into a binary search tree.
    b) Delete an element from a binary search tree.
    c) Search for a key element in a binary search tree.
11. Write C++ programs using class templates for the implementation of bfs and dfs for a given graph.

Text Books:

1. *Object oriented programming with C++, E. Balagurusamy,* Cengage Learning ,Tata McGraw Hill Education ,3rd Edition.
2. Data structures a pseudo code approach with c++, Indian edition, R.F.Gilberg and B.A.Forouzan Cengage Learning.
3. Programming Prinicples and Practice using C++, B.Stroustrup, Addition-Wiesly (Pearson Education)
4. Data Structures and STL,W.J.Collins,mc Graw Hill,Internationational Edition.
5. Data Structures and Algorithms with OODesign patterns in C++,B.R.Priess,John Wiley &sons.
6. The Art,Philosophy and Science of OOP with C++,Rick Miller,SPD.
7. C++ for Programmers ,P.J.Deitel and H.M.Deitel,PHI/Pearson.

Course Outcomes:

CO-1: A strong foundation in core Computer Science and Engineering, both theoretical and applied concepts.
CO-2: An ability to apply knowledge of mathematics, science, and engineering to real-world problems.
CO-3: Ability to model, understand, and develop complex software for System Software as well as Application Software.
CO-4: An ability to communicate effectively, both in writing and oral.
CO-5: A recognition of the need for, and an ability to engage in life-long learning.

Learning Outcomes:

1. Understanding of fundamental concepts of abstract data types and general standard data structures.
2. Ability to design linear data structures stacks, queues and linked lists.
3. Ability to design nonlinear data structures, trees and graphs, and to implement their operations.
4. Ability to implement different searching and sorting techniques.
5. Ability to apply different searching and sorting techniques for real world problems..

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

(AJ3209) ELECTRICAL MACHINES – I LAB

II Year B. Tech. I-Semester: EEE	**L**	**T**	**P**	**C**
	0	**0**	**3**	**2**

The following experiments are required to be conducted compulsory experiments:

1. Magnetization characteristics of DC shunt generator.
2. Load test on DC shunt generator.
3. Load test on DC series generator.
4. Load test on DC compound generator.
5. Swinburne's test on DC Shunt Machine and Speed control of DC shunt motor.
6. Brake test on DC compound motor.
7. Hopkinson's tests on DC shunt machines.
8. Field's test on DC series machines.

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.
10. Retardation test on DC shunt motor.
11. Separations of constant losses in DC shunt motor.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

II Year B. Tech. I-Semester: EEE **L T P C**
3 0 0 0

Value Education, Human Rights and Legislative Procedures
(AJMC02)

Module 1: Values and Self Development-Social values and individual attitudes, Work ethics, Indian vision of humanism, Moral and non moral valuation, Standards and principles, Value judgments. Importance of cultivation of values, Sense of duty, Devotion, Self reliance, Confidence, Concentration, Truthfulness, Cleanliness, Honesty, Humanity, Power of faith, National unity, Patriotism, Love for nature, Discipline.

Module 2: Personality and Behavior Development- Soul and scientific attitude, God and scientific attitude, Positive thinking, Integrity and discipline, Punctuality, Love and kindness, Avoiding fault finding, Free from anger, Dignity of labor, Universal brotherhood and religious tolerance, True friendship, Happiness vs. suffering love for truth, Aware of self destructive habits, Association and cooperation, Doing best, Saving nature.

Module 3:Character and Competence- Science vs. God, Holy books vs. blind faith, Self management and good health, Science of reincarnation, Equality, Nonviolence, Humility, Role of women, All religions and same message, Mind your mind, Self control, Honesty, Studying effectively.

Module 4:Human Rights- Jurisprudence of human rights nature and definition, Universal protection of human rights, Regional protection of human rights, National level protection of human rights, Human rights and vulnerable groups.

Module 5: Legislative Procedures- Indian constitution, Philosophy, fundamental rights and duties, Legislature, Executive and Judiciary, Constitution and function of parliament, Composition of council of states and house of people, Speaker, Passing of bills, Vigilance, Lokpal and functionaries.

Text Books:

1. Chakraborty, S.K., Values and Ethics for Organizations Theory and Practice, Oxford University Press, New Delhi, 2001.
2. Kapoor, S.K., Human rights under International Law and Indian Law, Prentice Hall of India, New Delhi, 2002.
3. Basu, D.D., Indian Constitution, Oxford University Press, New Delhi, 2002.

Reference Books:

1. Frankena, W.K., Ethics, Prentice Hall of India, New Delhi, 1990.
2. Meron Theodor, Human Rights and International Law Legal Policy Issues, Vol. 1 and 2, Oxford University Press, New Delhi, 2000.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

(AJ4210) POWER SYSTEMS-I

II Year B.Tech. EEE II-Semester	**L**	**T**	**P**	**C**
	4	**0**	**0**	**4**

Pre requisites:
Basics of Electrical Circuits, Electrical Machines and Thermal & Hydro Prime Movers.

Objectives:
- Electrical Power Generation by Conventional Energy Sources.
- Concepts of DC and AC Distribution, Voltage drop calculations

This course concerns the generation of power along with the economic aspects.

UNIT-1 Thermal Power Stations:
Line diagram of Thermal Power Station (TPS) showing paths of coal, steam, water, air, ash and flue gasses. - Brief description of TPS components: Economizers, Boilers, Super heaters, Condensers, Chimney and cooling towers. Numerical Problems.

Nuclear Power Stations:
Nuclear Power Stations: Nuclear Fission and Chain reaction. - Nuclear fuels. - Principle of operation of nuclear reactor.-Reactor Components: Moderators, Control rods, Reflectors and Coolants. - Radiation hazards: Shielding and Safety precautions. - Types of Nuclear reactors and brief description of PWR, BWR and FBR. Numerical Problems.

UNIT –II Gas and Hydroelectric Power Stations:
Gas Power Stations: Principle of Operation and Components.Elements of hydro electric power station-types-concept of pumped storage plants-storage requirements, mass curve (explanation only) estimation of power developed from a given catchment area; heads and efficiencies. Numerical Problems.

UNIT-III D.C. Distribution Systems:
Classification of Distribution Systems.- Comparison of DC vs. AC and Under-Ground vs. Over- Head Distribution Systems.- Requirements and Design features of Distribution Systems.-Voltage Drop Calculations (Numerical Problems) in D.C Distributors for the following cases: Radial D.C Distributor fed one end and at the both the ends (equal/unequal Voltages) and Ring Main Distributor.

A.C. Distribution Systems:
Voltage Drop Calculations (Numerical Problems) in A.C. Distributors for the following cases: Power Factors referred to receiving end voltage and with respect to respective load voltages.

UNIT-IV Substations, Power Factor Control and Voltage Control:
Substations: Classification of substations - Indoor & Outdoor substations: Substations layout showing the location of all the substation equipment. Bus bar arrangements in the Sub-Stations: Simple arrangements like single bus bar, sectionalized single bus bar, main and transfer bus bar system with relevant diagrams.
Power Factor Control: Causes and disadvantages of Low Power factor-Methods of improving power factor-Most economical power factor-Numerical Problems.

Voltage Control: Dependency of Voltage on Reactive Power Flow - Methods of Voltage Control.

UNIT-V Economic Aspects of Power Generation:
Load curve, load duration and integrated load duration curves-load, demand, diversity, capacity, utilization and plant use factors- Numerical Problems.
Tariff: Costs of Generation and their division into Fixed, Semi-fixed and Running Costs. Desirable Characteristics of a Tariff-Objectives of Tariff-Types of Tariff-Numerical Problems**.**

TEXT BOOKS:

1. Generation, Distribution and Utilization of electrical energy by C.L.Wadhwa, New age International Publishers.
2. Elements of Electrical Power Station Design, 3rd Edition, Wheeler. Pub.1998- M.V.Deshpande.
3. Power System Engineering- by R.K.Rajput Laxmi Publications (P) Limited, New Delhi 2006.

REFERENCE BOOKS:

1. Principles of Power Systems by V.K Mehta and Rohit Mehta S.CHAND& COMPANY LTD., New Delhi 2004.
2. Electrical Power Generation, Transmission and Distribution by S.N.Singh., PHI, 2003.
3. Hand book of Switchgear (BHEL) Tata Mc-Graw Hill Publication 2009.

OUTCOMES: After going through this course the student gets

- Knowledge on the thermal, nuclear, gas and Hydal power plants operation, AC and DC distribution, voltage drop calculations
- Air insulated indoor/outdoor substations, operation.
- Voltage control and power factor improvement techniques, economics aspects of power generation
- Different types of tariff

With which he/she can be able to apply the above conceptual things to real-world electrical and electronics problems and applications.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

(AJ4211) ELECTRICAL MACHINES – II

II Year B. Tech. II-Semester: EEE

L	T	P	C
4	1	0	4

Pre requisites:
Electrical Circuits and Electrical Machines – I

Objectives:

- To study the theory and performance of various Transformers
- To study the testing techniques of single phase transformer
- To study theory of operation and performance characteristics of poly phase induction motors
- To study the theory of speed control techniques of 3-phase induction motor.

UNIT I: Single Phase Transformers -Construction & Operation:
Single phase transformers – constructional details –minimization of hysteresis and eddy current losses –e.m.f equation –operation on no load and on load – phasor diagrams. Equivalent circuit –losses and efficiency – regulation. All day efficiency –effect of variation of frequency & supply voltage on iron losses-Numerical Problems

UNIT II: Testing of Single Phase Transformer:
OC and SC tests- predetermination of efficiency and regulation- Sumpner's test- – Separation of core losses in a transformer . Parallel operation with equal and unequal voltage ratios-Numerical Problems

UNIT III: Auto & Polyphase Transformers:
Autotransformers –equivalent circuit – comparison with two winding transformers. Polyphase transformers –Polyphase connections- Y/Y, Y/Δ, Δ/Y, Δ/Δ, and open Δ. Third harmonics in phase voltages –three winding transformers –tertiary windings- determination of Zp, Zs, and Zt transients in switching –off load and on load tap changing transformers, Scott connection. -Numerical Problems

UNIT – IV: Polyphase Induction Motors:
Polyphase induction motors-construction details of cage and wound rotor machines-production of rotating magnetic field - principle of operation - rotor EMF and rotor frequency - rotor reactance, rotor current and pf at standstill and during operation. -Numerical Problems

Characteristics of Induction Motors:
Rotor power input, rotor copper loss and mechanical power developed and their inter relation-torque equation - expressions for maximum torque and starting torque – torque-slip characteristics - equivalent circuit - Phasor diagram - crawling and cogging. -Numerical Problems

UNIT – V: Circle Diagram & Speed Control of Induction Motors:

No-load Test and Blocked rotor test –Predetermination of performance using Circle Diagram-Numerical Problems -Methods of starting-Starting current and Torque calculations.

Speed Control Methods:

Speed control-change of voltage, change of frequency, V/f, injection of an EMF into rotor circuit – Numerical Problems- Induction generator – principle of operation and its role in electrical systems.

TEXT BOOKS:

1. Electrical machines-PS Bhimbra, Khanna Publishers.
2. Electric Machines –by I.J.Nagrath & D.P.Kothari, Tata McGraw Hill, 7^{th} Edition.2009
3. Theory and Performance of Electrical Machines – J.B. Gupta, S.K. Kataria & Son's Publications
4. Performance and Design of AC Machines-M.G. Say. BPB Publishers.

REFERENCE BOOKS:

1. Electric machinery - A.E. Fitzgerald, C.Kingsley and S.Umans, Mc Graw Hill Companies, 5^{th} edition
2. Theory of Alternating Current Machinery- by Langsdorf, Tata McGraw-Hill Companies, 2^{nd} edition.
3. Electrical Machines – M.V Deshpande, Wheeler Publishing

OUTCOMES:

After going through this course

- The student gets a thorough knowledge on, construction operation characteristics and testing of different types of transformers.
- Testing (concept of circle diagram) and speed control method of poly-phase induction motor
- He/she can be able to apply the above conceptual things to real-world electrical and electronics problems and applications.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

(AJ4404) Switching Theory and Logic Design

B.Tech II Year II Sem : EEE

L	T	P	C
3	1	0	3

Course Objective:

- This Subject exposes the students to learn Digital Fundamentals
- After studying this subject the student will be able to Design, Analyze and Interpret Combinational and Sequential Digital Circuits.

UNIT- I: NUMBER SYSTEMS & BOOLEAN ALGEBRA

Binary Numbers, Number base Conversion, Octal and Hexadecimal Numbers, Complements, Signed Binary Numbers, Binary Codes, Boolean Algebra basic theorems and properties, Boolean functions, canonical and standard forms.

UNIT-II: GATE LEVEL IMPLEMENTATION AND MINIMIZATION

Basic Logic gates and Universal gates, Simplification of functions using Karnaugh map (Four & Five Variable) and QuineMcCluskey Method, Boolean function Implementation, Gate level Implementation.

UNIT-III: COMBINATIONAL LOGIC DESIGN

Combinational Circuit, Analysis Procedure, Design Procedure, Examples of Combinational Digital Circuits(Adders, Subtractor, Adder-Subtractor etc.) Hazards in Combinational Circuits, Hazards free realization.

UNIT-IV: SEQUENTIAL LOGIC DESIGN

Introduction to sequential Circuits: Latches and Flip-Flops(RS,JK, D, T and Master Slave), Design of Clocked Flip-Flop, Flip-Flop Conversion,

Counters: Design of Single Mode and Multi Mode Counters, Ripple Counters, Synchronous Counters.

Registers: Shift Registers, Shift Register Counters and Random Sequence Generators.

UNIT-V: DESIGN & ANALYSIS OF SEQUENTIAL CIRCUITS

Introduction to Mealy and Moore Design, State Diagrams, Analysis and Design of Synchronous sequential Circuits: Finite State Machines, State Reduction, Minimization and Design of Next state Decoder.

Text Books :

1. Maris Mano: “Digital Design” Prentice Hall 1993.

Reference:

1. John F Wakerly: “Digital Design : Principles and Practices”, Prentice-Hall, 2nd Ed., 2002

JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

(AJ4417) IC Applications

II Year B.Tech II-Sem: EEE	**L**	**T/P/D**	**C**
	3	**-/-/-**	**3**

UNIT I:INTEGRATED CIRCUITS

Classification. Chip Size and Circuit Complexity, Classification of Integrated Circuits. Standard TTL NAND Gate-Analysis & Characteristics, TTL Open Collector Outputs. Tristate TTL, MOS & CMOS open drain and tristate outputs, Comparison of Various Logic Families. IC interfacing- TTL driving CMOS & CMOS driving TTL

Ideal and Practical Op-Amp, Op-amp characteristics-DC and AC Characteristics. 741 Op-Amp and its Features, Modes of operation-inverting, non-inverting, differential**.**

UNIT II:OP-AMP and APPLICATIONS

Basic information of Op-Amp,Ideal and Practical Op-Amp, Op-amp characteristics-DC and AC Characteristics. 741 Op-Amp and its Features, Modes of operation-inverting, non-inverting, differential.

Basic Applications of Op-Amp, Instrumentation Amplifier, AC Amplifier, V to I and I to V Converters, Sample & Hold Circuits. Differentiators and Integrators. Comparators. Schmitt Trigger. Multivibrators, Introduction to Voltage Regulators Features of 723 Regulators.

UNIT III:ACTIVE FILTERS & OSCDLLATORS

Introduction, First Order Low Pass. High Pass and Band Pass Filters, Active Band Reject and All Pass Filters.

Principle of Operation and Types of Oscillators – RC, Wien Bridge and quadrature type. Waveform Generators - Triangular. Saw Tooth, Square Wave and VCO.

UNIT IV:TIMERS & PHASE LOCKED LOOPS

Introduction to 555 Timer, Functional Diagram, Monostable and Astable Operations and Applications, Schmitt Trigger, PLL- Introduction, Block Schematic, Principles and Description of individual Blocks of 565, VCO.

UNIT V: D-A AND A- D CONVERTERS

Introduction, Basic DAC Techniques - Weighted Resistor Type. R-2R Ladder Type, inverted R-2R Type and IC 1408 DAC. Different types of ADCs - Parallel Comparator Type. Counter Type. Successive Approximation Register Type and Dual Slope Type DAC and ADC Specifications.

TEXT BOOKS:

1. Linear Integrated Circuits -D. Roy Chowdhury, New Age International (p)Ltd.
2. Op-Amps & Linear ICs - Ramakanth A. Gayakwad.

REFERENCE BOOKS:

1. Op-Amps and Linear Integrated Circuits, R.F. Coughlin & Fredrick F. Driscoll, PHI.
2. Operational Amplifiers and Liner Integrated Circuits: theory & applications, Denton J. Daibey, TMH
3. Design with operational amplifiers &Analog Integrated Circuits, Serigo Franco. McGraw Hill.
4. Digital Fundamentals - Floyd and Jain, Pearson Education.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

(AJ4110) FLUID MECHANICS & HYDRAULIC MACHINERY

B.Tech. II Year – II Semester: EEE **L / T / P / C**
4 / 0 / 0 / 4

Objectives:

O1: Identify and obtain values of fluid properties and relationship between them.

O2: Understand the principles of continuity, momentum, and energy as applied to fluid motion.

O3: Describe the operating characteristics of hydraulic machinery (pumps and turbines) and The factors affecting their operation and specifications, as well as their operation in a system.

O4: Study and Analyze different types and elements of Hydro Electric Power Plants.

UNIT – I

INTRODUCTION: Dimensions and units- Physical Properties of Fluid specific gravity, Viscosity, Surface Tension, Vapor Pressure and their influences on fluid motion pressure at a point, Pascal's law, Hydrostatic Law- Atmospheric, Gauge and Vacuum pressure-measurement of pressure. Pressure gauges.

FLUID KINEMATICS: Description of fluid flow, Stream line, Path Line and Streak lines and stream tube. Classification of flows: Steady, unsteady, uniform, non-uniform, laminar, turbulent, rotational and irrotational flows-Equation of continuity for one, two , three dimensional flows- stream and velocity potential functions, flow net analysis.

UNIT – II

FLUID DYNAMICS and Measurements of Flow: Surface and body forces- Euler's and Bernoulli's Equation for flow along a stream line for 3-D flow,(Navier –Stokes Equations (Explanatory) Momentum equation and it's application-forces on pipe bend, Pitot tube, Venturi - meter and Orifice meter-Classification of Orifices, flow over rectangular, triangular and trapezoidal and stepped notches-Broad crested weirs.

CLOSED CONDUCT FLOW: Reynold's experiment-Characteristic of laminar & Turbulent flows. Laws of fluid friction-Darcy's equation, variation of friction factor with Reynold's number-Moody's Chart, Minor Losses-pipes in series-pipes in parallel-total energy line and hydraulic gradient line. Pipe network problems flow between parallel plates, flow through long tubes, flow through inclined tubes.

