RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

NANDYAL-518501, KURNOOL DIST., A.P., INDIA

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

EDUCATION FOR PEACE

(ESTD-1995)

B.Tech SYLLABUS

2015

Applicable for students admitted into B.Tech (Regular) from 2015-16 & B.Tech (Lateral Entry Scheme) from 2016-17

REGULATIONS, Course Structure & Detailed Syllabus

R.G.M C.E.T. Dept.of EEE NANDYAL

Head of Department
Electrical & Electronics Engineering
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RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous)

ELECTRICAL AND ELECTRONICS ENGINEERING

VISION

- ***To improve the curriculum of Electrical and Electronics Engineering to meet the changing technological needs of industry***
- ***To address the current social concerns and to build an environment which does not compromise safety and quality power***
- ***To contribute effects for the betterment of humankind taking cognizance of greenhouse effect.***

MISSION

- ***To accomplish values of excellence in the field of electrical engineering by incorporating regular changes in the curriculum on par with industrial trends***
- ***To provide an education that combines academics and practice with emphasis on safety of electrical equipments***
- ***To inculcate knowledge in production and maintenance of electrical power generation through renewable energy sources and meet the power demand of the society.***

Program Out Comes

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, and engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety and the cultural, societal and environmental considerations.
4. **Conduct investigations of complex problems**: Use research based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual and as a member or leader in diverse teams and in multi-disciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large being able to comprehend and write effective reports and design documentation, make effective presentations and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team to manage projects and in multi-disciplinary environments.
12. **Life-Long learning**: Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific outcomes

PSO– 1: Students are able to analyze and design the electrical and electronic circuits with the knowledge of courses related circuits, networks, linear digital circuits and power electronics.

PSO-2: Student can explore the scientific theories, ideas, methodologies in operation and maintenance of electrical machines to bridge the gap between academics and industries.

PSO-3: Students are able to work professionally with new cutting edge Technologies in the fields of power system, generation, operation, and maintenance.

Program Educational Objectives

- **PEO-1**: Graduates will have intra-disciplinary comprehension and skills to design and develop products and systems in the field of Electrical and Electronics Engineering.
- **PEO-2**: Graduates will acquire knowledge to meet the needs of operation and continuance of electrical tools used in various industries
- **PEO-3**: Graduates will be proficient to meet the tasks in public and private sectors of Electrical Engineering
- **PEO-4**: Graduates will possess the knowledge and motivation to pursue successful professional career for the betterment of humankind

Note: Program Outcomes (POs) and Program Specific Outcomes (PSOs) are mapped with Course Outcomes (COs) and they are correlated in following levels

1: Slight (Low)
2: Moderate (Medium)
3: Substantial (High)

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous)

ELECTRICAL AND ELECTRONICS ENGINEERING

(Affiliated to J.N.T.U.A, Anantapuramu)

ACADEMIC REGULATIONS, COURSE STRUCTURE AND DETAILED SYLLABI

B.Tech. (Regular) from 2015-16 and B.Tech (Lateral Entry Scheme) from 2016-17

For pursuing four year Bachelor Degree Program (under graduate) of study in Engineering (B.Tech.), Two year Master (post graduate) Degree of study in Engineering (M.Tech.),Two year Master (post graduate) degree of study in Business Administration (MBA), Three year Master (post graduate) Degree of study in Computer Applications (MCA) offered by Rajeev Gandhi Memorial College of Engineering and Technology, Nandyal - 518501 under Autonomous status and herein referred to as RGMCET (Autonomous):

All the rules specified herein approved by the Academic Council will be in force and applicable to students admitted from the Academic Year 2015-16 onwards. Any reference to "Institute" or "College" in these rules and regulations shall stand for Rajeev Gandhi Memorial College of Engineering and Technology (Autonomous).

All the rules and regulations, specified hereafter shall be read as a whole for the purpose of interpretation. As and when a doubt arises, the interpretation of the Chairman, Academic Council is final. As per the requirements of statutory bodies, the Principal, Rajeev Gandhi Memorial College of Engineering and Technology shall be the Chairman, Academic Council.

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

i) Passed either Intermediate Public Examination (IPE) conducted by the Board of Intermediate Education, Andhra Pradesh with Mathematics, Physics and Chemistry as optional subjects (or any equivalent examination certified by Board of Intermediate Examinations) or a Diploma in Engineering in the relevant branch conducted by the Board of Technical Education, Andhra Pradesh (or any equivalent examination certified by State Board of Technical Education) for admission.

ii) Secured a rank in the EAMCET examination conducted by AP State Council for Higher Education (APSCHE) for allotment of a seat by the Convener, EAMCET, for admission.

Admission Procedure:

As per the norms of A.P. State Council of Higher Education (APSCHE), Government of Andhra Pradesh, admissions are made to the first year of Four year B.Tech. Degree program as follows:-

a) As per the norms of Government of Andhra Pradesh, A-Category (based on the rank obtained in EAMCET) seats will be filled by the Convener, EAMCET.

b) As per the norms of Government of Andhra Pradesh, B-Category seats will be filled by the management.

Admission to the Second year of Four year B.Tech Degree Programming Engineering:

i) Candidates qualified in ECET and admitted by the Convener, ECET, in such cases for admission, when needed permission from the statutory bodies is to be obtained.

ii) 20% of the sanctioned strength in each program of study (of RGMCET) shall be filled by the Convener, ECET as lateral entry.

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous)

ELECTRICAL AND ELECTRONICS ENGINEERING

List of Programs offered

1. B.Tech. – Regular (& Lateral Entry)
2. M.Tech. – Regular
3. MBA – Regular
4. MCA – Regular

Academic Regulations for 2015 B. Tech. (Regular)

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

The B.Tech.be conferred by the Jawaharlal Nehru Technological University Anantapur, Anantapuramu students who are admitted to the program and fulfill all the requirements for the award of the Degree as specified below:

1.0 Award of B.Tech. Degree

1.1 The student will be declared eligible for the award of the B. Tech. degree if he fulfills the following academic regulations:

1.2 Pursued a course of study for not less than prescribed course work duration and not more than double the prescribed course work duration.

1.3 Registered for 200 credits and secured a minimum of 194credits with compulsory subjects as listed in Table-1 below.

Table 1: Compulsory Subjects

S.No.	SUBJECT PARTICULARS
1	All the first year subjects
2	All practical subjects
3	All Skill Development Courses/ value added courses
4	Mini project
5	Seminar
6	Comprehensive viva - voce
7	Project work
8	Extra Academic Activities(EAA)

2.0 Forfeit of seat

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.

3.0 Courses of study

The following courses of study are offered at present as specializations for the B.Tech Course:

1.	Civil Engineering
2.	Computer Science and Engineering
3.	Electrical and Electronics Engineering
4.	Electronics and Communication Engineering
5.	Information Technology
6.	Mechanical Engineering

and any other course as approved by the authorities of the University from time to time.

Table 2: Credits

Subject	Semester			
	Periods/ Week	Credits	Internal Marks	External Marks
Theory	3+1*	03	30	70
Practical/Mini project	03	02	25	50
Drawing	03	03	30	70
Skill Development Courses/Value Added Course		01**	100 **(30 IM+70 EM)**	
EAA (Extra Academic Activities)	02	01	00	00
Seminar		01	50	
Comprehensive Viva-voce		02		50
Project		08	50	100

[*Tutorial

****[Skill Development Courses / value Added Course credits will not be considered for the award of division. However all these courses have to be cleared through internal evaluation by scoring minimum of 40%marks.EAA courses will not have any marks. The credits obtained in Skill development courses and EAA will be taken in to account for the award of degree.]**

4.0 Distribution and Weightage of Marks

4.1 The performance of the student in each semester shall be evaluated subject – wise with a maximum of 100 marks for theory and 75 marks for practical subject. In addition, mini-project, comprehensive viva, seminar shall be evaluated for 50 marks each and the project work shall be evaluated for 150 marks.

4.2 For theory subjects the distribution shall be 30 marks for Internal Evaluation (25 marks for internal test and 05 marks for assignments or field work/group task) and 70 marks for the End-Examination.

4.3 During the semester there shall be 2 tests for theory subjects. In each Internal test there shall be one compulsory (short answers) question and 3 descriptive questions are to be answered. The duration of internal test will be for 2hours. First test to be conducted in 3 Units and second test to be conducted in the remaining 3 Units of each subject. For awarding of 25Internal marks the performance of the student in two Internal examinations conducted one in the middle of the semester and the other towards the end of the semester giving a weightage of 0.75 for the better score and 0.25 for the other score will be considered. There shall be two assignments in each subject (problem based/ field work/group task) for award of 05 marks so that internal component (marks) will be 30 marks (25 marks for internal test+05 marks for assignments / field work/group task).

Table 3: Units for Internal Tests

Semester
3 UnitsFirst Internal test
3 UnitsSecond Internal test

4.4 In the case of Skill Development Courses, two Internal examinations shall be conducted one in the middle of the semester and the other at the end of the semester for 30 marks and the marks scored by the student in these exams with a weightage of 0.75 for better score and 0.25 for the other score will be awarded as Internal marks for 30. For the remaining 70 marks an end

examination will be conducted along with other theory examinations. However skill development courses/Value added courses, end examination will be evaluated internally.