UNIIT – III

BASICS OF TURBO MACHINERY: Hydrodynamic force of jets on stationary and moving flat, inclined and curved vanes, jet striking centrally and at tip, velocity triangles at inlet and outlet, expression for work done and efficiency-angular momentum principles, Applications to radial flow turbines. Layout of a typical hydropower installation- Heads and efficiencies

UNIIT – IV

HYDRAULIC TURBINES: -Classification of turbines-Pelton wheel-Francis turbine-Kaplan turbine-working, working proportions, velocity diagram, work done and efficiency, hydraulic design, draft tube-theory and function efficiency. Governing of turbines-surge tanks-unit and specific turbines-unit speed-unit quantity-unit power-specific speed performance characteristics-geometric similarity-cavitation.

UNIT – V

CENTRIFUGAL PUMP: Installation details-classification-types work done-Manometric head-minimum starting speed-losses and efficiencies-specific speed multistage pumps-pumps in parallel-performance of pumps-characteristic curves-NPSH-water hammer.

HYDROELECTRIC POWER STATION: Elements of hydro electric power station-type – concept of pumped storage plants-storage requirements,curve(explanatory only) estimation of power developed from a given catchment area, heads and efficiencies.

Text Books:

1. F M White "*Fluid Mechanics",* Tata Mc Graw Hill Publishers.2011.
2. Modi &Seth "*Fluid Mechanics& Hydraulic Machines",* Standard book house.

Reference Books:

1. Dr.R.K.Bansal *"Fluid Mechanics and Hydraulic Machines",*Laxmi Publications.
2. Rajput *"Fluid Mechanics and Hydraulic Machines",*
3. A.K.Mohanty "*Fluid Mechanics* ", Prentice hall of India Pvt Ltd.
4. Banga & Sharma *"Hydraulic Machines",* Khanna Publications

Outcomes :

After completion of this course, students will be able to….

1: Apply fundamental knowledge of mathematics to modeling and analysis of fluid flow problems in civil and environmental engineering.

2: Conduct Experiments (in teams) in pipe flows and open channel flows and documenting them in engineering reports.

3: Understand the basics of hydraulic machinery and their operation design in water distribution systems.

4: Select and design appropriate pumps, classification, identify and design of hydraulic turbines and their application in Hydro Electric Power Plants

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

(AJ4112) FLUID MECHANICS & HYDRAULIC MACHINERY LAB

B.Tech. II Year – II Semester: EEE **L / T / P / C**
0/ 0 / 3/ 2

Objectives:

O1: Compare the result of analytical models introduced in lecture to the actual behavior of real fluid flow

O2: Discuss and practice standard measurement techniques of fluid mechanics and their applications.

O3:Familiarize the students with the componenets and working principles of the Hydraulic machines-different types of turbines, Pumps, amd other miscellaneous hydraulics machines.

O4: Learn and practice writing technical reports and to work on small design projects.

List of Experiments:

1. Calibration of Venturimeter & Orificemeter
2. Determination of Coefficient of discharge for a small orifice/Mouthpiece by constant head method.
3. Calibration of contracted Rectangular Notch and /Triangular Notch
4. Determination of friction factor of a pipe.
5. Determination of Coefficient for minor losses.
6. Verification of Bernoulli's equation.
7. Impact of jet on Vanes.
8. Study of Hydraulic jump.
9. Performance test on pelton wheel Turbine.
10. Performance test on Francis Turbine
11. Performance test on Kaplan Turbine.
12. Performance characteristic of a single stage/multi stage centrifugal pump.
13. Performance characteristic of a reciprocating pump.

Outcomes:

O1: Utilize basic measurement techniques of fluid mechanics and able to differentiate among measurement techniques their relevance and applications.

O2: Demonstrate Practical understanding of minor and friction losses in pipe flows.

O3: Demonstrate practical working of hydraulic machines-different types of Turbines, Pumps, and other miscellaneous hydraulics machines.

O4:Compare the results of analytical models introduced in lecture to the actual behavior of real fluid flows and draw correct and sustainable conclusions.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

(AJ4246) BASIC ELECTRICAL SIMULATION LAB

B.Tech.-II Year-II Semester: EEE

L	T	P	C
0	0	3	2

The following experiments are required to be conducted as compulsory experiments using PSPICE/MATLAB software:

1. Nodal Analysis.
2. Simulation of DC Circuits.
3. DC Transient response.
4. Simulation of Frequency response of second order RLC series circuit.
5. Simulation of Time response of second order RLC series circuit.
6. Simulation of Frequency response of second order RLC Parallel circuit
7. Simulation of Time response of second order RLC Parallel circuit.
8. Verification of superposition and Thevenin's Theorems.
9. Generation of Various Signals and Sequences (Periodic and A periodic), such as Unit Impulse, Unit Step, Square, Saw tooth, Triangular, Sinusoidal, Ramp, Sine waves.

In addition to the above nine experiments, at least any three of the experiments from the following list are required to be conducted using PSPICE/MATLAB software:

1. Computation of Unit sample, Unit step and Sinusoidal responses of the given LTI system and verifying its physical reliability and stability properties.
2. Finding the Fourier Transform of a given signal and plotting its magnitude and phase spectrum.
3. Waveform Synthesis using Laplace Transform.
4. Locating the Zeros and Poles and plotting the Pole-Zero maps in S-plane and Z-Plane for the given transfer function.
5. Locus Diagram of RL & RC circuits with variation of R, L, C
6. Verification of Maximum Power Transfer Theorem.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

(AJ4421) IC & HDL SIMULATION LAB

II Year B.Tech. II - Semester: EEE	**L**	**T/P/D**	**C**
	-	**- /3/-**	**2**

Note: To perform any sixteen experiments (choosing at least seven from each part).

Part - I: Linear IC Experiments

1. OP AMP Applications – Adder, Subtractor, Comparators.
2. Integrator and Differentiator Circuits using IC 741.
3. Active Filter Applications – LPF, HPF (first order)
4. IC 741 Waveform Generators - Sine, Square wave and Triangular waves.
5. IC 555 Timer - Monostable and Astable Multivibrator Circuits.
6. Schmitt Trigger Circuits - Using IC 741
7. IC 565 - PLL Applications.
8. Voltage Regulator using IC 723, Three Terminal Voltage Regulators - 7805, 7809, 7912.

EQUIPMENT REQUIRED:

1. 20 MHz / 40 MHz / 60 MHz Oscilloscope.
2. 1 MHz Function Generator (Sine, Square, Triangular and TTL).
3. Regulated Power Supply.
4. Multimeter / Volt Meter.

Part - II: HDL Simulation programs:

Programming can be done using any compiler. Download the programs on FPGA / CPLD boards and performance testing may be done using pattern generator / logic analyzer apart from verification by simulation using Cadence / Mentor Graphics / Synopsys / Equivalent front end CAD tools.

1. HDL code to realize all the logic gates
2. Design of 2-to-4 decoder
3. Design of 8-to-3 encoder (without and with Priority)
4. Design of 8-to-1 multiplexer and 1 x 8 demultiplexer.
5. Design of 4 bit binary to gray code converter
6. Design of 4 bit comparator
7. Design of Full adder using 3 modelling styles
8. Design of flip flops: SR, JK, T
9. Design of 4-bit binary, BCD counters (synchronous/ asynchronous reset)
10. Finite State Machine Design

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

(AJMC01) GENDER SENSITIZATION
(An Activity – based Course)

II Year B. Tech, II Semester (Common to All Branches)	**L**	**T**	**P**	**C**
	0	**0**	**3**	**0**

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

Learning Outcomes:

- Students will have developed a better understanding of important issues related to gender in contemporary India.
- 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.
- Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
- Students will acquire insight into the gendered division of labor and its relation to politics and economics.
- Men and women students and professionals will be better equipped to work and live together as equals.
- Students will develop a sense of appreciation of women in all walks of life.
- 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 and Equals **(Towards a World of Equals: Unit – 12)**
Mary Kom and Onler. 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 Labor (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 No! (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 – "! Fought for my Life ……" – Further Reading. The Caste Face of Violence.

Unit – V
GENDERS 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 of Telangana
Whose History? Questions for Historians and Others (Towards a World of Equals: Unit – 9)
Reclaiming a Past. Writing other Histories. Further Reading. Missing Pages from Telangana History.
Essential Reading: All the Units in the Text books, "Towards a World of Equals: A Bilingual Textbook on Gender" Written by A. Suneetha, Uma Bhrugubanda, Duggirala Vasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Tharu.
Note: Since it is Innterdisciplinary Course, reasource Persons can be drawn from the fields of English Literature of Sociology or Political Science or any other qualified faculty who has expertise in this field.

Reference Books:

1. Sen, Amartya. "More than Once 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. Gautam, Liela and Gita Ramaswamy. "A 'Conversation' between a Daughter and Mother". Broadsheel on Contemporany Politics. Special Issue on Sexuality and Harassment: Gender Politics on Campus Today. Ed.Madhumeeta Sinha and Asma Rasheed. Hydrabad: Anveshi research Center for Women`s Studies, 2014.
3. Abdulali Sohaila. " I Fought For My Life…and Won." Abailable online at: http://www.thealternative. In/lifestyle/i-fought-for-my lifeand-won-sohaila-abdulal/

4. Jeganathan Pradeep, Partha Chatterjee (Ed). “Community, Gender and Violence Subaltern Studies XI”. Permanent Block and Ravi Dayal Publishers, New Delhi, 2000
5. K. Kapadia. The Violence of Development: The Politics of Identity, Gender and Social Inequalities in India. London: Zed Books, 2002.
6. S. Benhabib. Situating the self: Gender, Community, and Postmodernism in Contemporary Ethics, London:Routledge, 1992.
7. Virginia Woolf A Room of One`s Oxford: Black Swan. 1992.
8. T. Banuri and M. Mahmood, Just Development: Beyond Adjustment with a Human Face, Karachi: Oxford University Press, 1997.
9. Tripti Lahiri. “By the Numbers: Where India Women Work.” Women`s Studies Journal (14 November 2012) Available online at: http://blogs. Wsj.com/India real time/2012/11/14/by – the –numbers – where- Indian- women-works/>
10. K. Satyanarayana and Susie Tharu (Ed.) Steel Nibs Are Sprouting: New Dalit Writing From South India, Dossier 2: Telugu And Kannada http://harpercollints.co.in/BookDetail.asp?Book Code=3732
11. Vimala “Vantilu (The Kitchen)”. Omen Writing in India: 600BC to the Present, Volume II The 20th Century. Ed. Susie Tharu and K. Lalita. Delhi: Oxford University Press, 1995. 599-601.
12. Shatrughna, Veena et al. Women`s Work and its Impact on Child Health and Nutrition, Hyderabad, National Institute of Nutrition, India Council of Medcial Research 1993.
13. Stress Shakti Sanghatana. “We Were Making History….’Life Stories of Women in the Telangana People`s Struggle. New Delhi:Kali of Women, 1989.
14. Menon, Nivedita. Seeing Like a Feminist. New Delhi. Zubaan-Penguin Books, 2012.
15. Jayaprabha, A. “Chupulu (Stares)”. Women Writing in India: 600BC to the Present. Volume II: The 20th Century Ed. Susie Tharu and K. Lalita. Delhi: Oxford University Press, 1995. 596-597.
16. Javeed, Shayam and Anupam Manuhaar. “Women and Wage Discrimination in India: A Critical Analysis”. International Journal of Humanilities and Social Science Invention 2, 4(2013).

B.TECH

III YEAR
I & II SEMESTER
SYLLABUS

JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

III Year B.Tech. I-Semester: EEE

L	T	P	C
4	1	0	4

(AJ5214)CONTROL SYSTEMS

Pre- Requisites: To learn this course students should have the concepts on the following subjects: Electrical Circuits-I, Electrical Circuits-II, Electrical Machines

Objective: In this course it is aimed to introduce to

1. The students the principles and applications of control systems in everyday life.
2. The basic concepts of block diagram reduction.
3. Time domain analysis solutions to time invariant systems.
4. Deals with the different aspects of stability analysis of systems in frequency domain and time domain.
5. Concept on multi input and multi output systems.

UNIT – I INTRODUCTION:

Concepts of Control Systems- Open Loop and closed loop control systems and their differences- Different examples of control systems- Classification of control systems, Feed-Back Characteristics, Effects of feedback. Mathematical models – Differential equations, Impulse Response and transfer functions - Translational and Rotational mechanical systems.

TRANSFER FUNCTION REPRESENTATION:

Transfer Function of DC Servo motor - AC Servo motor- Synchro transmitter and Receiver, Block diagram representation of systems considering electrical systems as examples -Block diagram algebra – Representation by Signal flow graph - Reduction using mason's gain formula.

UNIT-II TIME RESPONSE ANALYSIS:

Standard test signals - Time response of first order systems – Characteristic Equation of Feedback control systems, Transient response of second order systems - Time domain specifications – Steady state response - Steady state errors and error constants – Effects of proportional derivative, proportional integral systems.

UNIT –III STABILITY ANALYSIS:

The concept of stability – Routh- Hurwitz stability criterion – Absolute stability and conditional stability.

Root Locus Technique: The root locus concept - construction of root loci-effects of adding poles and zeros to G(s) H(s) on the root loci.

Frequency Response Analysis:

Introduction, Frequency domain specifications-Bode diagrams-Determination of Frequency domain specifications and transfer function from the Bode Diagram-Phase margin and Gain margin-Stability Analysis from Bode Plots.

UNIT-IV STABILITY ANALYSIS IN FREQUENCY DOMAIN:

Polar Plots, Nyquist Plots and applications of Nyquist criterion to find the stability –Effects of adding poles and zeros to G(s)H(s) on the shape of the Nyquist diagrams.

Classical Control Design Techniques:
Compensation techniques – Lag, Lead, and Lead-Lag Controllers design in frequency Domain, PID Controllers- Numerical Problems.

UNIT –V STATE SPACE ANALYSIS OF CONTINUOUS SYSTEMS:
Concepts 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 its Properties. Concepts on Controllability and Observability

TEXT BOOKS:

1. Control Systems Engineering – by I. J. Nagrath and M. Gopal, New Age International (P) Limited, Publishers, 2nd edition.
2. Automatic Control Systems 8th edition– by B. C. Kuo 2003– John wiley and sons.
3. Modern Control Engineering – by Katsuhiko Ogata – Prentice Hall of India Pvt. Ltd., 3rd edition, 1998.

REFERENCE BOOKS:

1. Control Systems by N.K.Sinha, New Age International (P) Limited Publishers, 3rd Edition, 1998.
2. Control Systems Engg. by NISE 3rd Edition – John wiley
3. Control Systems by S.Kesavan, Hitech Publications.
4. "Modeling & Control of Dynamic Systems" by Narciso F. Macia George J. Thaler, Thomson Publishers.
5. Solutions and Problems of Control Systems by A.K.Jairath, CBS Publictions,1992.

OUTCOMES:

After going through this course, the student gets knowledge on

1. Open loop and closed loop systems, concept of feedback in control systems, mathematical modeling and transfer function derivations of translational and rotational systems and transfer functions of servomotors and concepts of synchros.
2. Transfer function representation through block diagram algebra and signal flow graphs,
3. Time response analysis of different ordered systems through their characteristic equation and time-domain specifications.
4. Stability analysis of control systems in s-domain through R-H criteria and root-locus techniques.
5. Frequency response analysis through bode diagrams.

With which he/she can be able to apply the above conceptual things to real world electrical and Electronic problems and applications.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

III Year B.Tech. I-Sem: EEE

L	T	P	C
3	1	0	3

(AJ5216) POWER SYSTEMS-II

Pre-requisites: To learn this course students should have the concepts on the following subjects: Power Systems-I, Electrical Circuits-I

Objective:

1. This course is an extension of Power systems-I course.
2. It deals with basic theory of transmission lines modeling and their performance analysis.
3. This course gives emphasis on mechanical design of transmission lines, cables and insulators.

UNIT-I

TRANSMISSION LINE PARAMETERS

Types of conductors - calculation of resistance for solid conductors - Calculation of inductance for single phase and three phase, single and double circuit lines, concept of GMR & 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.

UNIT-II

PERFORMANCE OF SHORT AND MEDIUM LENGTH TRANSMISSION LINES

Classification of Transmission Lines - Short, medium and long line and their model representations - Nominal-T, Nominal-Pie and A, B, C, D Constants for Short, medium, symmetrical & Asymmetrical Networks, Numerical Problems. Mathematical Solutions to estimate regulation and efficiency of all types of lines - Numerical Problems.

PERFORMANCE OF LONG TRANSMISSION LINES

Long Transmission Line - Rigorous Solution, evaluation of A,B,C,D Constants, Interpretation of the Long Line Equations, Incident, Reflected and Refracted Waves -Surge Impedance and SIL of Long Lines, Wave Length and Velocity of Propagation of Waves - Representation of Long Lines - Equivalent-T and Equivalent Pie network models (numerical problems).

UNIT – III

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 (Numerical Problems), Bewley's Lattice Diagrams, Attenuation and distortion of Travelling Waves.

VARIOUS FACTORS GOVERNING THE PERFORMANCE OF TRANSMISSION LINE

Skin and Proximity effects - Description and effect on Resistance of Solid Conductors - Ferranti effect - Charging Current - Effect on Regulation of the Transmission Line. Corona - Description of the phenomenon, factors affecting corona, critical voltages and power loss, Radio Interference.

UNIT-IV

OVERHEAD LINE INSULATORS

Types of Insulators, String efficiency and Methods for improvement, Numerical Problems - voltage distribution, calculation of string efficiency, Capacitance grading and Static Shielding.

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.

UNIT-V

UNDERGROUND CABLES

Types of Cables, Construction, Types of Insulating materials, Calculation 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, HV cables.

TEXT BOOKS:

1. C.L. Wadhwa, Electrical power systems - New Age International (P) Limited, Publishers,1998.
2. I.J. Nagarath& D.P Kothari , Power System Engineering, TMH 2/e, 2010
3. Power System Engineering- by R.K.Rajput Laxmi Publications(P) Limited, New Delhi 2006.
4. Power System Analysis by Grainger and Stevenson, Tata McGraw Hill.

REFERENCE BOOKS:

1. B.R. Gupta, Power System Analysis and Design, Wheeler Publishing.
2. AbhijitChakrpabarti, SunithaHalder, Power System Analysis, Operation and control, PHI, 3/e, 2010
3. TuranGonen, Electrical Power Transmission system engineering Analysis and design, CRC Press (Taylor & Francis Group) Special Indian Edition, 2/e.
4. M.L. Soni, P.V. Gupta, U.S. Bhatnagar, A. Chakrabarthy, Power System Engineering, Dhanpat Rai & Co Pvt. Ltd.