4.5 No makeup test for internal examination or assignments/group tasks will be conducted in any subject or practical. The student, who is absent for any test shall be deemed to have scored zero in that test.

4.6 Elective subjects will commence from 3rd year second semester onwards. Out of the electives offered in 3-2 semester, one elective will be MOOC / Elective offered by the department. Any student who is interested can opt for the MOOC/ Elective offered by the department and acquires the required credits. Even if the student opts MOOC, he has to write two internal tests besides the end examination conducted by the institute like other subjects. However, he has to obtain the certificate from the organization in which he has registered. Any MOOC selected by the student should be of more than 45 hours duration and also from the reputed organization. Attendance of the student who has opted for MOOC will be taken from the remaining subjects and labs only in that semester while finalizing the attendance for fulfilling the minimum requirements of attendance for promotion to next semester. Attendance will not be recorded for MOOC.

4.7 Gap Year – Concept of student Entrepreneur in Residence shall be introduced and outstanding students who wish to pursue entrepreneurship are allowed to take a break of one year at any time after I/II/III year to pursue entrepreneurship full time. This period may be extended to two years at the most and these two years would not be counted for the time for the maximum time for graduation. An evaluation committee shall be constituted with to evaluate the proposal submitted by the student and committee shall decide on permitting the student for having the Gap Year. The committee consists of Principal as Chairman and all HODs as members.

4.8 In the electives offered in 4-1 semester, one elective will be open elective offered by the other department (inter - department). Student has to select one subject among the offered list of open elective subjects. Student has to clear the subject as per norms to get the required credits. At least 40students should register for any open elective; otherwise that open elective will not be offered.

4.9 Out of the electives offered in 4-2 semester again one elective will be based on MOOC/ elective offered by the department and the student has to acquire the required credits to clear the subject as specified in 4.9.

4.10 The institute would like to offer **Minor as optional feature of the B.Tech program aimed at providing additional learning opportunities for academically motivated and bright students. In order to earn a Minor, a student has to earn a minimum of 20 extra credits. For this in addition to the regular subjects, a student has to pursue three compulsory subjects from 3-1 semester and two electives (out of six electives offered from 3-2 Semester onwards). The Minor is indicated by separate CGPA and is reflected in the degree certificate as for example, B.Tech in ECE with Minor in Artificial Intelligence. Each department shall offer at least one Minor. The student has to select the subjects which are not studied in their regular course and student should have cleared all the**

subjects up to and including 2-2 semester with above 60% of marks to become eligible for Minor. The breakup of the credits are 5 subjects which carry 15 credits @3 credits for subject and project work carries 5 credits. The evaluation pattern of subjects and project work will be similar to methods followed in regular course evaluation. No attendance minimum will be considered for Minor. Not more than two subjects are allowed for registration in any semester.

4.11 Extra - Academic Activity (EAA)

Each of the following activities carries one credit and every student is required to register for two activities during second year of study which is mandatory.

a) NSS/NCC
b) Games and Sports
c) Yoga/Meditation
d) Extension Activities
e) Literary/ Cultural Activities

Any other which may be offered in future
The activities shall be carried out in the allotted hours. The activities will be monitored by the respective faculty in charge, senior faculty member of the department and the HOD. Grades will be awarded on the basis of participation, attendance, performance and behavior. Grades shall be entered in the marks statement as GOOD, SATISFACTORY and UNSATISFACTORY and shall not be counted towards CGPA calculation. If any student gets an Unsatisfactory Grade, he/she has to repeat the activity in the immediate subsequent year.

5.0 Question Paper Pattern

5.1 Each Internal Test question paper shall contain 5 questions, of which the First question is compulsory and three questions are to be answered from the remaining four. Compulsory question carries 10 marks (It contains 5 questions of two marks - no choice in first question). The remaining 3 questions carry 5 marks each. Each question shall have a,b,c.... parts.

5.2 The End Examination question paper will have 7 questions and students have to answer5 questions. However, the first question is compulsory and it consists of 7 short answer questions, each carrying 2 marks. The next 4 questions are to be answered from the remaining 6 questions and each carries 14 marks. Each 14 marks question shall have a, b, c ....parts.

5.3 For practical subjects, there shall be a continuous evaluation during the semester for 25 Internal marks and End Examination carries 50 marks. Of the 25 marks for Internal, 20 marks shall be awarded for day-to-day work and 5 marks to be awarded by conducting an internal laboratory test. The End Examination shall be conducted by the teacher concerned and an external Examiner from other institutions.

5.4 For the subject having design and/or drawing, (such as Engineering Graphics, Machine Drawing etc.) and estimation, the distribution shall be 30 marks for Internal evaluation (15marks for day-to-day work and 5 marks for Internal tests and 10 marks for assignments) and 70 marks for End

Examination. There shall be two internal tests in a Semester and the better of the two shall be considered for the award of marks for internal tests.

5.5 The Engineering drawing, wherever offered is to be treated as a theory subject. Evaluation method adopted for theory subjects shall be followed here as well.

5.6 There shall be mini-Project, in collaboration with an industry(wherever possible) of their specialization, to be taken up during the vacation(data collection, components etc.) after III year II Semester examination and implementation/simulation shall be carried out in IV year first semester during lab classes. Implementation or fabrication/simulation of mini project will be treated as laboratory. However, the mini project and its report shall be evaluated in IV year I Semester. The mini project shall be submitted in report form and should be presented before the committee, which shall be evaluated for 50 marks. The committee consists of an external Examiner, Head of the Department, and the supervisor of mini project and a senior faculty member of the Department. There shall be 25 internal marks for mini project which will be awarded based on the performance and involvement of the student during mini project period.

5.7 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 of the department. The seminar report shall be evaluated for 50 marks. There shall be no external examination for seminar.

5.8 There shall be a comprehensive viva voce examination at the end of IV year II semester for 50 marks which shall be conducted by HOD, senior faculty and external Examiner from other institute.

5.9 The project topic should be approved by Internal Department Committee (IDC). Out of total 150 marks for the project work, 50 marks shall be for Internal Evaluation and 100 marks for the End Semester Examination. The evaluation of project work shall be conducted at the end of the IV year II semester. The project viva voce examination will be conducted by the committee consisting of an external Examiner from other institute, Head of the Department and the supervisor of the project. The Internal evaluation for 50 marks shall be on the basis of two seminars given by each student on the topic of the project. The Internal evaluation of the project work for 50 marks shall be conducted by the committee consisting of head of the Department or his nominee, senior faculty member and the supervisor of project.

5.10 For all practical /mini project/main project/comprehensive viva-voce etc the HOD of the concerned dept shall submit a panel of 4 external examiners from different institutes and one will be selected by the Chief Superintendent of the Examination for conducting of end examination.

Table 4: Distribution of weightages for examination and evaluation

Sl. No.	Nature of subject	Marks	Type of examination and mode of assessment		Scheme of Examination
1	Theory	70	End Examination Double Evaluation (Internal + External evaluation)		End Examination in theory subjects will be for 70 marks.
		30	25	Internal examinations(Internal evaluation)	These 25 marks are awarded to the students based on the performance in two(semester)Internal examinations with a weightage of 0.75 for better score and 0.25 for the other score.
			05	Assignments/Field work/group task (Internal evaluation)	Average of two assignments/Field work/group task in a semester each evaluated for 05 marks.
2	Practical	50	End lab examination (External evaluation)		This End Examination in practical subjects will be for a maximum of 50 marks.
		25	20	Internal evaluation	Day-to-day performance in lab experiments and record
			05	Internal evaluation	Internal lab examination at the end of year/semester
3	Mini Project	50	End Examination (External evaluation)		This End Examination in mini project will be for a maximum of 50 marks.
		25	Internal evaluation		Day-to-day performance in executing mini project.
4	Seminar	50	Internal evaluation		Based on the performance in two seminars during semester
5	Comprehensive Viva	50	External evaluation		This end viva voce examinations in all the subjects for 50 marks
6	Project work	100	External evaluation		This end viva voce in project work for 100 marks
		50	Internal evaluation		These 50 marks will be based on the performance of the student in the project reviews apart from attendance and regularity
7	Skill Development Courses/ Value Added Course/ Mock interviews and Group Discussion	30	Internal evaluation		These 30 marks are awarded to the students based on the performance of two Internal examinations with a weightage of 0.75 for better score and 0.25 for the other score.
		70	Internal evaluation		Based on the performance in the end examination.
8	EAA	00	Internal evaluation		Based on performance and committee report.

6.0 Attendance Requirements:

6.1 The student shall be eligible to appear for End Examinations of the semester if he acquires a minimum of 75% of attendance in aggregate of all the subjects of that semester.

6.2 Condonation of shortage of attendance in aggregate up to 10% (65% and above and below 75%) in a semester may be granted by the College Academic Committee.

6.3 The 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.

6.4 Shortage of Attendance below 65% in aggregate shall in NO case be condoned.

6.5 Students whose shortage of attendance is not condoned in any semester are not eligible to take their End Examination of that class and their registration shall stand cancelled.

6.6 The stipulated fee shall be payable towards condonation of shortage of attendance.

6.7 The attendance in each subject will be recorded in the Marks memo.

7.0 Minimum Academic Requirements:

The following academic requirements have to be satisfied in addition to the attendance requirements mentioned in item No.6.0.

7.1 The student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each theory or practical or design or drawing subject or Skill Development Coursesor project if he secures not less than 35% of marks in the End Examination and he has to score minimum of 40% marks from Internal and external exam marks put together to clear the subject.

7.2 The student shall be promoted from II to III year only if he fulfils the academic requirement of securing a minimum of 51credits out of 102credits from all the exams conducted up to and including II year II semester regular examinations irrespective of whether the candidate takes the examination or not.

7.3 The student shall be promoted from third year to fourth year only if he fulfils the academic requirements of securing minimum of 76 credits out of 152credits from all the exams conducted up to and including III year II semester regular examinations, whether the candidate takes the examinations or not.

Table 5: Promotion rules

Promotion from	Total credits to register	Minimum credits to obtain for promotion
II yr to III yr	102	51
III yr to IV yr	152	76

7.4 The student shall register and put up minimum attendance in all 200 credits and earn a minimum of 194credits.Marks obtained in the best186credits(excluding the credits obtained in Skill Development Courses/VAC/Mock interviews and GD and EAA)shall be considered for the calculation of percentage of marks.

7.5 Students who fail to earn 194 credits as indicated in the course structure including compulsory subjects as indicated in Table-1 within eight academic years from the year of their admission shall forfeit their seat in B.Tech course and their admission shall stand cancelled.

8.0 Course pattern:

8.1 The entire course of study is of four academic years. Each academic year consists of two semesters

8.2 The 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.

Table: 6: Course pattern

Year	Semester	No. of Subjects		No. ofSkill Development Courses	Number of Labs		Total credits	
First year	First	CE/ME/ CSE	ECE/ EEE/ IT	00	CE/ ME/ CSE	ECE/ EEE/ IT	6X3=18 4X2=08	26
		06 {ENG-I, M-I, EP, MEC,CP, CORE-1}	06 {ENG-I M-I, ED, CP, EP, CORE-I}		EC lab, CP lab, EWS, ELCS	EP Lab, CP lab, ITWS, Core1 lab		
	Second	06 { Eng-II M-II, SSP/MP, DS,ED, CORE-II}	06 { Eng-II M-II, SSP, MEC,DS, CORE-II}	00	EP lab, DS Lab, ITWS Core-II lab	EC lab, DS lab, EWS, Core-II Lab	6X3=18 4X2=08	26
Second year	First	06		01	Subjects SDC/VAC Labs		6X3=18 1X1=01 3x2=06	25
	Second	06		01	Subjects SDC/VAC Labs		6X3=18 1X1=01 3X2=06	25
Third year	First	06		01	Subjects SDC/VAC Labs		6X3=18 1X1=01 3X2=06	25
	Second	04+01 Elective 01-MOOC/Elective		01	Subjects Elective MOOC/Elective SDC/VAC Labs		4X3=12 1X3=03 1X3=03 1X1=01 3x2=06	25
Fourth year	First	05+Open Elective		01	Subjects Open Elective Mock Interviews and GD Labs Mini project		5X3=15 1X3=03 1X1=01 2X2=03 1X2=03	25
	Second	01+Elective+ MOOC/Elective		01	Subjects Elective MOOC/Elective SDC/VAC Seminar Comprehensive Viva Project Viva EAA		1X3=03 1X3=03 1X3=03 1X1=01 1X1=01 1X2=02 1X8=08 2X1=02	23
GRAND TOTAL								200

9.0 Transitory Regulations:

Candidates who have been detained for want of attendance or not fulfilled academic requirements or who have failed after having undergone this course in earlier regulations or have discontinued and wish to continue the course are eligible for admission into the unfinished semester from the date of commencement of class work with the same or equivalent subjects as and when subjects are offered subject to section 2.0 and they continue to be in the academic regulations in which they were readmitted.

10.0 With-holding of results:

If the candidate has any dues not paid to the Institute or if any case of indiscipline of malpractice is pending against him, the result of the candidate shall be withheld and he will not be allowed/promoted into the next higher semester. The issue of degree is liable to be withheld in such cases.

11.0 Award of Class:

After the student has satisfied the requirements prescribed for the completion of the program and is eligible for the award of B. Tech. degree he shall be placed in one of the following four classes:

Table 7: Award of Division

Class Awarded	% of marks to be secured	Division/ Class	CGPA	
First Class with Distinction	70% and above	First class With Distinction	≥ 7.5	From the aggregate marks secured for the best 186 Credits (excluding Skill Development Courses, EAA)
First Class	Below 70% but not less than 60%	First Class	6.5 and < 7.5	
Second Class	Below 60% but not less than 50%	Second Class	≥ 5.5 and < 6.5	
Pass Class	Below 50% but not less than 40%	Pass	≥ 4 and < 5.5	

(The marks in internal evaluation and End Examination shall be shown separately in the marks memorandum)

12.0 Grading:

After each subject is evaluated for 100 marks, the marks obtained in each subject will be converted to a corresponding letter grade as given below, depending on the range in which the marks obtained by the student falls.

Table 8: Conversion into Grades and Grade points assigned

Range in which the % of marks in the subject fall	Grade	Grade point Assigned	Performance
90 to 100	O	10	Outstanding
80 to 89.9	A^+	09	Excellent
70 to 79.9	A	08	Very Good
60 to 69.9	B^+	07	Good
50 to 59.9	B	06	Above Average
45 to 49.9	C	05	Average
40 to 44.9	P	04	Pass
<40	F	00	Fail
Ab	AB	00	Fail

12.1 Requirement for clearing any subject: The students have to obtain a minimum of 35% in End Examination and they have to score minimum of 40% marks from Internal and external exam marks put together to clear the subject. Otherwise they will be awarded fail grade.

12.2 F is considered as a fail grade indicating that the student has to reappear for the end supplementary examination in that subject and obtain a non-fail grade for clearing that subject.

12.3 In case of skill development/ value added course / soft skill subjects, as there is no end exam, all 100 marks are for internal assessment only. Student has to score 40% in these courses to complete the subject which will be evaluated internally. Marks obtained in these courses shall not be considered for award of Division.

12.4 To become eligible for the award of degree the student must obtain a minimum CGPA of 4.0

13.0 Supplementary Examinations:

Apart from the regular End Examinations, the institute may also schedule and conduct supplementary examinations for all subjects for the benefit of students with backlogs. Such students writing supplementary examinations as supplementary candidates may have to write more than one examination per day. The student is not permitted to improve his performance in any subject in which he has obtained pass grade.

14.0 Grade Point Average (GPA) and Cumulative Grade Point Average(CGPA)

The Grade Point Average (GPA) for each semester and Cumulative Grade Point Average (CGPA) up to any semester are calculated as follows:

i) Semester Grade Point Average will be computed as follows:

$$GPA = \frac{\sum_1^n C_i \times GP_i}{\sum_1^n C_i}$$

Where, n is the number of subjects in that semester. C_i is Credits for the subjects. GP_i is the grade point obtained for the subject and the summation is over all the subjects in that semester.

ii) A Cumulative Grade Point Average (CGPA) will be computed for every student at the end of each semester. The CGPA would give the cumulative performance of the student from the first semester up to the end of the semester to which it refers to and is calculated as follows:

$$CGPA = \frac{\sum_1^m GPA_j \times TC_i}{\sum_1^m TC_j}$$

Where 'm' is the number of semester under consideration TC_j the total number of credits for a jth semester and GPA_j is the Grade Point Average of the jth semester. Both GPA and CGPA will be rounded off to the second digit after decimal and recorded as such.

While computing the GPA / CGPA, the subjects in whom the student is awarded zero grade points will also be included.

15.0 Grade Sheet:

A grade sheet (Memorandum) will be issued to each student indicating his performance in all subjects of that semester in the form of grades and also indicating the GPA and CGPA.

16.0 Transcripts:

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

17.0 Rules of Discipline:

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

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

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

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

18.0 Minimum Instruction Days:

The minimum instruction days for each semester shall be 95 clear instruction days excluding the days allotted for tests/examinations and preparation holidays declared if any.

19.0 Amendment of Regulations:

The college may, from time to time, revise, amend or change the regulations, scheme of examinations and syllabi. However the academic regulations of any student will be same throughout the course of study in which the student has been admitted. However students will continue to be in the academic regulations in which they were readmitted.

20.0 Transfers

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

21.0 General:

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

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

21.3 The Institute 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 Institute.

21.4 Where the words "he", "him", "his", occur in the regulations, they include "she", "her", "hers".

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous)

ELECTRICAL AND ELECTRONICS ENGINEERING

Academic Regulations for B.Tech (Lateral Entry Scheme)

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

1.0 The Students have to acquire a minimum of 142credits out of 148from II to IV year of B.Tech. Program (Regular) for the award of the degree.

2.0 Students, who fail to fulfill the requirement for the award of the degree in 6 consecutive academic years from the year of admission, shall forfeit their seat.

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

4.0 **Promotion Rule:**
The student shall be promoted from third year to fourth year only if he fulfills the academic requirements of securing minimum of 50 credits out of 100 credits from all the exams conducted up to and including III year II semester regular examinations, whether the candidate takes the examinations or not.

5.0 **Award of Class:**
After the student has satisfied the requirements prescribed for the completion of the program and is eligible for the award of B. Tech. Degree he shall be placed in one of the following four classes: The marks obtained in the best 134 credits will be considered for the calculation of percentage and award of class.