OUTCOMES:

After going through this course the student gets a thorough knowledge

1. On calculation of transmission line parameters, analysis of short, medium, long length lines and the factors affecting the performance of transmission lines, transients in transmission lines.
2. Operation of different types of overhead line insulators, sag and tension calculation of transmission lines and brief study and calculation of underground cables for power transmission as well for distribution.
3. With this subject which he/she can be able to apply the above conceptual things to real-world electrical and electronics problems and applications.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

III-Year B.Tech. I-Sem: EEE

L	T	P	C
4	1	0	4

(AJ5217) ELECTRICAL MACHINES-III

Pre requisites: To learn this course students should have the concepts on the following subjects: Electrical Machines-I, Electrical Machines-II

Objectives:

1. It deals with the detailed analysis of Synchronous Generators and Motors which are prime source of Electrical power generation and utilities.
2. Also covers different types of single phase motors which are having significant applications in house hold appliances and control systems.

UNIT-I: Construction and Principle of operation of synchronous machine

Constructional features of round rotor and salient pole machines, Armature windings: Integral slot and fractional slot windings; Distributed and concentrated windings Distribution Pitch and windings factors, E.M.F Equation.

Harmonics ingenerated E.M.F…. Superposition of harmonics, Armature reaction, Leakage reactance, Synchronous reactance and impedance, Experimental determination, Phasor diagram, Load characteristics.

UNIT-II: Regulation of Synchronous generator

Regulation by synchronous impedance method, MMF. Method, Z.P.F. method and A.S.A methods, Salient pole alternators. Two reaction analysis, Experimental determination of X_d and X_q (Slip test) Phasor diagrams, Regulation of salient pole alternators.

UNIT-III: Parallel operation of Synchronous generators

Synchronizing alternators with infinite bus bars, Synchronizing power torque, Parallel operation and load sharing, Effect of change of excitation and mechanical power input, Analysis of short circuit current wave form, Determination of sub-transient, Transient and steady state reactances.

UNIT-IV: Synchronous motors- principle of operation

Theory of operation, Phasor diagram, Variation of current and power factor with excitation synchronous condenser, Mathematical analysis for power developed

Power circles: Excitation and power circles - Hunting and its suppression, Methods of starting, synchronous induction motor.

UNIT-V: Single phase motors & Special machines

Single phase Motors: Single phase induction motor-Constructional features-Double revolving field theory, Cross Field theory Equivalent Circuit - Spilt phase motors – Capacitor start Capacitor run motors, shaded pole motor. Principle of A.C. Series motor-Universal motor, Stepper motor, PMDC and Reluctance Motor. (Qualitative Treatment only).

TEXT BOOKS:

1. Electrical Machines – by P.S. Bimbra, Khanna Publishers.
2. Electric Machines- by I.J. Nagrath & D.P. Kothari, Tata Mc Graw-Hill Publishers, 3rd Edition 2006.

REFERENCE BOOKS:

1. Performance and Design of AC Machines, MG. Say, BPB Publishers
2. Electrical Machines by Mulukutla S.Sarma, Mukesh K. Pathak, Cengage Learning, 2009.
3. Electric Machinery – by A.E. Fitzgerald, C.Kingsley and S.Umans,Mc Graw-Hill Companies, 5^{th} edition, 1990.

OUTCOMES:

After going through this course the student

1. To gets a thorough knowledge on, construction operation characteristics regulation parallel-operation power circle starting & speed control methods of synchronous machines
2. Construction operation characteristics of single-phase motor and special machines, with which he/she can be able to apply the above conceptual things to real-world electrical and electronics problems and applications.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

III Year B.Tech. I-Sem: EEE

L	T	P	C
3	1	0	3

(AJ5219)POWER ELECTRONICS

Pre requisites: To learn this course student should have the concepts on the following subjects: Electrical Circuits-I & II, Electronic Devices and Circuits

Objective:

1. With the advent of semiconductor devices, revolution is taking place in the power transmission distribution and utilization.
2. This course introduces the basic concepts of power semiconductor devices, converters and choppers and their analysis.

UNIT – I: Power Semi Conductor Devices and Commutation Circuits

Thyristors – Silicon Controlled Rectifiers (SCR's) – BJT – Power MOSFET – Power IGBT and their characteristics and other thyristors – Basic theory of operation of SCR – Static characteristics – Turn on and Turn off methods- Dynamic characteristics of SCR - Turn on and Turn off times -Salient points.

Two transistor analogy of SCR – R,RC,UJT firing circuits– Series and parallel connections of SCR's – Snubber circuit details – Specifications and Ratings of SCR's, BJT, IGBT - Numerical problems – Line Commutation and Forced Commutation circuits.

UNIT – II: Single Phase Half Wave Controlled Converters

Phase control technique – Single phase Line commutated converters – Half wave controlled converters with Resistive, RL load and RLE load– Derivation of average load voltage and current -Active and Reactive power inputs to the converters without and with Freewheeling Diode –Numerical problems

Single Phase Fully Controlled Converters

Fully controlled converters, Midpoint and Bridge connections with Resistive, RL loads and RLE load– Derivation of average load voltage and current – Line commutated inverters , semi-converters, active and Reactive power inputs to the converters , Effect of source inductance – Expressions of load voltage and current – Numerical problems.

UNIT – III: Three Phase Line Commutated Converters

Three phase converters – Three pulse and six pulse converters and bridge connections with R, RL load voltage and current with R and RL load and RLE loads – Semi Converters, Effect of Source inductance–Dual converters Waveforms –Numerical Problems.

UNIT – IV: AC VOLTAGE CONTROLLERS and CYCLO CONVERTERS

AC voltage controllers – 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: Single phase midpoint cyclo converters with resistive and inductive loads, Bridge Configuration of cyclo converters- Waveforms.

UNIT – V: Choppers & Inverters

Choppers – Time ratio control and Current limit control strategies – Step down choppers- Derivation of load voltage and currents with R, RL and RLE loads- Step up Chopper – load voltage expression and Problems,D.C Jones Chopper,AC Chopper ,Problems

Inverters – Single phase inverter – Waveforms, Three Phase Inverters (180,120 degrees modes of operation), Voltage control techniques for inverters- Pulse width modulation techniques – Numerical problems.

TEXT BOOKS:

1. P.S.Bhimbra , "Power Electronics ", Khanna publications.
2. M. H. Rashid, Power Electronics : Circuits, Devices and Applications,– Prentice Hall of India, 2nd edition, 1998.
3. Power electronics: converters, applications, and design By Ned Mohan, Tore M. Undeland, John Wiley & Sons,2009.

REFERENCE BOOKS:

1. Power Electronics, Vedam Subramanyam, New Age International (P) Limited, Publishers.
2. Elements of Power Electronics, Philip T. Krein, Oxford University Press.
3. Power Electronics, M. S. Jamil Asghar, PHI Private Limited.
4. Power Electronics, P.C.Sen,Tata Mc Graw-Hill Publishing.

OUTCOMES:

At the end of the course, the students will be able to

1. Distinguish between different types of power semiconductor devices and their characteristics.
2. Analyze Phase controlled converters and analyze AC voltage controllers and Cycloconverters.
3. Analyze DC –DC Choppers and analyze DC-AC Inverters.

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OPEN ELECTIVE-I

(AJ5E02) MANAGERTAL ECONOMICS AND FINANCIAL ANALYSIS

Course Objective:

To enable the student to understand and appreciate, with a practical insight, the imporlance of certain basic issues governing the business operations namely: demand and supply, production function, cost analysis, markets, forms of business organisations, capital budgeting and financial accounting and financial analysis.

Unit I

lntroduction & Demand Analysis.

Definition, Nature and Scope of Managerial Economics. Demand Analysis: Demand Determinants, Law of Demand and its exceptions. Elasticity of Demand: Definition, Types, Measurement and Significance of Elasticity of Demand. Demand Forecasting, Factors governing demand forecasting, methods of demand forecasting.

Unit II

Production & Cost Analysis: Production Function-
lsoquants and lsocosts, MRTS, Least Cost Combination of lnputs, Cobb-Douglas Production function, Laws of Returns, lnternal and External Economies of Scale. Cost Analysis: Cost concepts. Break-even Analysis (BEA)-Determination of Break-Even Point (simple problems) - Managerial Significance.

Unit III

Markets & New Economic Environment:
Types of competition and Markets, Features of Perfect competition, Monopoly and Monopolistic Competition. Price-Output Determination in case of Perfect Competition and Monopoly. Pricing Objectives and Policies of Pricing. Methods of Pricing. Eusrness; Features and evaluation of different forms of Business Organisation: Sole Proprietorship, Partnership, Joint Stock Company, Public Enterprises and their types, New Economic Environment Changing Business Environment in Post-liberalization scenario.

Unit IV

Capital Budgeting:
Capital and its significance, Types of Capitat, Estimation of Fixed and Working capital requirements, Methods and sources of raising capital - Trading Forecast, Capital Budget, Cash Budget. Capital Budgeting: features of capital budgeting proposals, Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR) and Net Present Value Method (simple problems).

Unit V

Introduction to Financial Accounting & Financial Analysis:

Accounting concepts and conventions - lntroduction IFRS - Double-Entry Book Keeping, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance sheet with simple adjustments).

Financial, Analysis: Analysis and lnterpretation of Liquidity Ratios, Activity Ratios, and Capital structure Ratios and Profitability ratios. Du Pont Chart'

References:

1. Varshney & Maheswari: Managerial Economics, Sultan Chand' 2009.
2. S.A. Siddiqui & A.S. Siddiqui, Managerial Economics and Financial Analysis, New Age international Publishers, Hyderabad 2013'
3. M' Kasi Reddy & Saraswathi, Managerial Economics and Financial Analysis, PHI New Delhi, 2012.
4. Ambrish Gupta, Financial Accounting for Management, Pearson Education, New Delhi. 2012.

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OPEN ELECTIVE-I
(AJ5129) DISASTER MANAGEMENT AND MITIGATION

Objectives:

1. To understand the disaster phenomenon, its different contextual aspects, impacts and public health consequences.
2. To learn the International Strategy for Disaster Reduction and to increase skills and abilities for implementing the Disaster Risk Reduction (DRR) Strategy.
3. To know the skills and abilities to analyze potential effects of disasters, strategies and methods to deliver public health response to avert these effects.
4. To understand the design, implement and evaluate research on disasters.

UNIT - I:

Environmental Hazards & Disasters: Meaning of Environmental hazards, Environmental Disasters and Environmental stress. Concept of Environmental Hazards, Environmental stress & Environmental Disasters. Different approaches & relation with human Ecology - Landscape Approach – Ecosystem Approach - Perception approach - Human ecology & its application in geographical researches.

UNIT - II:

Types of Environmental hazards & Disasters: Natural hazards and Disasters - Man induced hazards & Disasters - Natural Hazards - Planetary Hazards / Disasters - Extra Planetary Hazards / disasters - Planetary Hazards - Endogenous Hazards - Exogenous Hazards

UNIT - III:

Endogenous Hazards - Volcanic eruption - Earthquakes - landslides - Volcanic Hazards / Disasters - Causes and distribution of Volcanoes - Hazardous effects of volcanic eruptions - Environmental impacts of volcanic eruptions - Earthquake Hazards / disasters - Causes of Earthquakes - Distribution of earthquakes - Hazardous effects of - earthquakes - Earthquake Hazards in India - Human adjustment, perception & mitigation of earthquake.

UNIT - IV:

Exogenous hazards / disasters - Infrequent events - Cumulative atmospheric hazards / disasters

Infrequent events: Cyclones - Lightning - Hailstorms

Cyclones: Tropical cyclones & Local storms - Destruction by tropical cyclones & local storms (causes, distribution human adjustment, perception & mitigation) Cumulative atmospheric hazards/ disasters :- Floods - Droughts - Cold waves - Heal waves Floods :- Causes of floods - Flood hazards India - Flood control measures (Human adjustment, perception & mitigation) Droughts :- Impacts of droughts - Drought hazards in India - Drought control measures -

UNIT - V:

Chemical hazards / disasters: Release of toxic chemicals, nuclear explosion , Sedimentation processes: - Global Sedimentation problems - Regional Sedimentation problems - Sedimentation & Environmental problems - Corrective measures of Erosion & Sedimentation

Soil Erosion: Mechanics & forms of Soil Erosion - Factors 7 causes of Soil Erosion - Conservation measures of Soil Erosion.

Biological hazards / disasters: Population Explosion. Emerging approaches in Disaster Management - Three stages: Pre-disaster Stage (preparedness), Emergency Stage, Post Disaster stage – Rehabilitation Application of various technologies in Disaster risk: Geographic information systems - Remote sensing- contribution of remote sensing and GIS - Case study.

Text Books:

1. Disaster Mitigation: Experiences And Reflections by Pradeep Sahni
2. Natural Hazards & Disasters by Donald Hyndman & David Hyndman - Cengage Learning

References:

1. R. B. Singh (Ed) Environmental Geography, Heritage Publishers New Delhi, 1990
2. Savinder Singh Environmental Geography, Prayag Pustak Bhawann 1997
3. Kates, B. I & White, G. F The Environment as Hazards, oxford, New York, 1978
4. R. B. Singh (Ed) Disaster Management, Rawat Publication, New Delhi, 2000

Outcomes:

On completion of this course, students will be able to

1. Integrate knowledge and to analyze, evaluate and manage the different public health aspects of disaster events at a local and global levels, even when limited information is available.
2. Describe, analyze and evaluate the environmental, social, cultural, economic, legal and organizational aspects influencing vulnerabilities and capacities to face disasters.
3. Work theoretically and practically in the processes of disaster management (disaster risk reduction, response, and recovery) and relate their interconnections, particularly in the field of the Public Health aspects of the disasters.
4. Manage the Public Health aspects of the disasters.

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OPEN ELECTIVE-I
(AJ5361) THERMAL SCIENCES

Objectives:
1. To study the energy sources in various engineering fields.
2. To study the behavior of fluids and fluid flows.
3. To study the thermal behavior.
4. To study the heat transfer in different fields.
5. To study the requirements of human comforts in refrigeration and air-conditioning

UNIT-I
Energy sources: Energy classifications - renewable and non renewable – solar energy, wind energy, tidal power, ocean power, geothermal energy, hydrogen energy and energy from biomass.

UNIT-II
Fluid mechanics: Fluid statistics: Properties of fluids- measuring instruments of fluids and its applications - Fluid kinematics: classification of fluid flows – stream lines, streak lines and stream tube – equation of continuity for one dimensional and three dimensional flows.
Fluid dynamics: surface and body forces – Euler's and Bernouli's equations for flow along a stream line. Boundary layer concepts – basics of turbo machinery - classifications of hydraulic turbines and its performances – centrifugal pumps.

UNIT-III
Thermodynamics: Fundamental concepts – Laws of thermodynamics – first law, second law, third law and its applications – gas power cycles. I.C. engines – combustion in SI and CI engines and its performances.
Compressors: classifications of compressors – reciprocating, rotary, dynamic, axial flow compressors and its working principles. Concepts on steam power cycles – boilers and boiler mountings, steam turbines, steam condensers and their working principles. Concept on gas power cycles – Air compressors, combustion chambers, gas turbines and their working principles. Jet propulsions and rockets.

UNIT-IV
Heat transfer: Modes of heat transfer and laws of heat transfer – conduction, convection, radiation heat transfer. Fourier's laws of heat conduction – steady and unsteady state heat transfer with and without heat generation - convection heat transfer – forced and free convection and its applications – significance of non-dimensional numbers. Radiation heat transfer - Introduction, absorption and reflection of radiant energy, Emission, Radiosity and irradiation. Emission characteristics and laws of black-body radiation – laws of radiations. Boiling and condensation and its classifications – concept on heat exchangers.

UNIT-IV

Refrigeration and air-conditioning: Brayton and Rankine cycles – Performance Evaluation – combined cycles, Bell- Coleman cycle, and Vapour compression cycle - performance Evaluation – vapour absorption cycle- performance evaluation.

Air-conditioning: Psychometric Properties & Processes - Requirements of human comfort and concept of effective temperature- Comfort chart –Comfort Air conditioning - Air Conditioning systems - Classification of equipment, cooling, heating humidification and dehumidification, filters, grills and registers, fans and blowers and heat pumps.

Text books:

1. Thermal Engineering / R.K. Rajput / Lakshmi Publications
2. Thermal Engineering-M.L.Marthur & Mehta/Jain bros.

References:

1. Thermal Engineering-P.L.Bellaney/ khanna publishers.
2. P.K.Nag, Heat & Mass Transfer, TMH, 2008. ISBN:0-07-047337-4
3. Holman, J.P., "Heat Transfer", Tata McGraw Hill Book Company, 1988
4. Refrigeration and Air Conditioning / CP Arora / TMH

Outcomes:

1. Obtaining the power from different types of energy sources
2. Knowing the properties of fluids and its applications.
3. Obtaining the knowledge of IC engine performance.
4. Understand laws of heat transfer and energy balance in thermal engineering systems
5. Acquire the knowledge of systematic approach in solving heat transfer problems
6. Know the requirements of human comforts in refrigeration and air-conditioning

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PROFESSIONAL ELECTIVE-I
(AJ5220)RENEWABLE ENERGY SOURCES

Pre-requisites: To learn this course student should have the concepts on the following subjects: Engineering Physics & Chemistry

Objectives:

To make the student

1. Introduce to the technology of renewable sources of energy
2. Learn about the solar radiation, its applications and radiation measuring instruments
3. Learn about the various types of geothermal resources and its applications
4. Study the biomass energy resources , bio-mass systems
5. Learn the methods of energy extraction from the wind and oceans and learn to the technology of direct energy conversion methods

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 for India.

UNIT-II

SOLAR ENERGY COLLECTION: Flat plate and concentrating collectors, classification of concentrating collectors, orientation and thermal analysis, advanced collectors, tracking CPC and solar swing

SOLAR ENERGY STORAGE AND APPLICATIONS: Different methods, Sensible, latent heat and stratified storage, solar ponds. Solar Applications- solar heating/cooling technique, solar distillation and drying, photovoltaic energy conversion, applications of PV system-PV hybrid systems

UNIT-III WIND ENERGY: Sources and potentials, horizontal and vertical axis windmills, performance characteristics, Betz criteria, analysis of aerodynamic forces acting on blade, applications.

BIO-MASS: Principles of Bio-Conversion, Anaerobic/aerobic digestion, types of Bio-gas digesters, gas yield, combustion characteristics of bio-gas, utilization for cooking, I.C.Engine operation and economic aspects, biomass resource development in India.