Table 1: Award of Division

Class Awarded	**% of marks to be secured**	Division/ Class	CGPA	From the aggregate marks secured for best 134 Credits (i.e. II year to IV year) excluding Skill Development Courses
First Class with Distinction	70% and above	First class With Distinction	≥ 7.5	
First Class	Below 70% but not less than 60%	First Class	$6.5 and < 7.5$	
Second Class	Below 60% but not less than 50%	Second Class	≥ 5.5 *and* < 6.5	
Pass Class	Below 50% but not less than 40%	Pass	≥ 4 *and* < 5.5	

(The marks in Internal evaluation and End Examination shall be shown separately in the marks memorandum)

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

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous)

ELECTRICAL AND ELECTRONICS ENGINEERING

COURSE STRUCTURE

I B.TECH I SEM

S.No	Subject Code	Name of the Subject	Hours/Week			Credits	Marks		
			Theory	Tutorial	Lab		Internal	External	Total
Theory									
1	A0001151	Professional English- I	3	1	-	3	30	70	100
2	A0004151	Mathematics - I	3	1	-	3	30	70	100
3	A0301152	Engineering Drawing	3	3	-	3	30	70	100
4	A0501151	C-Programming	3	1	-	3	30	70	100
5	A0002151	Engineering Physics	3	1	-	3	30	70	100
6	A0401151	Fundamentals of Electronic Devices	3	1	-	3	30	70	100
Practicals									
7	A0591151	C- Programming Lab	-	-	3	2	25	50	75
8	A1291152	IT Workshop	-	-	3	2	25	50	75
9	A0093152	Physics Lab	-	-	3	2	25	50	75
10	A0491151	Fundamentals of Electronic Devices Lab	-	-	3	2	25	50	75
		Contact Periods / Week	18	8	12	26	280	620	900

I B.TECH II SEM

S.No	Subject Code	Name of the Subject	Hours/Week			Credits	Marks		
			Theory	Tutorial	Lab		Internal	External	Total
Theory									
1	A0005152	Professional English- II	3	1	-	3	30	70	100
2	A0006152	Mathematics -II	3	1	-	3	30	70	100
3	A0008152	Solid state Physics	3	1	-	3	30	70	100
4	A0502152	Data structures through C	3	1	-	3	30	70	100
5	A0003151	Modern Engineering Chemistry	3	1	-	3	30	70	100
6	A0202152	Fundamentals of Electrical Engineering	3	1	-	3	30	70	100
Practicals									
7	A0592152	Data structures through C Lab	-	-	3	2	25	50	75
8	A0391151	Engineering Workshop	-	-	3	2	25	50	75
9	A0091151	Engineering Chemistry Lab	-	-	3	2	25	50	75
10	A0092151	English Language Communication Skills Lab	-	-	3	2	25	50	75
		Contact Periods / Week	18	6	12	26	280	620	900

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous)

ELECTRICAL AND ELECTRONICS ENGINEERING

II B.TECH, I-SEMESTER

S.No	Subject Code	Name of the Subject	Hours/Week			Credits	Marks		
			Theory	Tutorial	Lab		Internal	External	Total
Theory									
1	A0015153	Mathematical Methods	3	1	-	3	30	70	100
2	A0203153	Field Theory	3	1	-	3	30	70	100
3	A0310154	Fluid Mechanics & Hydraulic Machinery	3	1	-	3	30	70	100
4	A0205153	Circuit Theory	3	1	-	3	30	70	100
5	A0206153	Electrical Machines –I	3	1	-	3	30	70	100
6	A0402153	Electronic Circuits	3	1	-	3	30	70	100
Skill Development Course									
7	A0010153	Aptitude, Arithmetic, Reasoning & Comprehension	1	2	-	1	30	70	100
Practicals									
8	A0492153	Electronic Circuits & Simulation Lab	-	-	3	2	25	50	75
9	A0396154	Fluid Mechanics & Hydraulic Machinery Lab	-	-	3	2	25	50	75
10	A0292154	Basic Electrical Lab	-	-	3	2	25	50	75
		Contact Periods / Week	19	8	9	25	285	640	925

II B.TECH, II-SEMESTER

S.No	Subject Code	Name of the Subject	Hours/Week			Credits	Marks		
			Theory	Tutorial	Lab		Internal	External	Total
Theory									
1	A0207154	Electrical Machines –II	3	1	-	3	30	70	100
2	A0244154	Network Theory	3	1	-	3	30	70	100
3	A0403154	Analog Electronic Circuits	3	1	-	3	30	70	100
4	A0208154	Generation & Distribution of Electrical Power	3	1	-	3	30	70	100
5	A0404154	Switching Theory & Logic Design	3	1	-	3	30	70	100
6	A0209154	Control Systems	3	1	-	3	30	70	100
Skill Development Course									
7	A0011154	Corporate Management Skills	1	2	-	1	30	70	100
Practicals									
8	A0293154	Circuit Simulation Lab	-	-	3	2	25	50	75
9	A0294154	Circuit Theory Lab	-	-	3	2	25	50	75
10	A0295154	Electrical Machines-I Lab	-	-	3	2	25	50	75
		Contact Periods / Week	19	8	9	25	285	640	925

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous)

ELECTRICAL AND ELECTRONICS ENGINEERING

III B.TECH, I-SEMESTER

S.No	Subject Code	Name of the Subject	Hours/Week			Credits	Marks		
			Theory	Tutorial	Lab		Internal	External	Total
Theory									
1	A0210155	Electrical Machines-III	3	1	-	3	30	70	100
2	A0211155	Power Electronics-I	3	1	-	3	30	70	100
3	A0405155	Linear & Digital IC Applications	3	1	-	3	30	70	100
4	A0212155	Transmission of Electric Power	3	1	-	3	30	70	100
5	A0009153	Environmental Science	3	1	-	3	30	70	100
6	A0213155	Microprocessor & Microcontrollers	3	1	-	3	30	70	100
Skill Development Course									
7	A0013156	Professional ethics and Soft Skills	1	2	-	1	30	70	100
Practicals									
8	A0493155	IC and PDC Lab	-	-	3	2	25	50	75
9	A0296155	Electrical Machines-II Lab	-	-	3	2	25	50	75
10	A0297155	Control Systems & Simulation Lab	-	-	3	2	25	50	75
		Contact Periods / Week	19	8	9	25	285	640	925

III B.TECH, II-SEMESTER

S.No	Subject Code	Name of the Subject	Hours/Week			Credits	Marks		
			Theory	Tutorial	Lab		Internal	External	Total
Theory									
1	A0214156	Power Electronics-II	3	1	-	3	30	70	100
2	A0215156	Power System Protection	3	1	-	3	30	70	100
3	A0216156	Electrical Measurements	3	1	-	3	30	70	100
4	A0014157	Managerial Economics & Financial Analysis	3	1	-	3	30	70	100
5		Elective - I	3	1	-	3	30	70	100
6		Elective - II	3	1	-	3	30	70	100
Skill Development Course									
7	A0223156	Electrical System Simulation	1	2	-	1	30	70	100
Practicals									
8	A0298156	Power Electronics Lab	-	-	3	2	25	50	75
9	A0299156	Microprocessor & Microcontrollers Lab	-	-	3	2	25	50	75
10	A0281156	Electrical Measurements Lab	-	-	3	2	25	50	75
		Contact Periods / Week	19	8	9	25	285	640	925

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous)

ELECTRICAL AND ELECTRONICS ENGINEERING

IV B.TECH, I-SEMESTER

S.No	Subject Code	Name of the Subject	Hours/Week			Credits	Marks		
			Theory	Tutorial	Lab		Internal	External	Total
Theory									
1	A0224157	Instrumentation	3	1	-	3	30	70	100
2	A0225157	Power System Control & Stability	3	1	-	3	30	70	100
3	A0226157	Power Semiconductor Drives	3	1	-	3	30	70	100
4	A0017157	Management Science	3	1	-	3	30	70	100
5		Elective-III	3	1	-	3	30	70	100
6		Elective-IV	3	1	-	3	30	70	100
Skill Development Course									
7	A0236157	Group Discussion and Mock Interview	1	2	-	1	30	70	100
Practicals									
8	A0282157	Power Systems Lab	-	-	3	2	25	50	75
9	A0283157	Instrumentation Lab	-	-	3	2	25	50	75
10	A0284157	Mini Project work	-	-	3	2	25	50	75
		Contact Periods / Week	19	8	9	25	285	640	925

IV B.TECH, II-SEMESTER

S.No	Subject Code	Name of the Subject	Hours/Week			Credits	Marks		
			Theory	Tutorial	Lab		Internal	External	Total
Theory									
1	A0237158	Utilization of Electrical Energy	3	1	-	3	30	70	100
2		**Elective-V**	3	1	-	3	30	70	100
3		**Elective-VI**	3	1	-	3	30	70	100
Skill Development Course									
4	A0204158	Homer	1	2	-	1	30	70	100
5	A0285158	Seminar	-	-	-	1	50	-	50
6	A0286158	Main Project	-	-	-	8	50	100	150
7	A0287158	Comprehensive Viva Voce	-	-	-	2		50	50
8		Extra Academic activities				2			
		Contact Periods / Week	10	5	-	23	220	430	650

ELECTRICAL AND ELECTRONICS ENGINEERING

ELECTIVE-I (Dept. Elective)

S.No	SUBJECT CODE	SUBJECTS
1	A0217156	Power System Analysis
2	A0218156	Linear System Analysis
3	A0219156	Operations & Quality Management

ELECTIVE-II (Dept. Elective/ Massive Online Open Course (MOOC)

S.No	SUBJECT CODE	SUBJECTS
1	A0220156	HVDC Transmission
2	A0221156	High Voltage Engineering
3	A0222156	Electrical Machine Design

ELECTIVE-III (Dept. Elective)

S.No	SUBJECT CODE	SUBJECTS
1	A0227157	Advanced Control Systems
2	A0228157	Digital Control Systems
3	A0229157	Neural Networks & Fuzzy Systems

ELECTIVE-IV (Dept. Elective)

S.No	SUBJECT CODE	SUBJECTS
1	A0230157	Renewable Energy Sources
2	A0231157	Programmable Logic Controllers
3	A0406157	Digital Signal Processing

ELECTIVE-V (Dept. Elective)

S.No	SUBJECT CODE	SUBJECTS
1	A0238158	Principles of Power Quality
2	A0239158	Electrical Distribution Systems
3	A0240158	Special Machines

ELECTIVE-VI (Dept. Elective/ Massive Online Open Course (MOOC)

S.No	SUBJECT CODE	SUBJECTS
1	A0503158	Object Oriented Programming through JAVA
2	A0504158	Computer Organization
3	A0505158	Web programming

Courses Offered to Other Departments (Open Electives)

S.No	SUBJECT CODE	SUBJECTS
1	A0232157	Control & Automation
2	A0217156	Power System Analysis
3	A0220156	HVDC Transmission
4	A0224157	Instrumentation
5	A0216156	Electrical Measurements
6	A0211155	Power Electronics-I
7	A0233157	Public Speaking
8	A0234157	Technical Writing
9	A0235157	Interview Skills

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous)

ELECTRICAL AND ELECTRONICS ENGINEERING

MINOR ACADEMIC CURRICULUM 2015-16

CIVIL ENGINEERING

Subject Code	Course Title	Credits	Theory	Total Marks	External	Internal
A0149153	Strength of Materials-I	3	3+1*	100	70	30
A0109154	Structural Analysis –I	3	3+1*	100	70	30
A0114155	Water Resources Engineering-I	3	3+1*	100	70	30
A0110154	Concrete Technology	3	3+1*	100	70	30
A0112155	Transportation Engineering-I	3	3+1*	100	70	30
A0171158	Minor Project	5	Grade			

ELECTRICAL & ELECTRONICS ENGINEERING

POWER ENGINEERING

Subject Code	Course Title	Credits	Theory	Total Marks	External	Internal
A0242152	Principles of Electrical Engineering	3	3+1*	100	70	30
A0208154	Generation & Distribution of Electrical Power	3	3+1*	100	70	30
A0212155	Transmission of Electrical Power	3	3+1*	100	70	30
A0239158	Electrical Distribution Systems	3	3+1*	100	70	30
A0237158	Utilization of Electrical Power7	3	3+1*	100	70	30
A0271158	Minor Project	5	Grade			

ELECTRICAL & ELECTRONICS ENGINEERING

ELECTRICAL MACHINES

Subject Code	Course Title	Credits	Theory	Total Marks	External	Internal
A0205153	Circuit Theory	3	3+1*	100	70	30
A0242154	Network Theory	3	3+1*	100	70	30
A0206153	Electrical Machines-I	3	3+1*	100	70	30
A0207154	Electrical Machines-II	3	3+1*	100	70	30
A0210155	Electrical Machines-III	3	3+1*	100	70	30
A0272158	Minor Project	5	Grade			

ELECTRICAL & ELECTRONICS ENGINEERING

POWER ELECTRONICS

Subject Code	Course Title	Credits	Theory	Total Marks	External	Internal
A0242152	Principles of Electrical Engineering	3	3+1*	100	70	30
A0402153	Electronic Circuits	3	3+1*	100	70	30
A0211155	Power Electronics-I	3	3+1*	100	70	30
A0214156	Power Electronics-II	3	3+1*	100	70	30
A0226157	Power Semiconductor Drives	3	3+1*	100	70	30
A0273158	Minor Project	5	Grade			

ELECTRICAL AND ELECTRONICS ENGINEERING

MECHANICAL ENGINEERING
THERMAL ENGINEERING

Subject Code	Course Title	Credits	Theory	Total Marks	External	Internal
A0306153	Thermodynamics	3	3+1*	100	70	30
A0309154	Internal Combustion Engines	3	3+1*	100	70	30
A0313155	Thermal Engineering	3	3+1*	100	70	30
A0318156	Heat Transfer	3	3+1*	100	70	30
A0328157	Refrigeration and Air Conditioning	3	3+1*	100	70	30
A0372158	Minor Project	5	Grade			

MECHANICAL ENGINEERING
MECHANICAL DESIGN

Subject Code	Course Title	Credits	Theory	Total Marks	External	Internal
A0302151	Engineering Mechanics-I	3	3+1*	100	70	30
A0305153	Material Science & Metallurgy	3	3+1*	100	70	30
A0308154	Kinematics of Machinery	3	3+1*	100	70	30
A0312155	Design of Machine Elements -I	3	3+1*	100	70	30
A0325157	CAD/CAM	3	3+1*	100	70	30
A0373158	Minor Project	5	Grade			

MECHANICAL ENGINEERING
PRODUCTION ENGINEERING

Subject Code	Course Title	Credits	Theory	Total Marks	External	Internal
A0311154	Manufacturing Technology	3	3+1*	100	70	30
A0316155	Machine Tools	3	3+1*	100	70	30
A0319156	Engineering Metrology	3	3+1*	100	70	30
A0322156	Tool Design	3	3+1*	100	70	30
A0341158	Modern Manufacturing Methods	3	3+1*	100	70	30
A0374158	Minor Project	5	Grade			

ELECTRICAL AND ELECTRONICS ENGINEERING

ELECTRONICS & COMUNICATIONS ENGINEERING

SIGNAL PROCESSING

Subject Code	Course Title	Credits	Theory	Total Marks	External	Internal
A0409153	Signals and Systems	3	3+1*	100	70	30
A0406157	Digital Signal Processing	3	3+1*	100	70	30
A0436158	Advanced Digital Signal Processing	3	3+1*	100	70	30
A0427157	Digital Image Processing	3	3+1*	100	70	30
A0431157	DSP Architecture and Applications	3	3+1*	100	70	30
A0471158	Minor Project	5	Grade			

ELECTRONICS & COMUNICATIONS ENGINEERING

EMBEDDED SYSTEMS

Subject Code	Course Title	Credits	Theory	Total Marks	External	Internal
A0213155	Microprocessors and Microcontrollers	3	3+1*	100	70	30
A0426157	VLSI Design	3	3+1*	100	70	30
A0421156	Embedded System Concepts	3	3+1*	100	70	30
A0418155	Embedded 'C' & Verilog	3	3+1*	100	70	30
A0422156	FPGA Architecture and Applications	3	3+1*	100	70	30
A0473158	Minor Project	5	Grade			

COMPUTER SCIENCE & ENGINEERING

MINOR IN COMPUTER SCIENCE

Subject Code	Course Title	Credits	Theory	Total Marks	External	Internal
A0512153	Discrete Mathematics	3	3+1*	100	70	30
A0518154	Design and Analysis of Algorithms	3	3+1*	100	70	30
A0519154	Operating Systems	3	3+1*	100	70	30
A0514153	Database Management Systems	3	3+1*	100	70	30
A0509157	Computer Networks	3	3+1*	100	70	30
A0574158	Minor Project	5	Grade			

COMPUTER SCIENCE & ENGINEERING

MINOR IN WEB PROGRAMMING

Subject Code	Course Title	Credits	Theory	Total Marks	External	Internal
A0516154	Core Java Programming	3	3+1*	100	70	30
A0520155	Advanced Java Programming	3	3+1*	100	70	30
A0508156	Web Technologies	3	3+1*	100	70	30
A0510155	C# & .NET Frame Work	3	3+1*	100	70	30
A0540157	PHP Programming	3	3+1*	100	70	30
A0575158	Minor Project	5	Grade			

ELECTRICAL AND ELECTRONICS ENGINEERING

INFORMATION TECHNOLOGY

MINOR DEGREE IN DATABASE TECHNICS

Subject Code	Course Title	Credits	Theory	Total Marks	External	Internal
A1202153	Foundations of Software Engineering	3	3+1*	100	70	30
A1207154	Relational Database Design and Development	3	3+1*	100	70	30
A1213155	Database Management Concepts	3	3+1*	100	70	30
A1228157	Cloud Infrastructure And Services	3	3+1*	100	70	30
A1217156	Software Testing Methodologies and Tools	3	3+1*	100	70	30
A1271158	Minor Project	5	Grade			

INFORMATION TECHNOLOGY

MINOR DEGREE IN WEB TECHNOLOGY CONCEPTS

Subject Code	Course Title	Credits	Theory	Total Marks	External	Internal
A1203153	Fundamentals of Object-Oriented Design	3	3+1*	100	70	30
A1209154	Java Programming	3	3+1*	100	70	30
A1212155	Web Application Through JAVA & Python	3	3+1*	100	70	30
A1216156	Basics Of Scripting Languages	3	3+1*	100	70	30
A1211155	Data Communications & Networking – 1	3	3+1*	100	70	30
A1272158	Minor Project	5	Grade			