UNIT-IV

GEOTHERMAL ENERGY: Structure of earth's interior- geothermal sites- earthquakes & volcanoes- geothermal resources- hot springs-steam ejection- principle of working- types of geothermal station with schematic representation site selection for geothermal power plants-problems associated with geothermal conversion-applications-geothermal energy prospects 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, principles of DEC. Thermo-electric generators, seebeck, peltier and joule Thomson effects and applications. MHD generators, principles and applications. Fuel cells, principles, and applications.

TEXT BOOKS:

1. Non-Conventional Energy Sources by G.D. Rai, Khanna Publihers, fourth edition, 2008

REFERENCE BOOKS:

1. Suhas.P.Sukhatma and Nayak.J.K., "solar Eenergy", TMH, New Delhi, 3rd edition, 2008
2. D.P.Kothari and Rakesh Ranjan and K.C. Singal., " Renewable energy resources and emerging technologies"Prentice Hall of India Pvt.Ltd., 2nd Edition, 2011
3. Non-Conventional Energy Systems / K Mittal /Wheeler

OUTCOMES:

At the end of the course, the student will be able to

1. Apply the technology to capture the energy from the renewable sources like sun, wind, ocean, biomass, geothermal.
2. Use different renewable energy sources to produce electrical power
3. Minimize the use of conventional energy sources to produce electrical energy
4. Identify the fact that the conventional energy resources are depleted

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PROFESSIONAL ELECTIVE-I
(AJ5221)ENERGY STORAGE SYSTEMS

Pre-requisites: To learn this course students should have the concepts on the following subjects: Engineering Physics & Chemistry

OBJECTIVES:

1. Introduce to the technology of energy storage systems
2. Learn about the characteristics of electricity and need of ESS in various applications
3. Learn about the various types and features of ESS
4. Learn about the practical applications of ESS

UNIT-I ELECTRICAL ENERGY STORAGE TECHNOLOGIES

Characteristics of electricity, Electricity and the roles of EES, High generation cost during peak-demand periods, Need for continuous and flexible supply, Long distance between generation and consumption, Congestion in power grids, Transmission by cable.

UNIT-II NEEDS FOR ELECTRICAL ENERGY STORAGE

Emerging needs for EES, More renewable energy, less fossil fuel , Smart Grid uses, The roles of electrical energy storage technologies, The roles from the viewpoint of a utility, The roles from the viewpoint of consumers, The roles from the viewpoint of generators of renewable energy.

UNIT-III FEATURES OF ENERGY STORAGE SYSTEMS

Classification of EES systems , Mechanical storage systems, Pumped hydro storage (PHS), Compressed air energy storage (CAES), Flywheel energy storage (FES),Electrochemical storage systems , Secondary batteries , Flow batteries, Chemical energy storage , Hydrogen (H2),Synthetic natural gas (SNG).

UNIT-IV TYPES OF ELECTRICAL ENERGY STORAGE SYSTEMS

Electrical storage systems, Double-layer capacitors (DLC) ,Superconducting magnetic energy storage (SMES),Thermal storage systems ,Standards for EES, Technical comparison of EES technologies.

UNIT-V APPLICATIONS

Present status of applications, Utility use (conventional power generation, grid operation & service) , Consumer use (uninterruptable power supply for large consumers), New trends in applications ,Renewable energy generation, Smart Grid, Smart Micro grid, Smart House, Electric vehicles, Management and control hierarchy of storage systems, Internal configuration of battery storage systems, External connection of EES systems , Aggregating EES systems and distributed generation (Virtual Power Plant), Battery SCADA– aggregation of many dispersed batteries.

TEXT BOOKS

1. Thyristor control of Electric Drives - Vedam Subranmanyam.
2. Analysis of electric machinery and Drives systems - Paul C. Krause, Oleg wasynezuk, Scott D. Sudhoff.
3. Electrical Energy Storage Systems-ICE white papers.

REFERENCES

1. T. B. Atwater and Arthur Dobley, *Metal/Air batteries,* Lindens Handbook of Batteries, 2011, ISBN 978-0-07-162421-X.
2. D. Jähnig, et al.: *Thermo-chemical storage for solar space heating in a single-family house,* 10th International Conference on Thermal Energy Storage: Ecostock 2006, 31 May - 2 June 2006, New Jersey, USA.
3. Shin-ichi INAGE: *Prospective on the Decarbonised Power Grid,* IEC/MSB/EES Workshop, Germany, 31 May - 1 June 2011.
4. P. Wolfrum, F. Steinke, C. Hoffmann: *EES Requirements for a renewable Europe,* Presentation, IEC Workshop EES, Freiburg, 31 May 2011.

COURSE OUTCOMES:

1. Apply the technology to have energy storage system for any electrical Loads
2. To save the electrical power in peak time loads using ESS
3. To store energy and to avoid the environmental pollution

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PROFESSIONAL ELECTIVE-I
(AJ5222) ELECTRICAL ENGINEERING MATERIALS

Objectives:

1. This course introduces conductors and semiconductors materials and types and applications.
2. Electrical properties of dielectric materials, insulators materials, types and applications. Soft and hard magnetic materials and applications.
3. Optical properties of solids and sensitive materials.

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: Semi-Conductors

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, hystersis loop, hystersis 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.

Outcomes:

1. Apply the techniques for usage of conductors in different applications.
2. Uses of semiconductor materials in practical oriented.
3. Dielectric and insulators materials uses in AC and DC transmission lines and machines.
4. Different Magnetic materials uses in locomotives and other appliances.
5. Solids and optical properties in electrical engineering applications.

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(AJ5215)CONTROL SYSTEMS LAB

Any Ten of the following experiments are to be conducted:

1. Time response of Second order system
2. Characteristics of Synchros
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

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(AJ5218)ELECTRICAL MACHINES – II LAB

The Following experiments are required to be conducted as compulsory experiments:

1. OC &SC tests on single phase transformer.
2. Sumpner's test on a pair of single phase transformers.
3. Brake test on three phase induction motor.
4. No load & blocked rotor tests on three phase induction motor.
5. Regulation of three phase alternator by synchronous impedance and m.m.f methods.
6. 'V' & inverted 'V' curves of a three phase synchronous motor.
7. Equivalent circuit of a single phase induction motor.
8. Determination of Xd & Xq of a salient pole synchronous machine.

In addition to the above eight experiments, atleast 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. Scott connection of transformers.
4. Regulation of three-phase alternator by Z.P.F. and A.S.A methods.
5. Efficiency of a three phase alternator.
6. Heat run test on a bank of 3Nos.of Single phase Delta Connected transformers.
7. Measurement of sequence impedance of a three phase alternator.

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(AJ6223)SWITCH GEAR AND PROTECTION

Prerequisites: To learn this course student should have the concepts on the following subjects: Power systems-I & II

Objective: This course introduces

1. All varieties of Circuit Breakers and Relays for protection of Generators, Transformers and feeder bus bars from over voltages and other hazards.
2. It emphasis on Neutral for overall protection.

UNIT – I: INTRODUCTION TO CIRCUIT BREAKERS

Circuit Breakers: Elementary principles of arc interruption, Arc Phenomena, Restriking Voltage and Recovery voltages. - Restriking Phenomenon, Average and Max. RRRV, Numerical Problems - Current Chopping and Resistance Switching - CB ratings and Specifications: Types and Numerical Problems. – Auto reclosures. Description and Operation of following types of circuit breakers: Minimum Oil Circuit breakers, Air Blast Circuit Breakers, Vacuum and SF6 circuitbreakers.

UNIT – II: ELECTROMAGNETIC AND STATIC RELAYS

Principle of Operation and Construction of Attracted armature, Balanced Beam, induction Disc and Induction Cup relays. Types of Over Current Relays: 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, Characteristics of Distance Relays and Comparison. Static Relays: Static Relays verses Electromagnetic Relays. Introduction to Numerical Relays.

UNIT – III: PROTECTION OF POWER EQUIPMENT

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 transformers: Percentage Differential Protection, Numerical Problem on Design of CT s Ratio, Buchholtz relay Protection. Protection of Lines: Over Current, Carrier Current and Three-zone distance relay protection using Impedance relays. Translay Relay.

Protection of Bus bars – Differential protection.

UNIT – IV NEUTRAL GROUNDING

Grounded and Ungrounded Neutral Systems:- Effects of Ungrounded Neutral on system performance, Arcing Grounds Methods of Neutral Grounding: Solid, Resistance, Reactance – Peterson Coil, voltage Transformer Earthing and Grounding Practices, Grounding Transformers(Star-DeltaandZig-Zag)

UNIT – V PROTECTION AGAINST OVERVOLTAGES

Generation of Over Voltages in Power Systems.-Protection against Lightning Over Voltages - Valve type and Zinc-Oxide Lighting Arresters - Insulation Coordination -BIL, Impulse Ratio, Standard Impulse Test Wave, Volt-Time Characteristics.

TEXT BOOKS:

1. Badri Ram, D.N Viswakarma, Power System Protection and Switchgear, TMH Publications 2nd editon
2. Sunil S Rao, Switchgear and Protection – Khanna Publlishers.
3. C.L.Wadhwa, Electrical Power Systems –New Age international (P) Limited, Publishers, 3rd editon.

REFERENCE BOOKS:

1. Paithankar and S.R.Bhide, Fundamentals of Power System Protection, PHI, 2003.
2. C R Mason, Art & Science of Protective Relaying – Wiley Eastern Ltd.
3. B.L.Soni, Gupta, Bhatnagar, Chakrabarthy, A Text book on Power System Engineering, Dhanpat Rai & Co.

OUTCOMES:

1. Students are knowledgeable in the field of power system protection, and circuit breakers.
2. Students are knowledgeable in the field of instrument transformers, the field of relays.
3. Students will demonstrate and ability to design the relevant protection systems for the main elements of a power system
4. Students are knowledgeable in the field of switchgear
5. Students are knowledgeable in the field of over- voltage protection and the basics of data transmission.

   Students will demonstrate an ability to participate in professional multidisciplinary teams.

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(AJ6224)POWER SEMICONDUCTOR DRIVES

Pre-requisites:

1. Basics of semiconductor devices and power electronics converter.
2. Awareness of all type of machines V-I Characteristics, torque - speed Characteristics and Speed control techniques.
3. Control system design basics.
4. Awareness about traction systems

Objectives:

1. This course is an extension of Power Electronics application to AC and DC drives.
2. Control of DC, Motor drives with 1 phase and 3 phase converters are given in detail.
3. Control of AC, Motor drives with variable frequency converters and variable voltage are presented for both stator and rotor side.
4. Different type of breakings is given in detail.

UNIT – I: Control of DC motors by Single phase 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- Problems on Converter fed d.c motors.

Control of DC motors by Three phase Converters

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 – Problems.

UNIT – II: Four Quadrant operations of DC Drives through Dual converters:

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)

UNIT – III: Control of DC motors by Choppers

Single quadrant, Two –quadrant and four quadrant chopper fed dc separately excited and series excited motors – Continues 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 –IV: Control of Induction Motor through Stator voltage

Variable voltage characteristics-Control of Induction Motor by Ac Voltage Controllers – Waveforms – speed torque characteristics.

Control of Induction Motor through Stator Frequency

Variable frequency characteristics-Variable frequency and v/f control of induction motor by Voltage source, current source inverter and cycloconverters, 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)

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 – problems

UNIT – V: Control of Synchronous Motors

Separate control & self control of synchronous motors – Operation of self controlled synchronous motors by VSI and CSI cycloconverters. Load commutated CSI fed Synchronous Motor – Operation – Waveforms – speed torque characteristics – Applications – Advantages and Numerical Problems – Closed Loop control operation of synchronous motor drives (Block Diagram Only), variable frequency control, Cyclo converter, PWM, VFI, CSI.

TEXT BOOKS:

1. Fundamentals of Electric Drives – by G K Dubey Narosa Publications
2. Power Electronic Circuits, Devices and applications by M.H.Rashid, PHI.
3. Electronic motor drives modeling Analysis and control –R. Krishnan –I Edition Prentice Hall India

REFERENCE BOOKS:

1. Power Electronics – MD Singh and K B Khanchandani, Tata – McGraw-Hill Publishing company,1998
2. Modern Power Electronics and AC Drives by B.K.Bose, PHI.
3. Thyristor Control of Electric drives – Vedam Subramanyam Tata McGraw Hill Publilcations.
4. A First course on Electrical Drives – S K Pillai New Age International(P) Ltd. 2nd Editon.

Outcomes: Student should be able to

1. Explain the fundamentals of electric drive and different electric braking methods.Analyze the operation of three phase converter controlled dc motors and four quadrant operation of dc motors using dual converters.
2. Explain the converter control of dc motors in various quadrants.
3. Explain the concept of speed control of induction motor by using AC voltage controllers and voltage source inverters.
4. Explain the principles of static rotor resistance control and various slip power recovery schemes.
5. Explain the speed control mechanism of synchronous motors

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(UGC-AUTONOMOUS)

III Year B.Tech. II-Sem: EEE

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(AJ6226)ELECTRICAL & ELECTRONICS INSTRUMENTATION

Pre requisites: To learn this course student should have the concepts on the following subjects: Mathematics-I, Electrical Circuits-I & II, Engineering Physics

OBJECTIVES:

1. Electrical measurements course introduces the basic principles of all measuring instruments.
2. It also deals with the measurement of RLC parameters voltage, current Power factor, power, energy and magnetic measurements.

UNIT-I: Introduction to Measuring Instruments

Classification – deflecting, control and damping torques – Ammeters and Voltmeters – PMMC, moving iron type instruments – expression for the deflecting torque and control torque – Errors and compensations, extension of range using shunts and series resistance. Electrostatic Voltmeters-electrometer type and attracted disc type – Extension of range of E.S. Voltmeters.

UNIT– II: Potentiometers & Instrument Transformers

Principle and operation of D.C. Crompton's potentiometer – standardization – Measurement of unknown resistance, current, voltage. A.C. Potentiometers: polar and coordinate type's standardization – applications. CT and PT – Ratio and phase angle errors.

UNIT –III: Measurement of Power & Energy

Single phase dynamometer wattmeter, LPF and UPF, Double element and three element dynamometer wattmeter, expression for deflecting and control torques – Extension of range of wattmeter using instrument transformers – Measurement of active and reactive powers in balanced and unbalanced systems.

Single phase induction type energy meter – driving and braking torques – errors and compensations – testing by phantom loading using R.S.S. meter. Three phase energy meter – tri-vector meter, maximum demand meters.

UNIT – IV: D.C & A.C Bridges

Method of measuring low, medium and high resistance – sensitivity of Wheat-stone's bridge – Carey Foster's bridge, Kelvin's double bridge for measuring low resistance, measurement of high resistance – loss of charge method.

Measurement of inductance- Factor - Maxwell's bridge, Hay's bridge, Anderson's bridge, Owen's bridge. Measurement of capacitance and loss angle - Desauty Bridge. Wien's bridge – Schering Bridge.

UNIT-V: Transducers& Oscilloscopes:

Definition of transducers, Classification of transducers, Advantages of Electrical transducers, Characteristics and choice of transducers; Principle operation of LVDT and capacitor transducers; LVDT Applications, Strain gauge and its principle of operation, gauge factor,

Thermistors, Thermocouples, Piezo electric transducers, photovoltaic, photo conductive cells, photo diodes.

CRO: 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

Measurement of Non-Electrical Quantities

Measurement of strain, Gauge sensitivity, Displacement, Velocity, Angular Velocity, Acceleration, Force, Torque, Temperature, Pressure, Vacuum, Flow and Liquid level.

TEXT BOOKS:

1. Electrical & Electronic Measurement & Instruments, A.K.Sawhney Dhanpat Rai & Co. Publications.
2. Electrical and Electronic Measurements and Instrumentation, R. K. Rajput, S. Chand & Company Ltd.
3.

REFERENCE BOOKS:

1. Electrical and Electronic Measurements, G. K. Banerjee, PHI Learning Pvt. Ltd.
2. Electrical Measurements and Measuring Instruments, Golding and Widdis, Reem Publications.
3. Electrical Measurements, Buckingham and Price, Prentice – Hall
4. Electrical Measurements: Fundamentals, Concepts, Applications, Reissland, M.U, New Age International (P) Limited, Publishers.
5. Electrical Measurements and measuring Instruments, E.W. Golding and F.C. Widdis, fifth Edition, Wheeler Publishing.

OUTCOMES:

After going through this student gets knowledge on:

1. Different types of measuring instruments their construction operation and characteristics
2. Resistance voltage current measurements through potentiometers, voltage current measurements through instruments transformers.
3. Power and energy measurements through watt and energy meters, resistance measurements through DC bridges, capacitance and inductance measurements through AC bridges, different types of transducers.
4. Measurement of frequency and phase through CRO, range extension of measuring instruments and different types of errors & their reduction methods in measuring instruments

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B.Tech III Year II-Sem: EEE	**3 0 0 3**

OPEN ELECTIVE-II
(AJ3416) COMPUTER ORGANIZATION

Objectives:

- To understand basic components of computers.
- To explore the I/O organizations in depth.
- To explore the memory organization.

UNIT I:

BASIC STRUCTURE OF COMPUTERS: Computer Types, Functional units, Basic operational concepts, Bus Structures, Software, Performance, Multiprocessors and multi computers.

Instruction Codes, Computer Registers, Computer instructions, Instruction cycle, Instruction formats, Addressing Modes, STACK organization.

UNIT II:

PROGRAM CONTROL: Status Bit Conditions, Conditional Branch Instructions, Program Interrupts: Types Of Interrupts.

MICROPROGRAMMED CONTROL: Control memory, Address sequencing, micro program example, design of control unit, hard wired control, Micro programmed control.

UNIT III:

MEMORY ORGANIZATIONS: Memory hierarchy, Main Memory, RAM, ROM Chips, Memory Address Map, Memory Connection to CPU, Associate memory, Cache Memory, Virtual memory, RAID.

UNIT-IV:

INPUT-OUTPUT ORGANIZATION : Peripheral Devices, Input Output Interface, Asynchronous data transfer, Modes of Transfer, Priority Interrupt, Direct memory Access, Input –Output Processor (IOP), Serial communication,

UNIT V:

PIPELINE AND VECTOR PROCESSING: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processors.

TEXT BOOKS:

1. Computer Organization – Carl Hamacher, Zvonks Vranesic, SafeaZaky, Vth Edition, McGraw Hill.
2. Computer Systems Architecture – M.Moris Mano, IIIrd Edition, Pearson/PHI.

REFERENCES:

1. Computer Organization and Architecture – William Stallings Sixth Edition, Pearson/PHI
2. Structured Computer Organization – Andrew S. Tanenbaum, 4th Edition, PHI/Pearson.
3. Fundamentals of Computer Organization and Design, - Sivaraama Dandamudi, Springer Int. Edition.