MASTER OF BUSINES ADMINISTRATION

HUMAN RESOURCE MANAGEMENT

SEMESTER – V, VI, VII & VIII (5*3 + 1*5 =20 Credits)

Subject Code	Semester	Course Title	Credits	Theory	Total Marks	External	Internal
E0009152	Semester V	Human Resource Management	3	3+1*	100	70	30
E0024153	Semester VI	Training & Development	3	3+1*	100	70	30
E0028153	Semester VI	Performance Management	3	3+1*	100	70	30
E0039154	Semester VII	Organization Development	3	3+1*	100	70	30
E0014152	Semester VIII	Business Research Methods	3	3+1*	100	70	30
E0047154	Semester VIII	Minor Project	5	Grade			

MARKETING MANAGEMENT

SEMESTER – V, VI, VII & VIII (5*3 + 1*5 =20 Credits)

Subject Code	Semester	Course Title	Credits	Theory	Total Marks	External	Internal
E0011152	Semester V	Marketing Management	3	3+1*	100	70	30
E0021153	Semester VI	Product & Brand Management	3	3+1*	100	70	30
E0033153	Semester VI	Advertising Management	3	3+1*	100	70	30
E0029153	Semester VII	Sales & Distribution	3	3+1*	100	70	30
E0014152	Semester VIII	Business Research Methods	3	3+1*	100	70	30
E0047154	Semester VIII	Project	5	Grade			

1* - Tutorial

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous)

ELECTRICAL AND ELECTRONICS ENGINEERING

I-B.Tech, I-Sem (EEE)

T	C
3+1*	3

(A0001151) PROFESSIONAL ENGLISH – I

(Common to all Branches)

English is the international language of business and opens up many opportunities to engineering professionals. This course introduces the essential learning theories and practices needed for a core professional. The course details the needs of LSRW Skills of the English language and explains how to face variant situations through soft skills. With a clear structure and can-do objectives in every Unit, Professional English Course is a straight forward, student-friendly course. It gradually builds up all the necessary knowledge to help students achieve their learning objectives.

OBJECTIVES:

Students should be able to:

1. Acquire basic language skills in order to communicate in English language.
2. Develop their awareness of the importance of English as a means of international communication.
3. Develop their LSRW skills, namely listening, speaking, reading and writing skills thereby improving their proficiency in oral and written communication in technical English.
4. Develop the linguistic competence that enables them to be aware of the cultural, economical and social issues of the society in order to contribute in giving solutions.

COURSE OUTCOMES:

After the completion of the course the student will be able to:

1. Introduction of English as a Lingua Franca and develop communication and Soft Skills.
2. Develop LSRW skills by prescribed lessons and technical reading exercises
3. Inculcate basic letter writing formats
4. Develop language through different genres like Short stories, Poems and Films and thereby creating awareness on cultural, economic and social diversities.
5. Acquire basic language skills through grammar usage and learn vocabulary from the conceptual clues.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	-	-	3	-	3	-	-	-
CO2	3	-	-	-	-	2	2	3	2	3	-	3	-	-	-
CO3	1	-	-	-	-	-	-	-	-	3	-	-	-	-	-
CO4	2	-	-	-	-	3	2	3	-	3	-	3	-	-	-
CO5	1	-	-	-	-	2	2	3	1	3	-	3	-	-	-

UNIT I

Practical English Usage - I

a) Review of Grammar-Parts of Speech-Tenses

b) Introduction to International English Language Testing System (IELTS) Level-1

Practice Tests – IELTS

UNIT II

a) Technical Writing – I: Techniques of Writing-Comparison & Contrast Pattern-Cause & Effect Pattern - Paragraph Writing–Developing An Essay-Letter Formats-Full block Format–Official & Business Letters

b) Soft Skill – *Fish! Philosophy – Attitude is Everything* by Harry Paul

UNIT III

a) Reading Skills - SQR3 Technique–Skimming & Scanning- Reading Comprehension
b) Autobiography – New Horizons – *My Struggle for an Education* by Booker T. Washington

UNIT IV

a) Semantics - Etymology – Synonyms & Antonyms-Phrasal verbs–Idioms
b) Essay – *The Law of Pure Potentiality* by Deepak Chopra

UNIT V

a) Literary Techniques – Allegory – Metaphor - Epithet
b) Short story - New Horizons - *The Happy Prince* by Oscar Wilde
c) Poem – New Horizons - *Where the Mind is without Fear* by Rabindranath Tagore

UNIT VI

a) Movie Analysis – Life of Pi - Plot – Characterization – Techniques
b) Project & Case Studies

***Text book Prescribed: New Horizons, for the JNTUA, Pearson, 2014.**

SUGGESTED READING:

1. Practical English Usage by Michael Swan, Oxford University Press
2. Murphy's English Grammar by Raymond Murphy, Cambridge University press 2004
3. Technical writing 3rd edition by *Sharon J. Gerson & Steven M. Gerson*, Pearson Education 2001
4. Communication Skills for Engineers(Second Edition) by C. Muralikrishna & SUnita Mishra, Pearson Education Ltd, 2011
5. Top tips for IELTS, British Council, On line edition

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous)

ELECTRICAL AND ELECTRONICS ENGINEERING

I-B.Tech, I-Sem (EEE)

T	C
3+1*	3

(A0004151) MATHEMATICS-I

(Common to all Branches)

OBJECTIVES:

- To make aware students about the importance and symbiosis between Mathematics and Engineering Achieve confidence with mathematical tools which an essential weapon in modern Graduate Engineer's Armory. Balance between the development of understanding and mastering of solution techniques with emphasis being on the development of student's ability to use Mathematics with understanding to solve engineering problems by retaining the philosophy learning by doing.

COURSE OUTCOMES:

Engineering Graduates will be able to

1. Acquire knowledge of Infinite series, real analysis, ordinary differential equations and Laplace transforms and its applications in Basic sciences, Biological sciences and engineering.
2. Understand to solve differential equations of first and higher order with wide range of applications in circuit analysis, fluid dynamics.
3. Analyze solutions of differential equations to various physical problems such as Electric circuits, temperature, Concentration and Velocity of fluids in fluid dynamics.
4. Apply Laplace Transform and its Inverse to convert the equations of calculus in to the equations of algebraic with applications in signals and systems of Digital circuit analysis.
5. Synthesize real analysis with functions and differential equations with Laplace transforms.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	-	-	-	-	-	-	-	-	-	-	2	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-	2	-	-
CO3	-	2	-	-	-	-	-	-	-	-	-	-	2	-	-
CO4	-	-	-	-	3		-	-	-	-	-	-	2	-	-
CO5	-		2	-	-	-	-	-	-	-	-	-	2	-	-

UNIT I

Infinite Series: Sequence – Convergence and divergence of sequence. Series – Tests of convergence and divergence – P-Test, Comparison Test, Ratio Test, n-Root Test, logarithmic Test- Alternating Series – Absolute and conditional convergence of series.

UNIT II

Differential equations of first order and first degree – Exact, linear and Bernoulli equations - Applications to LR & CR circuits, orthogonal trajectories

UNIT III

Non-homogeneous linear differential equations of second and higher order with constant coefficients with RHS term of the type e^{ax}, Sin ax, cos ax, polynomials in x, e^{ax} V(x), xV(x), Method of variation of parameters

UNIT IV

Rolle's Theorem – Lagrange's Mean Value Theorem – (excluding proof) Simple examples of Taylor's and Maclaurin's Series - Functions of several variables – Jacobian – Maxima and Minima of functions of two variables, Lagrangian method of Multipliers with three variables only - Raidus of Curvature

UNIT V

Laplace transform of standard functions – Inverse transform – First shifting Theorem, Transforms of derivatives and integrals – Unit step function – Second shifting theorem – Dirac's delta function – Convolution theorem – Laplace transform of Periodic function.

UNIT VI

Differentiation and integration of Laplace transform – Application of Laplace transforms to ordinary differential equations of first and second order.

TEXT BOOKS:

1. Advanced Engineering Mathematics By Erwin Kreyszig.
2. Advanced Engineering Mathematics By R.K. Jain and S.R.K. Iyengar, Narosa Publications.

REFERENCES:

1. A Text Book of Engineering Mathematics, Vol – 1, T.K.V. Iyengar, B. Krishna Gandhi and Others S. Chand & Company.
2. Higher Engineering Mathematics by B.S.Grewal, Khanna Publishers.
3. A Text Book of Engineering Mathematics, Thomson Book Collection.
4. Engineering Mathematics By Srimantha Pal et.al. Oxford University Press.
5. Engineering Mathematics, Sarveswara Rao Koneru, Universities Press

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING AND TECHNOLOGY

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ELECTRICAL AND ELECTRONICS ENGINEERING

I-B.Tech, I-Sem (EEE)

T	C
3+3*	3

(A0301152) ENGINEERING DRAWING

(Common to all branches)

OBJECTIVES:

- To impart and inculcate proper understanding of the theory orthographic projection.
- To improve the visualization skills.
- To enable the students with various concepts like dimensioning, Construction of conic Sections and polygons.
- To impart the knowledge on understanding and drawing of simple solids.
- To know about sections and developments of solids etc.