4. Computer Architecture a quantitative approach, John L. Hennessy and David A. Patterson, Fourth Edition, Elsevier
5. Computer Architecture: Fundamentals and principles of Computer Design, Joseph D. Dumas II, BS Publication.

Course outcomes:

CO1: Ability to model, understand, and develop complex software for system software as well as application software
CO2: The broad education necessary to understand the impact of computer science and engineering solutions in the scientific, societal and human contexts
CO3: A knowledge of contemporary issues Be able to manipulate numeric information in different forms, e.g., different bases, signed integers, various codes such as ASCII, Gray, and BCD.
CO4: Be able to manipulate simple Boolean expressions using the theorems and postulates of Boolean algebra and to minimize combinational functions.
CO5: Be able to design and analyze combinational circuits and to use standard combinational functions/building block to build more complex circuits.
CO6: Be able to learn the internal organization of popular 8086 microprocessors

Learning outcomes:

1. Understand the basic components of a computer, including CPU, memories, and input/output, and their organization, Ability to use memory and I/O devices effectively.
2. Understand the cost performance tradeoff in designing memory hierarchy and instruction sets, able to explore the hardware requirements for cache memory and virtual memory.

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B.Tech III Year II-Sem: EEE **L T P C**
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OPEN ELECTIVE-II
(AJ6511) DATABASE MANAGEMENT SYSTEMS

Objectives:
This Course provides an emphasis on how to organize, maintain and retrieve information efficiently and effectively from a Database and it presents an introduction to database management systems (DBMS) and relational data model. Also the course introduces the concepts of transactions and transaction processing and the issues and techniques relating to concurrency and recovery in multi-user database environments.

UNIT-I
Database System Applications, database System VS file System, View of Data – Data Abstraction –Instances and Schemas – Data Models, Database Languages, Database Architecture, Database Users and Administrators.
Database design, ER diagrams, Beyond ER Design, Entities, Attributes and Entity sets, Relationships and Relationship sets, Additional features of ER Model, Conceptual Design with the ER Model.

UNIT-II
Introduction to the Relational Model – Integrity Constraints over Relations, Enforcing Integrity constraints, Querying relational data, Logical data base Design, Introduction to Views –Destroying/altering Tables and Views. Relational Algebra – Selection and Projection, Set Operations, Renaming, Joins, Division, Examples of Algebra Queries, Relational calculus – Tuple relational Calculus – Domain relational calculus – Expressive Power of Algebra and calculus.

UNIT-III
Form of Basic SQL Query – Examples of Basic SQL Queries, Introduction to Nested Queries, Correlated Nested Queries, Set – Comparison Operators – Aggregate Operators, NULL values – Comparison using Null values – Logical connectives – AND, OR and NOT – Impact on SQL Constructs, Outer Joins, Disallowing NULL values, Complex Integrity Constraints in SQL Triggers and Active Data bases.Schema refinement – Problems Caused by redundancy, Decomposition – Problem related to decomposition - Reasoning about FDS - FIRST, SECOND, THIRD Normal forms – BCNF –Schema Refinement in Data base Design – Multi valued Dependencies – FOURTH Normal Form.

UNIT–IV
Transaction Concept- Transaction State- Implementation of Atomicity and Durability – Concurrent – Executions – Serializability- Recoverability – Implementation of Isolation.
Lock –Based Protocols – Timestamp Based Protocols- Validation- Based Protocols.
Recovery and Atomicity – Log – Based Recovery – Recovery with Concurrent Transactions – Buffer Management – Failure with loss of nonvolatile storage-Advance Recovery systems-Remote Backup systems.

UNIT–V

Data on External Storage, File Organization and Indexing – Clustered Indexes, Primary and Secondary Indexes, Index data Structures – Hash Based Indexing – Tree base Indexing, Comparison of File Organizations.

Intuitions for tree Indexes, Indexed Sequential Access Methods (ISAM) B+ Trees: A Dynamic Index Structure.

TEXT BOOKS:

1. Raghurama Krishnan, Johannes Gehrke " Data base Management Systems" TATA McGraw-Hill 3rd Edition
2. Silberschatz, Korth "Data base System Concepts" McGraw hill, V Edition.

REFERENCE BOOKS:

1. Peter Rob and Carlos Coronel "Data base Systems design, Implementation, and Management" 7th Edition.
2. Elmasri Navrate "Fundamentals of Database Systems" Pearson Education

Course outcomes:

1: A strong foundation in core Computer Science and Engineering, both theoretical and applied concepts.
2: Ability to model, understand and develop complex software for system software as well as application software.
3: The broad education necessary to understand the impact of Computer Science and Engineering solutions in the scientific, societal and human contexts.
4: A Knowledge of Contemporary Issues.

Learning outcomes:

1. Ability to understand the fundamental concepts of database management.
2. Ability to design and query databases, as well as understand the internals of databases.
3. Ability to define basic functions of DBMS & RDBMS.
4. Ability to describe database development process and to apply the Relational Database Model
   to understand the Logical and Physical aspects of the DBMS architecture.
5. Ability to analyze database models & entity relationship models and to draw the E-R diagram
   for the given case study.
6. Ability to use Structured Query Language (SQL) with complex queries.

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B.Tech III Year II-Sem: EEE **L T P C**
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OPEN ELECTIVE-II
(AJ6E06) INTELLECTUAL PROPERTY RIGHTS

Course Objectives:

In the interest of the national economic growth the innovations and improvements are to be owned and used for the production and distribution process. The students of technology will be benefited by knowing the process of obtaining recognition of their innovations. This course will enable them to know the legal process of registering the innovations.

UNIT – I

INTRODUCTION TO INTELLECTUAL PROPERTY: Introduction, types of intellectual property, International organizations, agencies and treaties, importance of intellectual property rights.

UNIT – II

TRADE MARKS: Purpose and function of trade marks, acquisition of trade mark rights, protectable matter, selecting and evaluating trade mark, trade marks registration processes.

UNIT – III

LAW OF COPY RIGHTS: Fundamental of copy right law, originally of material, rights of reproduction, rights of perform the work publicity, copy right ownership issues, copy right registration, notice of copy right, international copy right law.

LAW OF PATENTS: Foundation of patent law, patent searching process ownership rights and transfer.

UNIT- IV

TRADE SECRETS: Trade secrete law, determination of trade secrete status, liability for misappropriations of trade secrets, protection for submission trade secrete litigation.

UNIT-V

NEW DEVELOPMENT OF INTELLECTUAL PROPERTY: New developments in trade mark law: Copy right law, patent law, intellectual property audits.

TEXT BOOOKS & REFERENCES:

1. Intellectual property rights, Deborah, E. Bouchux, cengage learing
2. Intellectual property right – Unleashing the knowledge economy, prabuddha ganguli, Tate Mc Graw Hill Publishing company ltd

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III Year B.Tech. II-Sem: EEE

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PROFESSIONAL ELECTIVE-II

(AJ6228)UTILIZATION OF ELECTRICAL ENERGY

Pre-requisites: learn this course student should have the concepts on the following subjects: Power Electronics, Electrical Machines –I & II

Objectives:
This subject deals with

1. The fundamentals of illumination and its classification and the electric heating and welding.
2. It gives the detailed study of all varieties of Electric drives and their application to electrical traction systems.

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 & WELDING

Advantages and methods of electric heating, resistance heating induction heating and dielectric heating.

ELECTRIC WELDING
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. Various Illumination Methods. 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**.**
Mechanics of train movement. Speed-time curves for different services – trapezoidal and quadrilateral speed time curves.

UNIT – V: ELECTRIC TRACTION-II
Calculations of tractive effort, power, specific energy consumption for given run, effect of varying acceleration and braking retardation, adhesive weight and coefficient of adhesion.

TEXT BOOK:

1. E. Openshaw Taylor, Utilisation of Electric Energy – by University press.
2. Partab, Art & Science of Utilization of electrical Energy –Dhanpat Rai & Sons.
3.

REFERENCE BOOKS:

1. N.V.Suryanarayana, Utilization of Electrical Power including Electric drives and Electric traction, New Age International (P) Limited, Publishers, 1996.
2. C.L. Wadhwa, Generation, Distribution and Utilization of electrical Energy, New Age International (P) Limited, Publishers, 1997.
3.

OUTCOMES:

1. Implementation of knowledge of drives to real world problems.
2. An ability to function effectively in industry related to drives.
3. Ability to apply the technical knowledge in electric traction and application involved in motion control.
4. Ability to work in industry related to lightening.

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III Year B.Tech. II-Sem: EEE

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PROFESSIONAL ELECTIVE-II

(AJ6229)POWER SYSTEM RELIABILITY

Pre-requisites: learn this course student should have the concepts on the following subjects: Power system-I

Objectives:

1. This subject introduces the concept of probability, reliability, distribution functions,
2. Various methods and techniques to calculate and estimate the reliability of different engineering problems and models.

UNIT-I: Generating System Reliability Analysis – I

Generation system model – capacity outage probability tables – Recursive relation for capacitive model building – sequential addition method – unit removal – Evaluation of loss of load and energy indices – Examples.

UNIT-II: Generating System Reliability Analysis – Ii

Frequency and Duration methods – Evaluation of equivalent transitional rates of identical and non-identical units – Evaluation of cumulative probability and cumulative frequency of non-identical generating units – 2- level daily load representation - merging generation and load models – Examples.

UNIT-III: Operating Reserve Evaluation

Basic concepts - risk indices – PJM methods – security function approach – rapid start and hot reserve units – Modeling using STPM approach.

Bulk Power System Reliability Evaluation

Basic configuration – conditional probability approach – system and load point reliability indices – weather effects on transmission lines – Weighted average rate and Markov model – Common mode failures.

UNIT-IV: Inter Connected System Reliability Analysis

Probability array method – Two inter connected systems with independent loads – effects of limited and unlimited tie capacity - imperfect tie – Two connected Systems with correlated loads – Expression for cumulative probability and cumulative frequency.

Distribution System Reliability Analysis – I (Radial configuration):

Basic Techniques – Radial networks –Evaluation of Basic reliability indices, performance indices– load point and system reliability indices – customer oriented, loss and energy oriented indices – Examples.

UNIT-V: Distribution System Reliability Analysis-Ii(Parallel Configuration)

Basic techniques – inclusion of bus bar failures, scheduled maintenance – temporary and transient failures – weather effects – common mode failures –Evaluation of various indices – Examples

Substations and Switching Stations
Effects of short-circuits - breaker operation – Open and Short-circuit failures – Active and Passive failures – switching after faults – circuit breaker model – preventive maintenance – exponential maintenance times.

TEXT BOOK

1. Reliability Evaluation of Power systems — R. Billinton, R.N.Allan, Pitman Advance Publishing Program, New York, reprinted in India by B.S.Publications, 2007.
2. Assessment of Power System Reliability Methods and Applications—Marko Cepin

REFERENCE BOOKS:

1. Reliability Evaluation of Power Systems by Roy Billinton and Ronald N. Allan, Plenum press, New York and London (Second Edition), 1996.
2. Reliability Modeling in Electric Power Systems by J. Endrenyi, John Wiley and Sons, 1978. (First Edition)

Outcome:

1. After going through this course the student gets a thorough knowledge on, basic probability theory,
2. Distribution functions, reliability analysis of various models through different n,ethics, reliability functions,
3. Repairable irreparable systems reliability through markov modeling frequency
4. Duration techniques, with which he/she can able to apply the above conceptual things to real-world electrical and electronics problems and applications.

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III Year B.Tech. II-Sem: EEE

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PROFESSIONAL ELECTIVE-II

(AJ6230) ELECTRICAL ESTIMATION AND COSTING

Pre-requisites: learn this course student should have the concepts on the following subjects: Power system-I, Power system-II

Objective:

1. Emphasize the estimating and costing aspects of all electrical equipment, installation
2. Designs to analyze the cost viability. Exposure to design and estimation of wiring
3. Design of overhead and underground distribution lines, substations and illuminations design.
4. These techniques should help the students to successfully estimate costing of the products or projects that are part of our every day usage.

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.

Outcome

1. After going through this course the student gets a thorough knowledge on, estimating
2. costing aspects of all electrical equipment, installation and designs to analyze the cost viability, exposure to design
3. and estimation of wiring, design of overhead and underground distribution lines
4. Substations and illuminations, with which he/she can able to apply the above conceptual things to real-world electrical and electronics problems and applications.

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III Year B.Tech. I-Sem: EEE

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(AJ6225)POWER ELECTRONICS LAB

Any Ten of the Experiments From the following List:

1. Study of Characteristics of SCR, MOSFET & IGBT
2. Gate firing circuits for SCR's
3. Single Phase AC Voltage Controller with R and RL Loads
4. Single Phase fully controlled bridge converter with R and RL loads
5. Forced Commutation circuits (Class A, Class B, Class C, Class D & Class E)
6. DC Jones chopper with R and RL loads.
7. Single phase parallel, inverter with R and RL load.
8. Single Phase Cycloconverter with R and RL loads
9. Single Phase half controlled converter with R load
10. Three Phase half controlled bridge converter with R-load
11. Single phase series, inverter with R and RL load
12. Single Phase Mc-Murray Bridge converter with R and RL loads
13. Single phase dual converter with RL loads.
14. Operation of MOSFET based chopper.

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III Year B.Tech. II-Sem: EEE

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(AJ6227)ELECTRICAL MEASUREMENTS LAB

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 an 3-ammeter methods.

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

9. Calibration LPF wattmeter – by Phantom testing.
10. Measurement of 3-phase power with single watt meter and 2 No's of C.T.
11. P.T. testing by comparison – V.G. as Null detector – Measurement of % ratio error and phase angle of the given P.T.
12. LVDT and Capacitive pickup-Characteristics and calibration
13. Resistance strain gauge – strain measurements and Calibration.
14. Transformer turns ratio measurement using a.c. bridge.
15. Measurement of % ratio error and phase angle of given C.T. by comparison.

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(AJ6015) ADVANCED ENGLISH COMMUNICATION SKILLS LAB

1. Introduction:

The introduction of the English Language Lab is considered essential at 3rd year 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 an integrated theory and lab course to enable students to use 'good' English and perform the following:

- Gather ideas and information, to organize ideas relevantly and coherently.
- Engage in debates.
- Participate in group discussions.
- Face interviews.
- Write project/research reports/technical reports.
- Make oral presentations.
- Write formal letters.
- Transfer information from non-verbal to verbal texts and vice versa.
- To take part in social and professional communication.

2. Objectives:

This Lab focuses on using computer-aided multimedia instruction for language development to meet the following targets:

- 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.
- Further, they would be required to communicate their ideas relevantly and coherently in writing.

3. **Syllabus**:

The following course content is prescribed for the Advanced Communication Skills Lab:

- Functional English - starting a conversation – responding appropriately and relevantly – using the right body language – role play in different situations.
- Vocabulary building – synonyms and antonyms, word roots, one-word substitutes, prefixes and suffixes, study of word origin, analogy, idioms and phrases.
- Group Discussion – dynamics of group discussion , intervention, summarizing, modulation of voice, body language, relevance, fluency and coherence.
- Interview Skills – concept and process, pre-interview planning, opening strategies, answering strategies, interview through tele and video-conferencing.

- Resume' writing – structure and presentation, planning, defining the career objective, projecting ones strengths and skill-sets, summary, formats and styles, letter-writing.
- Reading comprehension – reading for facts, guessing meanings from context, scanning, skimming, inferring meaning, critical reading.
- Technical Report writing – Types of formats and styles, subject matter – organization, clarity, coherence and style, planning, data-collection, tools, analysis.

4. Minimum Requirement:

The English Language Lab shall have two parts:

i) **The Computer aided Language Lab** for 60 students with 60 systems, one master console, LAN facility and English language software for self- study by learners.

ii) **The Communication Skills Lab** with movable chairs and audio-visual aids with a P.A System, a T. V., a digital stereo –audio & video system and camcorder etc.

System Requirement (Hardware component):

Computer network with Lan with minimum 60 multimedia systems with the following specifications:

iii) P – IV Processor
   a) Speed – 2.8 GHZ
   b) RAM – 512 MB Minimum
   c) Hard Disk – 80 GB

iv) Headphones of High quality

5. Suggested Software:

The software consisting of the prescribed topics elaborated above should be procured and used.

Suggested Software:

- **Clarity Pronunciation Power** – part II
- **Oxford Advanced Learner's Compass**, 7th Edition
- **DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice.**
- **Lingua TOEFL CBT Insider**, by Dreamtech
- **TOEFL & GRE**(KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)
- **The following software from 'train2success.com'**
  - **Preparing for being Interviewed,**
  - **Positive Thinking,**
  - **Interviewing Skills,**
  - **Telephone Skills,**
  - **Time Management**
  - **Team Building,**
  - **Decision making**
- **English in Mind**, Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge

6. Books Recommended:

1. **Effective Technical Communication**, M. Ashraf Rizvi, Tata Mc. Graw-Hill Publishing Company Ltd.
2. **A Course in English communication** by Madhavi Apte, Prentice-Hall of India, 2007.
3. **Communication Skills** by Leena Sen, Prentice-Hall of India, 2005.
4. **Academic Writing- A Practical guide for students** by Stephen Bailey, Rontledge Falmer, London & New York, 2004.
5. **English Language Communication : A Reader cum Lab Manual** Dr A Ramakrishna Rao, Dr G Natanam & Prof SA Sankaranarayanan, Anuradha Publications, Chennai
6. **Body Language- Your Success Mantra** by Dr. Shalini Verma, S. Chand, 2006.
7. **DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice**, New Age International (P) Ltd., Publishers, New Delhi.
8. Books on **TOEFL/GRE/GMAT/CAT** by Barron's/cup

9. **IELTS series with CDs** by Cambridge University Press.
10. **Technical Report Writing Today** by Daniel G. Riordan & Steven E. Pauley, Biztantra Publishers, 2005.
11. **Basic Communication Skills for Technology** by Andra J. Rutherford, 2nd Edition, Pearson Education, 2007.
12. **Communication Skills for Engineers** by Sunita Mishra & C. Muralikrishna, Pearson Education, 2007.
13. **Objective English** by Edgar Thorpe & Showick Thorpe, 2nd edition, Pearson Education, 2007.
14. **Cambridge Preparation for the TOEFL** Test by Jolene Gear & Robert Gear, 4th Edition.
15. **Technical Communication** by Meenakshi Raman & Sangeeta Sharma, Oxford University Press.

DISTRIBUTION AND WEIGHTAGE OF MARKS:

Advanced Communication Skills Lab Practicals:

1. The practical examinations for the English Language Laboratory practice shall be conducted as per the University norms prescribed for the core engineering practical sessions.

2. For the English Language lab sessions, there shall be a continuous evaluation during the year for 25 sessional marks and 50 End Examination marks. Of the 25 marks, 15 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The End Examination shall be conducted by the teacher concerned with the help of another member of the staff of the same department of the same institution.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

III Year B.Tech. II-Sem: EEE

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(AJMC03) ENERGY STUDIES

Module 1:
Energy Sources – Fossil fuels. Nuclear fuels, hydel, solar, wind and bio fuels in India, Energy Conservation, Nuclear Energy through fission and fusion processes.

Module 2:
Energy Conversion – Energy conversion from source to utility, Solar, Nuclear, Geothermal, Tide and Wind Energies.

Module 3:
Global Energy Scenario-Role of Energy in economic development and social transformation, over all energy demand, availability and consumption, depletion of energy resources and its impact on economy, Non proliferation of Nuclear energy. International policies of G-8, G-20 OPEC and European union countries.

Module 4:
Indian Energy scenario – Commercial and Non commercial forms of energy, Utilization pattern in the past, present and also future prediction, Sector wise energy consumption.

Module 5:
Energy Policy: Energy policy issues at global level, national level and state level, Energy conservation Act 2001, Electricity act 2003, Energy pricing and its impact on global variations.

Text Books:
1. Jose Goldeberg. Thomas Johanson, and Reddy A.K.N., Energy for Sustainable World, Wiley Eastern, 2005.
2. Charles E. Brown, World Energy Resources, Springer Publication, New York, 2002.
3. Culp, A.W., Principles of Energy Conversion, McGraw Hill New York, 2004.

B.TECH

IV YEAR
I & II SEMESTER
SYLLABUS

JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS

IV Year B.Tech. I-Sem: EEE **L T P C**
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(AJ7231)POWER SYSTEM OPERATION & CONTROL

Pre- Requisites: To learn this course student should have the concepts on the following subjects: Power system-I., FMHM, Control systems

Objective:

1. This subject deals with Economic operation of Power Systems, Hydrothermal scheduling
2. Modeling of turbines, generators and automatic controllers. It emphasizes on single area
3. Two area load frequency control and reactive power control.

UNIT – I

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

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 (No Derivation) and State-Space II-Order Mathematical Model of Synchronous Machine.

Modeling of Governor: Mathematical Modeling of Speed Governing System – Derivation of small signal transfer function.

Modeling of Excitation System: Fundamental Characteristics of an Excitation system, Ttransfer function, Block Diagram Representation of IEEE Type-1 Model

UNIT – IV

Single Area & Two-Area 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 Two-Area: 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: Overview of Reactive Power control – Reactive Power compensation in transmission systems - advantages and disadvantages of different types of compensating equipment for transmission systems; load compensation – Specifications of load compensator, Uncompensated and compensated transmission lines: shunt and Series Compensation.

TEXT BOOKS:

1. Power Systems Analysis by C.L.Wadhwa, Newage International-3rd Edition
2. Modern Power System Analysis – by I.J.Nagrath & D.P.Kothari Tata M Graw – Hill Publishing Company Ltd, 2nd edition.

REFERENCE BOOKS:

1. Power System Analysis and Design by J.Duncan Glover and M.S.Sarma., THOMPSON, 3rd Edition.
2. Power System stability and control,Prabha kundur,The McGraw-Hill companies
3. Electric Energy systems Theory – by O.I.Elgerd, Tata Mc Graw-hill Publishing Company Ltd., Second edition.
4. Power System Analysis by Grainger and Stevenson, Tata McGraw Hill.
5. Power System Analysis by Hadi Saadat – TMH Edition.

OUTCOMES:

1. After going through this course the student gets a thorough knowledge on, economic operation of power systems, scheduling of hydro-thermal power plants, modeling of the power system components like turbine, governor
2. Excitation systems, necessity of keeping the frequency of the power system constant , load frequency control in single and two area systems, operation of load frequency controllers, reactive power control, uncompensated transmission line
3. Compensation in transmission systems through shunt and series compensations, with which he/she can able to apply the above conceptual things to real-world electrical and electronics problems and applications.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

IV Year B.Tech. I-Sem: EEE **L T P C**
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(AJ7423) MICRO PROCESSORS AND MICRO CONTROLLERS

COURSE OBJECTIVES:

1. Understanding the importance of micro processors and micro controllers
2. Understanding the application development skills by using various instructions
3. Understanding the interfacing of devices with processors and controllers
4. Understanding the development of basic Real Time Operating System.
5. Understanding the advanced micro processors and controllers

UNIT-I

Introduction to 8085 Architecture

8086 Architecture: 8086 Architecture-Functional diagram, Register Organization, Memory Segmentation, Programming Model, Memory addresses, Physical Memory Organization, Architecture of 8086, Signal descriptions of 8086, interrupts of 8086.

UNIT-II

Instruction Set and Assembly Language Programming of 8086: Instruction formats, Addressing modes, Instruction Set, Assembler Directives, Macros, and Simple Programs involving Logical, Branch and Call Instructions, Sorting, String Manipulations.

IO Interfacing: 8251 Communication Interface, 8255 PPI Interface, ADC, DAC Interface, DMA Controllers.

UNIT -III:

Introduction to Microcontrollers: Overview of 8051 Microcontroller, Architecture, I/O Ports, Memory Organization, Addressing Modes and Instruction set of 8051.

8051 Real Time Control: Programming Timer Interrupts, Programming External Hardware Interrupts, Programming the Serial Communication Interrupts, Programming 8051 Timers and Counters

UNIT –IV:

I/O And Memory Interface: LCD, Keyboard, External Memory RAM, ROM Interface, ADC, DAC Interface to 8051.

Serial Communication and Bus Interface: Serial Communication Standards, Serial Data Transfer Scheme, On board Communication Interfaces-I2C Bus, SPI Bus, UART; External Communication Interfaces-RS232,USB,IEEE-488, Prototyping & Trouble shooting

UNIT –V:

ARM Architecture: ARM Processor fundamentals, ARM Architecture – Register, CPSR, Pipeline, exceptions and interrupts interrupt vector table, ARM instruction set – Data processing, Branch instructions, load store instructions, Software interrupt instructions, Program status register instructions, loading constants, Conditional execution, Introduction to Thumb instructions.

Advanced ARM Processors: Introduction to CORTEX Processor and its architecture, OMAP Processor and its Architecture.

TEXT BOOKS:

1. Micro Processor Architecture Programming and Applications with the 8085-Ramesh Goankar, 5th Edition,Penram International Publishing.
2. Advanced Microprocessors and Peripherals – A. K. Ray and K.M. Bhurchandani, TMH, 2nd Edition 2006.
3. The 8051 Microcontroller, Kenneth. J. Ayala, Cengage Learning, 3rd Ed.
4. ARM System Developers guide, Andrew N SLOSS, Dominic SYMES, Chris WRIGHT, Elsevier, 2012

REFERENCE BOOKS:

1. Microprocessors and Interfacing, D. V. Hall, TMGH, 2nd Edition 2006.
2. Introduction to Embedded Systems, Shibu K.V, TMH, 2009
3. The 8051Microcontrollers, Architecture and Programming and Applications -K.Uma Rao, Andhe Pallavi, Pearson, 2009.
4. ARM Reference Manuals

Course Outcomes:

- Understands the internal architecture and organization of 8085 and 8086, 8051 and ARM processors/controllers.
- Understands the interfacing techniques to 8086 and 8051 and can develop assembly language programming to design microprocessor/ micro controller based systems.

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IV Year B.Tech. I-Sem: EEE

OPEN ELECTIVE-III
(AJ7E01) MANAGEMENT SCIENCE

Course Objectives:

This course is intended to familiarise the students with the framework for the managers and leaders availbale for understanding and making decisions realting to issues related organiational structure, production operations, marketing, Human resource Management, product management and strategy.

UNIT - I:

Introduction to Management and Organisation: Concepts of Management and organization- nature, importance and Functions of Management, Systems Approach to Management - Taylor's Scientific Management Theory- Fayal's Principles of Management- Maslow's theory of Hierarchy of Human Needs- Douglas McGregor's Theory X and Theory Y - Hertzberg Two Factor Theory of Motivation - Leadership Styles, Social responsibilities of Management, Designing Organisational Structures: Basic concepts related to Organisation - Departmentation and Decentralisation, Types and Evaluation of mechanistic and organic structures of organisation and suitability.

UNIT - II:

Operations and Marketing Management: Principles and Types of Plant Layout-Methods of Production(Job, batch and Mass Production), Work Study - Basic procedure involved in Method Study and Work Measurement - Business Process Reengineering(BPR) - Statistical Quality Control: control charts for Variables and Attributes (simple Problems) and Acceptance Sampling, TQM, Six Sigma, Deming's contribution to quality, Objectives of Inventory control, EOQ, ABC Analysis, Purchase Procedure, Stores Management and Store Records - JIT System, Supply Chain Management, Functions of Marketing, Marketing Mix, and Marketing Strategies based on Prodcut Life Cycle, Channels of distribution.

UNIT - III:

Human Resources Management(HRM): Concepts of HRM, HRD and Personnel Management and Industrial Relations (PMIR), HRM vs PMIR, Basic functions of HR Manager: Manpower planning, Recruitment, Selection, Training and Development, Plcement, Wage and Salary Administration, Promotion, Transfer, Seperation, Performance Appraisal, Grievance Handling and Welfare Administration, Job Evaluation and Merit Rating - Capability Maturity Model (CMM) Levels - Performance Management System.

UNIT - IV:

Project Management (PERT/ CPM): Network Analysis, Programme Evaluation and Review Technique (PERT), Critical Path Method (CPM), Identifying critical path,

Probability of Completing the project within given time, Project Cost Analysis, Project Crashing (simple problems).

UNIT - V:

Strategic Management and Contemporary Strategic Issues: Mission, Goals, Objectives, Policy, Strategy, Programmes, Elements of Corporate Planning Process, Environmental Scanning, Value Chain Analysis, SWOT Analysis, Steps in Strategy Formulation and Implementation, Generic Strategy alternatives. Bench Marking and Balanced Score Card as Contemporary Business Strategies.

TEXT BOOKS:

1. Stoner, Freeman, Gilbert, Management, 6th Ed, Pearson Education, New Delhi, 2004.
2. P. Vijay Kumar, N. Appa Rao and Ashnab, Chnalill, Cengage Learning India, 2012.

REFERENCE BOOKS:

1. Kotler Philip and Keller Kevin Lane: Marketing Management, Pearson, 2012.
2. Koontz and Weihrich: Essentials of Management, McGraw Hill, 2012.
3. Thomas N. Duening and John M. Ivancevich Management - Principles and Guidelines, Biztantra, 2012.
4. Kanishka Bedi, Production and Operations Management, Oxford Uiversity Press, 2012.
5. Samuel C. Certo: Modern Management, 2012.
6. Schermerhorn, Capling, Poole and Wiesner: Management, Wiley, 2012.
7. Parnell: Strategic Management, Cengage, 2012.
8. Lawrence R Jauch, R. Gupta and William F. Glueck: Business Policy and Strategic Management Science, McGraw Hill, 2012.

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IV Year B.Tech. I-Sem: EEE **L T P C**
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OPEN ELECTIVE-III

(AJ7424)DIGITAL SIGNAL PROCESSING

Course Objectives:

1. To learn the fundamental concepts of Digital Signal Processing.
2. To explore the properties of DFT in mathematical problem solving. To illustrate FFT calculations mathematically and develop FFT based DSP algorithms.
3. To learn the Physical realization of Digital Filters.
4. To study the Design of IIR &FIR filters Mathematically.
5. To introduce DSP applications, Multirate Signal Processing.

UNIT-I :

Introduction: Introduction to Digital Signal Processing

Classification of Signals, The Representation of discrete –time signals and sequences, Block Diagram of Processing system, Signal Manipulations, Linear Time Invariant Systems, Stability, Causality, Linear constant coefficient difference equation, frequency domain representation of DTS& Signals.

UNIT-II:

Discrete Fourier Transform: Introduction , DFT and its properties, FFT algorithms 8-Point DFT using radix-2 FFT Decimation In Time, Decimation in Frequency , Linear convolution of sequences using DFT, Circular convolution of sequence using DFT, Computation of DFT :Overlap-add Method, Over-lap save Method, Relation between DTFT,DFS,DFT and Z-transform.

UNIT-III:

Realization of Digital Filters : Classification of filter on the their pole zero diagram, Realization of IIR systems by Direct form-I, Direct form-II, Cascade and Parallel. Realization of FIR systems by Direct form, cascade and linear phase system.

UNIT-IV:

Digital Filter Design Techniques :Design of IIR filter Methods IIT and BLT. Design of Butterworth and -I IIR filter. FIR filter Design :Design of FIR filter by using Different Windowing Technique. By using Frequency Sampling. Realization of system by using Frequency Sampling Technique. Comparison of IIR &FIR filters.

UNIT-V

Applications of DSP: Multirate signal processing: Decimation, Interpolation, Sampling rate conversion by a rational factor – Adaptive Filters: Introduction, Applications of adaptive filtering to equalization. Applications to Speech Processing,Radar signal Processing ,Bio-medical Instrumentation.

Text Books:

1.Digital signal processing-P.Ramesh Babu Second edition.
2.Digital signal Processing-A.Anand Kumar.

Reference Books :

1. Proakis Manolakis, 'Digital Signal Processing : Principles, Algorithms and Applications' Fourth 2007, Pearson Education, ISBN 81-317-1000-9.
2. Digital signal processing- Nagoor Khani, TMG,2012.
3. Emmanuel C. Ifeachor, Barrie W. Jervis, "Digital Signal Processing: A Practical Approach", Pearson Education ISBN 0-201-59619- 9

Course Outcomes: Learner will be able to…

1. To understand the concept of DT Signal and perform signal manipulation.
2. Understand the Properties of DFT in mathematical problem solving, and FFT Algorithms.
3. Understand the Physical Realization of Digital filters.
4. Understand Design of Digital filters.
5. Understand the Multirate DSP Techniques and applications.

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IV Year B.Tech. I-Sem: EEE

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Open Elective-III
(AJ7530) CLOUD COMPUTING AND IoT

Objectives:
This course will develop student's knowledge in/on…

- The concepts and fundamentals of cloud computing technology
- Various cloud models and different services offered by cloud technology developments
- Key components of cloud computing technology like cloud virtualization cloud storage and cloud platforms
- Security related issues involved in cloud computing
- To introduce the terminology, technology and its applications
- To introduce the concept of M2M (machine to machine) with necessary protocols
- To introduce the Python Scripting Language which is used in many IoT devices
- To introduce the Raspberry PI platform, that is widely used in IoT applications
- To introduce the implementation of web based services on IoT devices

UNIT-I

Introduction: Cloud computing at a glance, Historical developments, Building Cloud computing environment, Computing platforms and technologies
Principles of Parallel and Distributive Computing: Eras of computing, parallel Vs Distributive computing, Elements of parallel computing, Elements of distributive computing, Technologies for Distributive Computing.
Virtualization: Introductions, Characteristics of Virtualized environments, Taxonomy of virtualization techniques, Virtualization and Cloud computing, Pros and Cons of virtualization, Technology examples.

UNIT-II

Cloud Computing Architecture: Introduction, Cloud reference model, Types of cloud, Economics of the cloud, Open challenges.
Aneka- Cloud Application Platform: Framework Overview, Anatomy of the Aneka container, Building Aneka clouds, Cloud programming and Management.

UNIT-III

Concurrent Computing: Introducing Parallelism for Single Machine computation, Programming applications with Threads, Multi-Threading with Aneka, and Programming applications with Aneka Threads.
Data Intensive Computing: What is Data intensive computing, Technologies for Data intensive computing.

UNIT-IV

Cloud Platform in Industry: Amazon Web Services, Google App Engine, Microsoft Azure, Windows Azure Platform Appliance.

Cloud Applications: Scientific applications: ECG analysis in the cloud, Protein structure prediction, Gene Expression Data analysis for Cancer Diagnosis, Satellite image processing, Business and Consumer

Applications: CRM and ERP, Productivity, Social Networking, Media **a**pplication, Multiplayer online gaming.

Advance Topics in Cloud Computing: Federated Clouds/Inter-Cloud: Characterization and Definition, Cloud Federation Stack, Aspects of interest, technologies for Cloud Federation.

UNIT-V

Introduction to Internet of Things –Definition and Characteristics of IoT, Physical Design of IoT – IoT Protocols, IoT communication models, Iot Communication APIs IoT enabaled Technologies – Wireless Sensor Networks, Cloud Computing, Big data analytics, Communication protocols, Embedded Systems, IoT Levels and Templates Domain Specific IoTs – Home, City, Environment, Energy, Retail, Logistics, Agriculture, Industry, health and Lifestyle

Text Books:

1)Rajkumar Buyya, Christian Vecchiola, and Thamarai Selvi, "Mastering Cloud Computing", *Tata McGraw Hill, First Edition,* ISBN-13: 978-1-25-902995-0, 2013.

2)Internet of Things - A Hands-on Approach, Arshdeep Bahga and Vijay Madisetti, Universities Press, 2015, ISBN: 9788173719547

Reference Books:

1)Anthony T.Velte ,Toby J Velte and Robert Elsenpeter, "Cloud Computing A practical Approach ", *McGraw Hill, First Edition,* ISBN: 978-0-07-162695-8, 2010.

2)Barrie Sosinsky, "Cloud Computing Bible", *Wiley Publications, First Edition* ISBN: 978-0-470-90356-8, 2011.3)Dr.Kumar Saurabh, "Cloud Computing Insights into New-Era Infrastructure", *Wiley India Publications, First Edition* ISBN: 978-81-265-2883-7, 2011. 3)Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014, ISBN: 9789350239759

Outcomes :

Upon completion of this course, students will be able to…

- Assess the knowledge and the important role of cloud computing in the development of various applications
- Describe the of various services offered in cloud computing
- Summarize the knowledge of underlying technologies used in cloud computing
- identify the security related issues involved in cloud computing
- Explain in a concise manner how the general Internet as well as Internet of Things work.
- Understand constraints and opportunities of wireless and mobile networks for Internet of Things.
- Use basic measurement tools to determine the real-time performance of packet based networks.
- Analyse trade-offs in interconnected wireless embedded sensor networks.

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IV Year B.Tech. I-Sem: EEE

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PROFESSIONAL ELECTIVE-III
(AJ7232) COMPUTER METHODS IN POWER SYSTEMS

Pre- Requisites: To learn this course students should have the concepts on the following subjects: Power systems-II, Switch gear and protection, Mathematics-II

Objectives:

1. This course introduces formation of Z bus of a transmission line, power flow studies by various methods.
2. It also deals with short circuit analysis and analysis of power system of steady state and transient stability.