COURSE OUTCOMES:

After the completion of the course the student will be able to:

1. Draw different engineering curves and know their applications.
2. Draw orthographic projections of different objects.
3. Visualize three dimensional objects and draw isometric projections.
4. Use techniques and able to interpret the drawing in the engineering field.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	2	3	-	-	-	-	-	2	-	1	-	-
CO2	3	2	3	2	3	-	-	-	-	-	-	-	1	-	-
CO3	3	2	2	1	3	-	-	-	-	-	-	1	1	-	-
CO4	3	2	2	2	3	-	-	-	-	-	1	-	1	-	-

UNIT I

Polygons-Construction of Regular Polygons using given length of a side; Conic sections-Ellipse- Arcs of Circles and Oblong Methods, Construction of Parabola and Hyperbola by eccentricity method only.

UNIT II

Introduction to Orthographic Projections- Projections of Points-Projections of Straight Lines parallel to both planes; Projections of Straight Lines-Parallel to one and inclined to other plane, inclined to both planes, determination of true lengths, angle of inclinations.

UNIT III

Projections of Planes- Regular Planes Perpendicular / parallel to one Reference, Plane and inclined to other Reference Plane.

UNIT IV

Projections of Solids-Prisms, pyramids, cones and Cylinders with the axis inclined to one Plane.

UNIT V

Section of solids: Sectioning of prism, pyramid, cone and cylinder– sectional view – true shape. Solids in simple position and cutting plane inclined to one reference plane only.
Development of surface of solids: Development of truncated prism, pyramid, cone and cylinder – frustum of cone and pyramid.

UNIT VI

Conversion of Isometric Views to Orthographic Views / Projections – Conversion of Orthographic Views to Isometric Projections and Views.

TEXT BOOK:

1. Engineering Drawing by N.D. Bhatt, Chariot Publications.
2. Engineering Drawing and Graphics, Venugopal/New age publications.

REFERENCE BOOKS:

1. Engineering Drawing , N.S Parthasarathy & Vela Murali, Oxford Publishers
2. Engineering Drawing. K.L Narayana, P. Kannaiah, Scitech Publications.
3. Engineering Drawing, B.V.R Gupta, J.K. Publishers.
4. Engineering Drawing by M.B. Shah and B.C.Rana, Pearson Publishers.
5. Engineering Drawing, Johle, Tata Mc Graw- Hill.
6. K.V. Natarajan, 'A text book of Engineering Graphics', Dhanalakshmi publishers, Chennai.

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ELECTRICAL AND ELECTRONICS ENGINEERING

I-B.Tech, I-Sem (EEE)

T	C
3+1*	3

(A0501151) C PROGRAMMING

(Common to all branches)

OBJECTIVES:

- To make students aware about fundamentals of computer programming.
- To provide exposure on C programming language
- To provide exposure on various C programming concepts like arrays, functions, pointers, structures etc.,
- To develop solutions for various problems by using C programming language by students.

COURSE OUTCOMES:

Course Outcomes: Upon completion of the subject, students will be able to

1. Clearly formulate a program's requirements
2. Develop an algorithm for solving a problem
3. Identify functions for solution of a problem, and identify and classify the parameters
4. Write C programs using various control structures and arrays .
5. Build sets of test data in order to evaluate computer programs .
6. Write C programs using pointers

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	-	-	-	-	-	2		2	-	-	-	-
CO2	3	3	3	-	-	-	-	-		2	-	-	-	-	-
CO3	-	3	2	-	-	-	-	-		-	-	-	-	-	-
CO4	-	-	3	-	-	-	-	-	3	-	-	-	-	-	-
CO5	-	3	3	-	-	-	-	-		-	2		-	-	-
CO6	-	-	3	-	-	-	-	-	3	-	-	-	-	-	-

UNIT I

INTRODUCTION TO COMPUTER PROGRAMMING LANGUAGES: Evolution of Computer Programming languages - Fundamentals of Algorithms and Flowcharts - Simple examples on how to write and trace an effective algorithms and how to draw an effective flow charts - Program control structures – sequence, selection and iteration - Software Development Method.

UNIT II

C LANGUAGE FUNDAMENTALS: General Form of a C Program, Steps to execute C program, Character set of C language, Data Types, Constants and Variables, Identifiers, Keywords, Operators, Precedence of operators, Expressions. Example Programs on the topics covered in this Unit

UNIT III

CONTROL STATEMENTS IN C LANGUAGE: Non iterative statements – if statement, if else statement, nested if else statement, if else ladder statement, switch statement, goto statement. Iterative statements – while loop, do while loop and for loop - Example Programs on the topics covered in this Unit.

UNIT IV

ARRAYS IN C LANGUAGE: Importance of an array in C language, Definition, Need of arrays while writing C programs. Types of arrays - One dimensional array, Two dimensional array. Declaration of One dimensional array, initialization of one dimensional array, storing and accessing the elements from a one dimensional array. Two-dimensional Arrays and their declaration, initialization, storing & accessing elements from it Example Programs on

the topics mentioned above -Strings- Definition, Declaring and initializing strings, Basic Operations on strings, String handling Functions. Example Programs on the topics mentioned above.

UNIT V

FUNCTIONS IN C LANGUAGE: Top down approach of problem solving, Library Functions and User defined functions - Need for user-defined functions. General form of declaring a function, Elements of an user defined functions- Function definition Function call, Function declaration, Function name, return type, parameters, return statements. Categorization of functions with respect to parameters and return values. Definition of Scope of a variable with suitable examples. Storage Classes - Automatic, External, Static, and Register. Arrays and functions - Passing an entire array as an Argument to a function. Pre-processor Commands. Example Programs on the topics mentioned above.

UNIT VI

POINTERS IN C LANGUAGE: Pointers- Pointer variable and its importance, Pointer variable declaration, initialization of pointer variables, how to access a value from a memory location through it's pointer variable. Arithmetic operations on pointer variables, Scale factor length. Pointers and functions - pointers as function arguments (i.e., call-by-reference), Pointers and Arrays, Pointers and Strings, Array of Pointers, Pointers to Pointers, Generic Pointers, Pointer to Functions. Example Programs on the topics mentioned above.

TEXT BOOKS:

1. Programming in C ,Pradeep Dey, Manas Ghosh, Oxford Heigher Education
2. Computer programming and Data Structures, E. Balaguruswamy, Tata Mc Graw Hill. 2009 revised edition.
3. The C Programming Language, Brian W.Kerninghan, Dennis M.Ritchie
4. Programming in C , Dr. N. Uday Bhaskar, Winger publications

REFERENCES:

1. Let us C – Yeshwanth kanetkar, 8th Edition.BPB Publications
2. C Programming with problem solving, J.A. Jones & K. Harrow, Dreamtech Press
3. Data Structures using C – A.M.Tanenbaum, Y.Langsam, and M.J. Augenstein, Pearson Education / PHI, Eighth Edition.
4. C Programming & Data Structures, B.A.Forouzan and R.F. Gilberg, Third Edition, Cengage Learning.

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(Autonomous)

ELECTRICAL AND ELECTRONICS ENGINEERING

I-B.Tech, I-Sem (EEE)

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(A0002151) ENGINEERING PHYSICS

(Common to ALL Branches)

OBJECTIVES:

The Engineering Physics (Physics-I) for undergraduate program is designed

- To develop students with sufficient depth in both engineering and physics skills to produce engineers who can relate fundamental physics to practical engineering problems.
- To nurture innovative talent in modern applied physics, providing students both solid theoretical grounding and training in practical scientific research skills.
- To prepare students for careers in engineering where physics principles can be applied to the development of technology.

COURSE OUTCOMES:

After the completion of the course the student will be able to:

1. Understand the concept of electromagnetic signals by studying light behavior.
2. Apply the concepts of light in optical fibers and light wave communication systems.
3. Solve electrical engineering problems using the concepts of wave and particle duality for electrons.
4. Find remedies for acoustically defected buildings.
5. Apply Ultrasonic for the testing of materials

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	-	2	1	1	-	-	-	-	-	-	1	1	-	-
CO2	3	-	1	1	2	-	-	-	-	-	-	-	1	-	-
CO3	-	3	-	2	2	-	-	-	-	-	-	1	1	-	-
CO4	-	3	2	-	1	-	1	-	-	-	-	-	1	-	-
CO5	-	3	2	-	2	-	-	-	-	-	-	1	1	-	-

UNIT I

WAVE OPTICS: Interference – Types of Interference - Interference in thin films by reflection - Newton's rings – Applications - Diffraction – Distinction Between Interference and Diffraction - Fraunhofer diffraction at a single slit - Fraunhofer diffraction at a double slit (qualitative) - Diffraction grating – Determination of Wavelength of Light - Polarization – Optic axis - Double Refraction in Calcite Crystal - Nicol Prism – Different types of polarized lights - Quarter and Half wave plates – Applications - problems.

UNIT II

FIBER OPTICS: Principle – Optical Fiber Cable- Propagation of Light in Optical fibres – Acceptance angle, Numerical aperture and Fractional Index change – Types of rays - Types of optical fibres (index, mode and material based) – Losses in Optical Fiber - Fibre optical communication system (Block diagram) – Merits of Optical Fibers – Applications - problems.