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 ZBus Matrix for addition element for the following cases: Addition of element from a new bus to reference, Addition of element from a new bus to an old bus, Addition of element between an old bus to reference and Addition of element between two old busses (Derivations and Numerical Problems). - Modification of ZBus for the changes in network (Problems)

UNIT-II

Power flow Studies: load Flows: 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 P-V 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 Co-Ordinates 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 load Flow

UNIT-III

Short Circuit Analysis: **Per-Unit System of Representation:** Per-Unit 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: 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: 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. Power System Analysis-Dr.N.V.Ramana M/s Pearson Education (P) Ltd
2. Modern Power system Analysis – by I.J.Nagrath & D.P.Kothari: Tata McGraw-Hill Publishing Company, 2nd edition.

REFERENCE BOOKS:

1. Computer Techniques in Power System Analysis by M.A.Pai, TMH Publications
2. Power System Analysis by Grainger and Stevenson, Tata McGraw Hill.

3. Computer techniques and models in power systems, By K.Uma rao, I.K.International
4. Power System Analysis by Hadi Saadat – TMH Edition.

5.Power System Analysis,PSR Murthy,BS Publications

Power system Analysis, T.K.Nagasarkar, M.S.Sukhija,Oxford University Press.

OUTCOMES:

1. After going through this course the student gets a thorough knowledge on, power system network matrices through graph theory
2. power flow studies (load-flow) through various computer methods, short-circuit analysis, per-unit system of representation
3. concept of sequence impedance, symmetrical and unsymmetrical fault analysis, steady-state dynamic-state and transient- state stability analysis
4. With which he/she can able to apply the above conceptual things to real-world electrical and electronics problems and applications.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
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IV Year B.Tech. I-Sem: EEE

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PROFESSIONAL ELECTIVE-III

(AJ7247) ADVANCED POWER SYSTEM PROTECTION

Pre- Requisites: To learn this course students should have the concepts on the following subjects Power system-I,II &SGPT

Objectives:
This course will develop student's knowledge in/on

1. Fundamental concepts of Powers systems.
2. Knowing about the comparators used in power system.
3. Knowing the knowledge of protection equipments used in power system

UNIT-I:
Static Relays: Advantages of static relays-Basic construction of static relays-Level detectors-Replica impedance –Mixing circuits-General equation for two input phase and amplitude comparators-Duality between amplitude and phase comparators.

Amplitude Comparators: Circulating current type and opposed voltage type- rectifier bridge comparators, Direct and Instantaneous comparators.

UNIT-II:
Phase Comparators: Coincidence circuit type- block spike phase comparator, techniques to measure the period of coincidence-Integrating type-Rectifier and Vector product type- Phase comparators.

Static Over Current Relays: Instantaneous over-current relay-Time over-current relays-basic principles –definite time and Inverse definite time over-current relays.

UNIT-III:
Static Differential Relays: Analysis of Static Differential Relays –Static Relay schemes –Duo bias transformer differential protection –Harmonic restraint relay.

Static Distance Relays: Static impedance-reactance–MHO and angle impedance relay-sampling comparator –realization of reactance and MHO relay using sampling comparator.

UNIT-IV:
Multi-Input Comparators: Conic section characteristics-Three input amplitude comparator –Hybrid comparator-switched distance schemes –Poly phase distance schemes-phase fault scheme –three phase scheme – combined and ground fault scheme.

Power Swings: Effect of power swings on the performance of distance relays –Power swing analysis-Principle of out of step tripping and blocking relays-effect of line and length and source impedance on distance relays.

UNIT-V:

Microprocessor based Protective Relays: (Block diagram and flowchart approach only)- Over current relays–impedance relays-directional relay-reactance relay .Generalized mathematical expressions for distance relays-measurement of resistance and reactance – MHO and offset MHO relays-Realization of MHO characteristics- Realization of offset MHO characteristics -Basic principle of Digital computer relaying.

TEXT BOOKS:

1. Badri Ram and D.N.Vishwakarma, "Power system protection and Switch gear ", TMH publication New Delhi 1995.

2. T.S.Madhava Rao , "Static relays", TMH publication, second edition 1989.

REFERENCE:

1. Protection and Switchgear, Bhavesh Bhalja, R. P. Maheshearі, Nilesh G. Chothani, Oxford University Press.
2. Electrical Power System Protection, C. Christopoulos and A. Wright, Springer International.

OUTCOMES

Student can learn

1. Fundamental concepts of Power systems.
2. Specifications of protecting devices in power systems.
3. Acquiring the knowledge about all advance protection schemes
4. Get the thorough knowledge about the comparators used in power systems.

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PROFESSIONAL ELECTIVE-III

(AJ7244) MODERN POWER ELECTRONIC CONVERTERS

Pre- Requisites: To learn this course students should have the concepts on the following subjects Power Electronics

Objectives :

1. This courses introduces modern power semiconductor devises
2. Most of the applications done by the modern power electronic devises
3. Both power supplies are using this type of semiconductors.
4.

UNIT -I:

Modern power semiconductor devices Modern power semiconductor devices- MOS Turn Off Thyristor (MTO) – Emitter Turn Off Thyristor (ETO) – Integrated Gate – Commutated thyristor (IGCTs) – MOS – controlled thyristors (MCTs) – Static induction Thyristors (SITHs) – Power integrated circuits (PICs) – Symbol, structure and equivalent circuit-comparison of their features.

UNIT-II:

Resonant pulse inverters: Resonant pulse inverters – series resonant inverters- series resonant inverters with unidirectional switches – series resonant inverters with bidirectional switches- analysis of half bride resonant inverter- evaluation of currents and Voltages of a simple resonant inverter – analysis of half bridge and full bridge resonant inverter with bidirectional switches – Frequency response of series resonant inverter- for series loaded inverter – for parallel resonant inverters – Voltage control of resonant inverters-class E resonant inverter – class E resonant rectifier- evaluation of values of C‟s and L‟s for class E inverter and Class E rectifier – numerical problems.

UNIT-III: Resonant Converters: Resonant converters- zero current switching resonant converters – L type ZCS resonant converter M type ZCS resonant converter – zero voltage Switching resonant converters – comparison between ZCS and ZVS resonant converters-Two quadrant ZVS resonant converters – resonant dc – link inverters- evaluation of L and C for zero current switching inverter – Numerical problems. Multilevel Inverters: Multilevel concept- Classification of multilevel inverters – Diode clamped multilevel inverter Principle of operation – main features- improved diode clamped inverter – principle of operation – Flying capacitors multilevel inverter – principle of operation – main features.

UNIT-IV:

Multilevel inverters (continued) Cascaded multilevel inverter – principle of operation – main features- multilevel inverter applications – reactive power compensation – back to back intertie system – adjustable drives – switching device currents – dc link capacitor voltage balancing –features of Multilevel inverters – comparisons of multilevel converters.

UNIT -V:

DC Power supplies: DC power supplies – classification- switched mode dc power supplies – fly back Converter forward converter- push –pull converter –half bridge converter –Full bridge converter – Resonant DC power supplies- bidirectional power supplies- Application. UNIT -VII: **AC Power Supples:** AC power supplies – classification – switched mode ac power supplies Resonant AC power supplies-bidirectional ac power supplies – multistage conversions- control circuits- applications. Power conditioners and Uninterruptible Power Supplies: Introduction- power line disturbances – power conditioners- uninterruptible power supplies applications.

TEXT BOOKS:

1. Power Electronics: Mohammed H.Rashid-Pearson Education- Third Edition –first Indian reprint-2004
2. Power Electronics – Ned Mohan, Tore M.Undeland and William P.Robbind – John wiley & Sons – Second Edition

REFERENCES:

1. Power Electronics and converters—M.D.Singh
2. Power Electronics – Ned Mohan, Tore M.Undeland and William P.Robbind – John wiley & Sons – Second Edition

OUTCOMES:

1. This courses student learns modern power semiconductor devises structures and applications.
2. Industrial applications done by the modern power electronic devises,high and mediam power applications.
3. Both AC and DC power supplies are used this type of semiconductor devices
4. Multilevel converters are also designed. Multilevel operations and applications are also learned by this courses

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IV Year B.Tech. I-Sem: EEE

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PROFESSIONAL ELECTIVE-IV

(AJ7234) ELECTRICAL DISTRIBUTION SYSTEMS

Pre- Requisites: To learn this course student should have the concepts on the following subjects: Power system-I, Switch gear and protection

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.

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 & P.F 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 BOOKS:

1. Electrical Power Distribution Systems, V.Kamaraju, TMH.
2. Electrical Distribution Systems, Dr. S. Siva nagaraju, Dr. K.Shankar. Danapathi Ral Publications.

REFERENCE BOOKS:

1. Electric Power Distribution System Engineering, Turan Gonen, CRC Press.
2. Electric Power Generation, Transmission and Distribution, SN. Singh, PHI Publishers.

OUTCOMES:

1. After going through this course the student gets a thorough knowledge on, general aspects of electrical distribution systems,
2. design and analysis of distribution feeders and substations, distribution systems analysis through voltage-drop and power loss calculations,
3. operation of protective devices used in distribution systems and their co-ordination
4. voltage control and power factor improvement through capacitor compensation
5. and distribution system aults analysis, with which he/she can able to apply the above conceptual things to real-world electrical and electronics problems and applications.

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PROFESSIONAL ELECTIVE-IV

(AJ7235) HIGH VOLTAGE ENGINEERING

Pre- Requisites: To learn this course students should have the concepts on the following subjects: Electrical Engineering Materials, Electrical Measurements, power Systems-II

OBJECTIVES:

1. This subject deals with the detailed analysis of Breakdown occurring in gaseous, liquids
2. Solid dielectrics. Information about generation and measurement of High voltage and current.
3. In addition High voltage testing methods are also discussed.

UNIT- I

Introduction to High Voltage Engineering: Electric Field Stresses, Gas / Vacuum as Insulator, Liquid D electrics, Solids and Compotes, Estimation and Control of Electric Stress, Numerical methods for electric field Computation, Surge voltages, their distribution and control, Applications of insulating materials in transformer, rotating machines, circuit breakers, cable power capacitors and bushings.

UNIT- II

Break Down in Dielectric Materials: Gases as insulating media, collision process, Ionization process, Tow ‘send’s criteria of breakdown in gases, Paschen’s law. Liquid as Insulator, pure and commercial liquids, breakdown in pure and commercial liquids. Intrinsic breakdown, elector mechanical breakdown, thermal breakdown, breakdown of solid dielectrics in practice, Breakdown in composite dielectrics, solid dielectrics used in practice.

UNIT-III

Generation & Measurement of High Voltages & 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 Direct Current voltages, Measurement of High Voltages alternating and impulse, Measurement of High Currents direct, alternating and Impulse, Oscilloscope for impulse voltage and current measurements.

UNIT-IV

Over Voltages & Insulation Co-Ordination: Natural causes for over voltages — Lightning phenomenon, over Voltage due to switching surges, systems faults and other abnormal conditions, Principals of insulation Coordination voltage and Extra High Voltage power systems.

UNIT-V

Testing Of Materials & Electrical Apparatus: Measurement of D.C Resistivity, Measurement of Dielectric Constant and loss factor, Partial discharge measurements. Testing of Insulators and bushings, Testing of Isolators and circuit breakers, testing of cables, Testing of Transformers, Testing of Surge Arresters, and Radio Interference measurements.

TEXT BOOKS

1. High Voltage Engineering, M.S.Naidu and V. Kamaraju, TMH Publications.
2. High Voltage Engineering, C.L.Wadhwa, New Age Internationals (P) Limited.

REFERENCE BOOKS

1. High Voltage Engineering: Fundamentals, E.Kuffel, W.S.Zaengi, J.Kuffel by Elsevier.
2. High Voltage Insulation Engineering, Ravindra Arora, Wolfgang Mosch, New Age International (P) Limited.
3. High Voltage Engineering, Theory and Practice, Mazen Abdel Salam, Hussein Anis, Ahdan El-Morshedy, Roshdy Radwan, Marcel Dekker

Outcome

1. After going through this course the student gets a thorough knowledge on, basics of high voltage engineering, break-down phenomenon in different types of dielectrics, generation
2. measurement of high voltages and currents, the phenomenon of over-voltages,
3. concept of insulation coordination, testing of various materials and electrical apparatus used in high voltage engineering,
4. With which he/she can able to apply the above conceptual things to real-world electrical and electronics problems and applications.

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PROFESSIONAL ELECTIVE-IV

(AJ7236) DIGITL CONTROL SYSTEMS

Pre- Requisites: To learn this course student should have the concepts on the following subject: Control systems

OBJECTIVES:

1. This course gives fundamentals digital control systems, z-transforms, state space representation of the control systems, concepts of controllability and observably.
2. Estimation of stability in different domains, design of discrete time control systems, compensators, state feedback controllers, state observers through various transformations.

UNIT-I

Introduction: Introduction, Examples of Data control systems — Digital to Analog conversion and Analog to Digital conversion, sample and hold operations. Z — TRANSFORMS: Introduction, Linear difference equations, pulse response, Z — transforms, Theorems of Z — Transforms, the inverse Z — transforms, Modified Z- Transforms. Z-Transform method for solving difference equations; Pulse transforms function) block diagram analysis of sampled — data systems, mapping between s-plane and z-plane.

UNIT — II

State Space Analysis: State Space Representation of discrete time systems, Pulse Transfer Function Matrix solving discrete time state space equations, State transition matrix and its Properties, Methods for Computation of State Transition Matrix, Discretization of continuous time state — space equations. Concepts of Controllability and Observability, Tests for controllability and Observability. Duality between Controllability and Observability, Controllability and Observability conditions for Pulse Transfer Function.

UNIT —III

Stability Analysis: Mapping between the S-Plane and the Z-Plane — Primary strips and Complementary Strips — Constant frequency loci, Constant damping ratio loci, Stability Analysis of closed loop systems in the Z-Plane. Jury stability test — Stability Analysis by use of the Bilinear Transformation and Routh Stability criterion.

UNIT-IV

Design of Discrete Time Control System: Transient and steady — State response Analysis — Design based on the frequency response method — Bilinear Transformation and Design procedure in the w-plane, Lead, Lag and Lead-Lag compensators and digital PID controllers.

UNIT-V

State Feedback Controllers & Observers: Design of state feedback controller through pole placement — Necessary and sufficient conditions, Ackerman's formula. State Observers — Full order and Reduced order observers.

TEXT BOOK

1. Discrete-Time Control systems – K. Ogata, Pearson Education/PHI, 2 Edition.
2. Digital Control Systems, Kuo, Oxford University Press, 2 Edition, 2003.Digital Control and State Variable Methods by M.Gopal, TMH.

REFERENCE BOOKS

1. Digital Control Engineering Analysis and Design M. Sami Fadali Antonio Visioli, AP Academic Press.
2. Digital Control Systems , V. I. George, C. P. Kurian, Cengage Learning

OUTCOMES:

1. After going through this course the student gets a thorough knowledge on, basics of digital control systems,
2. z-transforms, mapping between S-plane and Z-plane, state-space analysis, concept of controllability and observabilty,
3. derivation of pulse-transfer function, stability analysis in S-domain and Z domains, stability through jury-stability test, stability through bilinear transformation
4. R-H criteria, design of discrete-time control systems, design of lag, lead, lead-lag compensators, design of PID controllers and design of state feedback controllers
5. Observers, with which he/she can able to apply the above conceptual things to real-world electrical and electronics problems and applications.

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(AJ7430) MICRO PROCESSORS AND MICRO CONTROLLERS LAB

Cycle 1: Using 8086 Processor Kits and/or Assembler (5 Weeks)

Assembly Language Programs to 8086 to Perform

1. Arithmetic, Logical, String Operations on 16 Bit and 32 Bit Data.
2. Bit level Logical Operations, Rotate, Shift, Swap and Branch Operations.
3. sort the given array of Numbers.
4. pick the median from the given String.
5. find the length of a given string and Verify the Password

Using 8051 Microcontroller Kit and/or Keil IDE (6 weeks)

1. Assembly Language Programs to Perform Arithmetic (Both Signed and Unsigned) 16 Bit Data Operations, Logical Operations (Byte and Bit Level Operations), Rotate, Shift, Swap and Branch Instructions
2. Time delay Generation Using Timers of 8051.
3. Serial Communication from / to 8051 to / from I/O devices.
4. Program Using Interrupts to Generate Square Wave 10 KHZ Frequency on P2.1 Using Timer0 8051 in 8bit Auto reload Mode and Connect a 1HZ Pulse to INT1 pin and Display on Port0.Assume Crystal Frequency as 11.0592MHZ

Cycle 2: Interfacing I/O Devices to 8086 & 8051 (5 Weeks)

1. 8251 PPI Interfacing to 8086
2. 8257 DMA Controller Interfacing to 8086
3. Stepper motor interfacing to 8086
4. Seven Segment Display interfacing to 8086.
5. Tone Generator interfacing to 8086.
6. Interfacing ADC and DAC to 8086.
7. SRAM and DRAM Interfacing to 8086
8. Digit Key Interfacing to 8086.
9. Matrix Keypad interfacing to 8051.
10. Sequence Generator Using Serial Interface in 8051.

Equipment/Software Required

MASM assembler, Keil IDE/Other IDE

8086 processor kits, 8051 controller kits

8251 interfacing kits, 8257 interfacing kits, Stepper motors interfacing kits, seven segment display interfacing kits

ADC/DAC kits interfacing kits, SRAM/DRAM interfacing kits, DIGIT Key interfacing kits, 4x4 MATRIX Keypad.

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(AJ7233)SIMULATION OF ELECTRICAL SYSTEMS LAB

The following experiments are required to be conducted as compulsory experiments:

1. PSPICE simulation of transient response of RLC circuits.
    a) Response to Pulse input
    b) Response to step input
    c) Response to sinusoidal input
2. PSPICE simulation of single-phase full converter using RL E loads and single-phase AC voltage controller using RL & E loads.
3. PSPICE simulation of resonant pulse commutation circuit and Buck chopper.
4. PSPICE simulation of single phase Inverter with PWM control
5. PSPICE simulation of Op-Amp based integrator and Differentiator circuits.
6. Linear system analysis(Time domail analysis,Error analysis) using MATLAB
7. Stability analysis(Bode,Root Locus,Nyquist) of Linear Time Invariant System Using MATLAB
8. State Space model for classical transfer function using MATLAB-verification

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

1. Transfer function analysis of DC circuit using PSPICE.
2. Modeling a transformer and simulation of loss transmission line in PSPICE.
3. Short circuit studies.
4. Power flow solution and Transient stability evaluation of Power system.
5. Transient simulation of RLC circuits using EMTP.
6. Transient simulation of Transformers using EMTP

Reference Books:

1. Pspice for circuits and electronics using PSPICE – M.H. Rashid, M/s. PHI Publications.
2. Pspice A/D user's manual – Microsim, USA.
3. Pspice reference guide – Microsim, USA.
4. MATLAB user's manual – Math works, USA.
5. MATLAB – Control System toolbox – Math works, USA.
6. SIMULINK user's manual – Math works, USA. 7. EMTP User's Manual

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PROFESSIONAL –V

(AJ8237)FUNDAMENTALS OF HVDC AND FACTS DEVICES

Pre- Requisites: To learn this course student should have the concepts on the following subject: Power systems-II, Power Electronics

OBJECTIVES:

1. This subject deals with the importance of HVDC transmission, analysis of HVDC converters, Harmonics and Filters.
2. Reactive power control and Power factor improvements of the system. it also deals with basic FACTS concepts
3. Static shunt and series compensation and combined compensation techniques.

UNIT—I

Introduction: Comparison of AC and DC transmission systems, application of DC transmission, types of DC links, typical layout of a HVDC converter station. HVDC converters, pulse number, analysis of Gratez circuit with and without overlap, converter bridge characteristics, equivalent circuits or rectifier and inverter configurations of twelve pulse converters.

UNIT—II

Converter & HVDC System Control: Principles of DC Link Control — Converters Control Characteristics — system control hierarchy, firing angle control, current and extinction angle control, starting and stopping of DC link.

UNIT-III

Harmonics, Filters and Reactive Power Control: Introduction, generation of harmonics, AC and DC filters. Reactive Power Requirements in steady state, sources of reactive power, static VAR systems.

Power Flow Analysis in AC/DC Systems: Modeling of DC/AC converters, Controller Equations-Solutions of AC/DC load flow —Simultaneous method-Sequential method.

UNIT-IV

Introduction to FACTS: Flow of power in AC parallel paths and meshed systems, basic types of FACTS controllers, brief description and definitions of FACTS controllers.

Static Shunt Compensators: Objectives of shunt compensation, methods of controllable VAR generation, static VAR compensators, SVC and STATCOM, comparison between SVC and STATCOM.

UNIT-V

Static Series Compensators: Objectives of series compensation, variable impedance type-thyristor switched series capacitors (TCSC), and switching converter type series compensators, static series synchronous compensator (SSSC)-power angle characteristics-basic operating control schemes.
Combined Compensators: Introduction, unified power flow controller (UPFC), basic operating principle, independent real and reactive power flow controller, control structure.

TEXT BOOKS:

1. HVDC Transmission, S. Kamakshaiah, V. Kamaraju, The Mc — Graw Hill Companies.
2. Understanding FACTS, Concepts and Technology of Flexible AC Transmission Systems, Narain. G. Hingorani, Laszlo Gyugyi, IEEE Press, Wiley India.

REFERENCE BOOKS:

1. HVDC and Facts Controllers Applications of Static Converters in Power Systems, Vijay K. Sood, Kiuwer Academic Publishers.
2. HVDC Power Transmission Systems: Technology and system Interactions, K.R.Padiyar, New Age International (P) Limited.
3. Thyristor — Based Conrollers for Electrical Transmission Systems, R.Mohan Mathur, Rajiv K. Varma.Wiley India.
4. FACTS Modeling and Simulation in Power Networks, Enrique Acha, Wiley India Distributed by BSP Books Pvt. Ltd.

OUTCOMES:

1. After going through this course the student gets a thorough knowledge on, basics of HVDC system.
2. converters control schemes harmonics filters reactive power control and power flow analysis in HVDC systems
3. basic concepts of FACTS, necessity of FACTS controllers and their operation, shunt and series compensation through various static compensators
4. With which he/she can able to apply the above conceptual things to real-world electrical and electronics problems and applications.

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PROFESSIONAL –V

(AJ8238) EXTRA HIGH VOLTAGE AC TRANSMISSION

Pre- Requisites: To learn this course student should have the concepts on the following subject: Power systems-II, HVDC

OBJECTIVES:

1. This course introduces the concepts of extra high voltage AC transmission.
2. It also emphasis on the behavior of the line parameters for extra high voltages, voltage gradients of the transmission line conductors gradients
3. The effect of corona, electrostatic filed calculations, travelling wave theory concept, voltage control when the line carries extra high voltages.

UNIT — I

Introduction: Necessity of EHV AC transmission — advantages and problems—power handling capacity and line losses- mechanical considerations — resistance of conductors — properties of bundled conductors — bundle spacing and bundle radius- Examples. Line and ground reactive parameters: Line inductance and capacitances — sequence inductances and capacitances — modes of propagation — ground return — Examples

UNIT — II

Voltage Gradients of Conductors: Electrostatics — field of sphere gap — held of line changes and properties — charge — potential relations for multi- conductors — surface voltage gradient on conductors — distribution of voltage gradient on sub-conductors of bundle — Examples.

UNIT — III

Corona Effects: Power loss and audible noise (AN) — corona loss formulae — charge voltage diagram — generation, characteristics – limits and measurements of AN — relation between 1-phase and 3-phase AN levels — Examples. Radio interference (RI) – corona pulses generation, properties, limits — frequency spectrum — modes of propagation — excitation function — ‘measurement of RI, RIV and excitation functions — Examples.

UNIT — IV

Electro Static Field: Electrostatic field: calculation of electrostatic field of EHV/AC lines — effect on humans, animals and plants — electrostatic induction un-energized circuit of double-circuit line — electromagnetic interference- Examples.

Traveling wave theory: Traveling wave expression and solution- source of excitation-terminal conditions- open circuited and short-circuited end-reflection and refraction coefficients-Lumped parameters of distributed lines- generalized constants-No load voltage conditions and charging current.

UNIT -V

Voltage Control: Power circle diagram and its use — voltage control using synchronous condensers — cascade connection of shunt and series compensation — sub synchronous resonance in series capacitor — compensated lines — static VAR compensating system.

TEXT BOOKS

1. EHVAC Transmission Engineering by R. D. Begamudre, New Age International (p) Ltd.
2. HVAC and DC Transmission by S. Rao.
3. REFERENCE BOOKS
4. Rokosh Das Begamudre,"Extra High Voltage AC Transmission Engineering"—Wiley Eastern LTD.
5. Edison,"EHV Transmission line"- Electric Institution.

REFERENCES

1. Rokosh Das Begamudre,"Extra High Voltage AC Transmission Engineering"—Wiley Eastern LTD.
2. Edison,"EHV Transmission line"- Electric Institution

OUTCOMES:

1. After going through this course the student gets a thorough knowledge on, general aspects
2. necessity of extra high voltage (EHVAC) transmission, advantages and disadvantages of EHVAC,
3. concepts of voltage gradient, effects of corona, electro static field calculations, theory of travelling waves
4. and voltage control of EHVAC transmission, with which he/she can able to apply the above conceptual things to real-world electrical
5. electronics problems and applications.

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PROFESSIONAL –V

(AJ8239) POWER QUALITY

Pre- Requisites: To learn this course student should have the concepts on the following subject: Power systems-II, Power system operation and control.

OBJECTIVES:

1. This course introduces power quality in supplies domestic and industrial applications.
2. Different types transmissions and sags swells applications about single phase and three phase supplies.

UNIT-I:

Introduction : Introduction of the Power Quality (PQ) problem, Terms used in PQ: Voltage, Sag, Swell, Surges, Harmonics, over voltages, spikes, Voltage fluctuations, Transients, Interruption, overview of power quality phenomenon, Remedies to improve power quality, power quality monitoring.

UNIT-II:

Long & Short Interruptions: Interruptions – Definition – Difference between failures, outage, Interruptions – causes of Long Interruptions – Origin of Interruptions – Limits for the Interruption frequency – Limits for the interruption duration – costs of Interruption – Overview of Reliability evaluation to power quality, comparison of observations and reliability evaluation.

Short interruptions: definition, origin of short interruptions, basic principle, fuse saving, voltage magnitude events due to re-closing, voltage during the interruption, monitoring of short interruptions, difference between medium and low voltage systems. Multiple events, single phase tripping – voltage and current during fault period, voltage and current at post fault period, stochastic prediction of short interruptions.

UNIT III:

1 & 3-Phase Voltage SAG Characterization: Voltage sag – definition, causes of voltage sag, voltage sag magnitude, and monitoring, theoretical calculation of voltage sag magnitude, voltage sag calculation in non-radial systems, meshed systems, and voltage sag duration.

Three phase faults, phase angle jumps, magnitude and phase angle jumps for three phase unbalanced sags, load influence on voltage sags.

UNIT-IV:

Power Quality Considerations in Industrial Power Systems: Voltage sag – equipment behavior of Power electronic loads, induction motors, synchronous motors, computers, consumer electronics, adjustable speed AC drives and its operation. Mitigation of AC Drives, adjustable speed DC drives and its operation, mitigation methods of DC drives.

UNIT-V:

Mitigation of Interruptions & Voltage Sags: Overview of mitigation methods – from fault to trip, reducing the number of faults, reducing the fault clearing time changing the power system, installing mitigation equipment, improving equipment immunity, different events and mitigation methods. System equipment interface – voltage source converter, series voltage controller, shunt controller, combined shunt and series controller.
Power Quality and EMC Standards: Introduction to standardization, IEC Electromagnetic compatibility standards, European voltage characteristics standards, PQ surveys.

TEXTBOOKS:

1. Math H J Bollen "Understanding Power Quality Problems", IEEE Press.
2. R.C. Dugan, M.F. McGranaghan and H.W. Beaty, "Electric Power Systems Quality." New
   York: McGraw-Hill.1996

REFERENCES:

1. G.T. Heydt, „Electric Power Quality", 2nd Edition. (West Lafayette, IN, Stars in a
   Circle Publications, 1994).
2. Power Quality VAR Compensation in Power Systems, R. SastryVedamMulukutla S. Sarma,CRC Press.
3. A Ghosh, G. Ledwich, Power Quality Enhancement Using Custom Power Devices. Kluwer

OUTCOMES:

1. Students learn power quality in supplies domestic and industrial applications.
2. Different types of transmissions and sags and swells applications.
3. Power quality issues in single phase and three phase supply voltage.
4. About current Harmonics and frequency harmonics of supply.

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PROFESSIONAL –VI

(AJ8240) NEURAL NETWORKS AND FUZZY LOGIC

Pre- Requisites: To learn this course student should have the concepts on the following subject:
Power system operation and control, Computer Methods in power system

OBJECTIVES:

1. This course introduces the basics of Neural Networks and essentials of Artificial Neural Networks with Single Layer and Multi layer Feed Forward Networks.
2. Also deals with Associate Memories and introduces Fuzzy sets and Fuzzy Logic system components.
3. The Neural Network and Fuzzy Network system application to Electrical Engineering is also presented. This subject is very important and useful for doing Project Work.

UNIT-I

Introduction & Essentials to Neural Networks: Introduction, Humans and Computers, Organization of the Brain, Biological Neuron, Biological and Artificial Neuron Models, Hodgkin-Huxley Neuron Model, Integrate-and-Fire Neuron Model, Spiking Neuron Model, Characteristics of ANN, McCullochPitts Model, Historical Developments, Potential Applications of ANN. Artificial Neuron Model, Operations of Artificial Neuron, Types of Neuron Activation Function, ANN Architectures, Classification Taxonomy of ANN — Connectivity, Neural Dynamics (Activation and Synaptic), Learning Strategy (Supervised, Unsupervised, Reinforcement), Learning Rules, Types of Application

UNIT—II

Single & Multi Layer Feed Forward Neural Networks: Introduction, Perceptron Models: Discrete, Continuous and Multi-Category, Training

Algorithms: Discrete and Continuous Perceptron Networks, Perceptron Convergence theorem, Limitations of the Perceptron Model, Applications. Credit Assignment Problem, Generalized Delta Rule, and Derivation of Back-propagation (BP) Training, Summary of Back-propagation Algorithm, Kolmogorov Theorem, Learning Difficulties and Improvements.

UNIT-III

Associative Memories-I: Paradigms of Associative Memory, Pattern Mathematics, Hebbian Learning, General Concepts of Associative Memory (Associative Matrix, Association Rules, Hamming Distance, The Linear Associate, Matrix Memories, Content Addressable Memory).

UNIT-IV

Associative Memories-II: Bidirectional Associative Memory (BAM) Architecture, BAM Training Algorithms: Storage and Recall Algorithm, BAM Energy Function, Proof of BAM Stability Theorem. Architecture of Hopfield

Network: Discrete and Continuous versions, Storage and Recall Algorithm, Stability Analysis, Capacity of the Hopfield Network Summary and Discussion of Instance/Memory Based Learning Algorithms, Applications.

UNIT – V

Fuzzy Logic: Classical & Fuzzy Sets: Introduction to classical sets – properties, Operations and relations; Fuzzy sets, Membership, Uncertainty, Operations, properties, fuzzy relations, cardinalities, membership functions.

Fuzzy Logic System Components: Fuzzification, Membership value assignment, development of rule base and decision making system, Defuzzification to crisp sets, Defuzzification methods.

Applications of ANN: Process identification,control,fault diagnosis,and load forecasting,fuzzy logic application

TEXT BOOKS

1. Neural Networks, Fuzzy logic, Genetic algorithms: synthesis and applications, Rajasekharan and Pal, PHI.
2. Neural Networks and Fuzzy Logic, C. Naga Bhaskar, G. Vijay Kumar, BS Publicatior-is.

REFERENCE BOOKS

1. Artificial Neural Networks, B. Yegnanarayana, PHI.
2. Artificial Neural Networks, Zaruda, PHI.
3. Neural Networks and Fuzzy Logic System, Bail Kosko, PHI.
4. Fuzzy Logic and Neural Networks, M. Amirthavalli, Scitech Publications India Pvt. Ltd.
5. Neural Networks, James A Freeman and Davis Skapura, Pearson Education.
6. Neural networks by satish Kumar, TIVIH, 2004
7. Neural Networks, Simon Hakins , Pearson Education.
8. Neural Engineering, C.Eliasmith and CH.Anderson, PHI.

OUTCOMES:

1. After going through this course the student gets a thorough knowledge on, biological neurons and artificial neurons,
2. Comparative analysis between human and computer, artificial neural network models, characteristics of ANN's, different types of activation functions, learning strategies, learning rules, perceptron models, single and multi layer feed-forward and feed—back neural networks
3. Back-propagation algorithm, Kolmogorov Theorem, different types of associative memories and basics of fuzzy logic,
4. concept of classical and fuzzy sets, fuzzy logic system components Fuzzification and Defuzzification,
5. With which he/she can able to apply the above conceptual things to real-world electrical and electronics problems and applications.

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PROFESSIONAL –VI

(AJ8241) LINEAR SYSTEMS ANALYSIS

Pre- Requisites: To learn this course student should have the concepts on the following subject: Electrical circuit-I,II and Control systems

OBJECTIVES:

1. To provide students with the modeling of electrical systems.
2. To familiarize the students with the state space analysis of dynamic systems and Fourier series representation.
3. To make students understand the concepts forurier transforms and Laplace transforms approach To have the different methods of representation of network synthesis
4. Testing of polynomials. To familiarize the students with the concepts of sampling and z-transformations

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 Representation

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.

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 – III Laplace Transform Applications

Application of Laplace transforms Methods of Ananlysis – Response of RL, RC, RLC Networks to Step, Ramp, and impulse functions, Shifting Theorem – Convolution Integral – Applications

UNIT-IV Testing of Polynomials

Elements of reliability-Hurwitz polynomials-positive real functions-Properties-Testing-Sturm's Test, examples.

Network Sysnthesis

Synthesis of one port LC networks-Foster and Cauer methods-Synthesis of RL and RC one port networks-Foster and Cauer methods.

UNIT-V 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.

Z-Transforms

Fundamental difference between continuous and discrete time signals, discrete time complex, exponential and sinusoidal signals, periodicity of discrete time complex exponential, concept of Z-Transform 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 – AN 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.

OUTCOMES:

1. Learn students with the modeling of electrical systems.
2. To familiarize the students with the state space analysis of dynamic systems and Fourier series representation.
3. To make students understand the concepts forurier transforms and Laplace transforms approach to have the different methods of representation of network synthesis.
4. Testing of polynomials.
5. To familiarize the students with the concepts of sampling and z-transformations.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

IV Year B.Tech. II-Sem: EEE

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PROFESSIONAL –VI

(AJ8242) ADVANCED CONTROL SYSTEMS

Objective

1. This subject deals with state space, describing function, phase plane and stability analysis including controllability and observabilty.
2. It also deals with modern control and optimal control systems.

UNIT — I

Stability Analysis-I: Frequency Domain: Polar Plots-Nyquist Plots-Stability Analysis. Lag, Lead, Lead-Lag Controllers design in frequency Domain.

UNIT —II

Stability Analysis-II: Stability in the sense of Lyapunov. Lyapunov's stability and Lypanov's instability theorems. Direct method of Lypanov for the Linear and Nonlinear continuous time autonomous systems.

UNIT —III

Phase—Plane Analysis: Introduction to phase-plane analysis, Method of Isoclines for Constructing Trajectories, singular points, phase-plane analysis of nonlinear control systems.

UNIT —IV

Describing Function Analysis: Introduction to nonlinear systems, Types of nonlinearities, describing functions, describing function analysis of nonlinear control systems.

UNIT — V

State Space Analysis of Continuous Systems: Concepts of state, state variables and state model, derivation of state models from block diagrams, Denationalization- Solving the Time invariant state Equations- State Transition Matrix and it's Properties — Concepts of Controllability and Observability.

TEXT BOOKS

1. Advanced Control Systems, B. N. Sarkar, PHI Learning Private Limited.
2. Modern Control System Theory, M. Gopal, New Age International Publishers

REFERENCE BOOKS

1. Control Systems theory and applications, S.K Bhattacharya, Pearson.
2. Control Systems, N.C.Jagan, BS Publications.
3. Control Systems Engineering, I. J. Nagrath and M. Gopal, New Age International (P) Limited, Publishers.
4. Control Systems, N.K.Sinha, New Age International (P) Limited Publishers.
5. Modern Control Engineering, K. Ogata, Prentice Hall of India, 3d edition, 1998.
6. Advanced Control Theory, Somanath Majhi, Cengage Learning.
7. Modern Control Engineering, D. Roy Choudhury, PHI Learning.
8. Digital Control and State Variable Methods, M. Gopal, Tata Mc Graw Hill Companies.

OUTCOMES:

1. After going through this course the student gets a thorough knowledge on, basics of advanced control systems
2. Stability analysis of control systems in frequency domain through polar & Nyquist plots
3. Design of lag, lead, lag lead compensators in frequency domain, stability analysis through Lypanov stability, phase-plane analysis, non-linear systems,
4. Describing functions, state space analysis of continuous systems and concept of controllability and observably,
5. With which he/she can able to apply the above conceptual things to real-world electrical and electronics problems and applications.

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