UNIT III

LASERS: Introduction – Characteristics - Einsteins A and B coefficients - Principle of Spontaneous emission and stimulated emission, Population inversion, pumping. – Important Components of a laser - - Types of lasers – Nd-YAG, He-Ne, CO_2 and Semiconductor lasers (homo junction GaAs) – Hetrojunction laser – Applications - problems.

UNIT IV

QUANTUM PHYSICS: Matter waves – properties - de-Broglie's hypothesis – Heisenberg's Uncertainty principle – Electron as a wave experiment - Schrödinger's Time independent wave equation – Physical significance of wave function – Particle in a one dimensional box - problems.

UNIT V

ACOUSTICS AND ULTRASONICS: Introduction to acoustics - Reverberation and reverberation time - growth and decay of energy - Sabine's formula (qualitative) - absorption coefficient and its measurement - factors affecting architectural acoustics - problems.

Introduction to ultrasonics – Production – magnetostriction effect-magnetostriction generator, piezoelectric effect - piezoelectric generator- Detection of ultrasonic waves – Types of Ultrasonic waves - properties – Cavitations - Non Destructive Testing –pulse echo system through transmission and reflection modes - Testing Methods - A, B and C –scan displays - problems.

UNIT VI

NUCLEAR ENERGY: Nuclear fission – Discovery of fission, binding energy curve, chain reaction (fission of U235), critical size, critical mass, essentials of nuclear reactor - problems

Nuclear fusion – Thermonuclear reaction - fusion reaction in stars - p-p cycle, C-N cycle, controlled fusion – fusion reactor - problems

REFERENCES:

1. Arthus Beiser, "Concepts of Modern Physics", Tata Mc Graw Hill Publications, New Delhi.
2. Resnick and Halliday, "Physics Volume – II", Wiley, New Delhi.
3. M.N. Avadhanulu and PG Kshirsagar, 'A Text book of Engineering Physics', S.Chand and company, Ltd., New Delhi, 2014.
4. D. K. Bhattacharya and Poonam Tandon, "Engineering Physics", Oxford University Press, 2015.
5. R. K. Gaur and S.C. Gupta, "Engineering Physics", Dhanpat Rai Publications, New Delhi.
6. Rajagopal, "Engineering Physics", PHI, New Delhi.
7. Rajendran, V and Marikani A, "Engineering Physics", Tata Mc Graw Hill Publications Ltd, III Edition, New Delhi.
8. Chitra Shadrach and Sivakumar Vadivelu, "Engineering Physics", Pearson Education, New Delhi.

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ELECTRICAL AND ELECTRONICS ENGINEERING

I-B.Tech, I-Sem (EEE) T C
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(A0401151) FUNDAMENTALS OF ELECTRONIC DEVICES

(Common to EEE & IT)

OBJECTIVES:

- To understand the basic materials used for fabrication of different semiconductor devices.
- To understand construction details, principle of operation and equivalent electrical model of each device.
- Evolution of different diodes based on doping levels.

COURSE OUTCOMES:

1. Students are capable of identifying a particular device for different applications.
2. Students are able to understand that all the devices are basically two state devices (Switches).
3. Students are capable of using two junction devices as an amplifying device.
4. Students are able to understand rectifiers, filters and regulators

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	-	-	-	-	-	-	-	-	-	-	2	-	-
CO2	1	3	-	-	-	-	-	-	-	-	-	-	2	-	-
CO3	2	-	3	-	-	-	-	-	-	-	-	-	2	-	-
CO4	-	2	3	-	-	-	-	-	-	-	-	-	2	-	-

UNIT I

FUNDAMENTALS OF SEMI CONDUCTOR: Semi-conductor, bonds in semi-conductor, commonly used semiconductors, energy band description of semi-conductors, types of semi-conductors, conductivity of a , charge densities in a semi-conductor, Diffusion current, Drift current, Carrier life time, continuity equation, Hall effect.

UNIT II

SEMICONDUCTOR DIODE CHARACTERISTICS: Review of PN Junction Diode - V-I characteristics of PN diode, Static and Dynamic resistances, Temperature dependence of parameters(Derivation not necessary)Diode equivalent circuits, Diode capacitances, Breakdown Mechanisms in Semiconductor Diodes, Zener diode characteristics, small signal equivalent circuit of PN diode

UNIT III

BIPOLAR JUNCTION TRANSISTORS (BJT): Study of operation of BJT, Detailed study of currents in a transistor, Input and Output characteristics of transistor in CB, CE, and CC configurations, Relation between Alpha, Beta and Gamma

UNIT IV

JUNCTION FIELD EFFECT TRANSISTORS (JFET): Construction, operation and transfer and output characteristics, Pinch-Off voltage, construction of MOSFET and its characteristics (Enhancement and depletion mode), Comparison of Transistors (BJT, FET, and MOSFET) - UJT

UNIT V

SPECIAL PURPOSE DEVICES: Principle and operation of Schottky Barrier Diode, SCR, DIAC, TRIAC, Avalanche photo diode, LED and Tunnel Diode with the help of energy band diagrams

UNIT VI

RECTIFIERS, FILTERS AND REGULATORS: PN Junction as a Rectifier, Half wave rectifier, ripple factor, Efficiency, regulation and Transformer utilization factor (TUF). Full wave rectifier, Bridge rectifier **Filters:** Harmonic components in a rectifier circuit, Inductor filter, Capacitor filter, L-Section filter, Π- Section filter, comparison of various filter circuits, Simple circuit of a regulator using Zener diode.

TEXT BOOKS:

1. Electronic Devices and Circuits – J.Millman, C.C.Halkias, Tata McGraw Hill, 2nd Ed., 2007.
2. Electronic Devices and Circuits – R.L. Boylestad and Louis Nashelsky, Pearson/Prentice Hall, 9th Edition, 2006.
3. Electronic Devices and Circuits- David A. Bell, Oxford University Press, 5th Edition, 2008.

REFERENCES:

1. Electronic Devices and Circuits – T.F. Bogart Jr., J.S.Beasley and G.Rico, Pearson Education, 6th edition, 2004.
2. Principles of Electronic Circuits – S.G.Burns and P.R.Bond, Galgotia Publications, 2nd Edn.., 1998.
3. Microelectronics – Millman and Grabel, Tata McGraw Hill, 1988.
4. Electronic Devices and Circuits – Dr. K. Lal Kishore, B.S. Publications, 2nd Edition, 2005.
5. Electronic Devices and Circuits- Prof GS N Raju I K International Publishing House Pvt. Ltd 2006.

I-B.Tech, I-Sem (EEE) P 3 C 2

(A0591151) C PROGRAMMING LAB

(Common to all branches)

OBJECTIVES:

- To make the student to learn how to write programs in **C** language.
- To introduce different constructs of **C** language to the students to solve various kinds of problems.
- To make the students to implement different kinds of sorting algorithms like selection sort, bubble sort, insertion sort, quick sort and merge sort etc.
- To make the students to implement different kinds of searching algorithms like linear search and binary search etc.

COURSE OUTCOMES:

By the end of this course, students should be able

1. Write a C program using various features of c language.
2. Build sets of test data in order to evaluate computer programs
3. Thoroughly test a program.
4. Debug a program.
5. Understand the organization of a computer program.
6. Understand the process of compiling, linking, and running a program

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-
CO2	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-
CO3	-	-	-	-	-	-	-	-	3	-	2	-	-	-	-
CO4	-	-	-	-	-	-	-	-	3	-	3	-	-	-	-
CO5	-	-	3		-	-	-	-		-	-	-	-	-	-
CO6	-	-			-	-	-	-	3	-		-	-	-	-

RECOMMENDED SYSTEMS /SOFTWARE REQUIREMENTS:

- Intel based desktop PC with ANSI C Compiler and Supporting Editors

Exercise 1:

Write a C program to demonstrate the various operators used in C language.

Exercise 2:

a) Write a C program to find the roots of a quadratic equation.
b) Write a C program to find both the largest and smallest number in a list of integers.

Exercise 2:

a) Write a C program, which takes two integer operands and one operator from the user, performs the specified operation and then prints the result. (Consider the operators +,- ,*, /, % and use Switch Statement)
b) Write a C Program to find the reverse of a given number.

Exercise 3:

a) Write a C program to find the sum of individual digits of a positive integer.
b) Write a C program to generate the first 'n' terms of the Fibonacci sequence.

   [**Note:** A 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.]
c) Write a C program to generate all the prime numbers between 1 and n, where 'n' value is given by the user.

[**Note:** Develop each of the above programs by using different loop constructs supported by C language. (i.e., while, do while and for Loops)]

Exercise 4:

a) Write a C Program to mask the most significant digit of the given number.

b) Write a program which Prints the following patterns

```
ABCDEFGFEDCBA
ABCDEF  FEDCBA
ABCDE    EDCBA
ABCD      DCBA
ABC        CBA
AB          BA
A             A
```

```
    0
   111
  22222
 3333333
444444444
```

Exercise 5:

a) Write a C program to generate Pascal's triangle.

b) Write a C program to construct a pyramid of numbers.

Exercise 6:

a) Write a C program to find all the even numbers in the given one dimensional array.

b) Write a C program to print the elements of an array in reverse order.

c) Write a C program to perform the following operations:
i) Addition of Two Matrices ii) Multiplication of Two Matrices
[Note: Use functions to implement the above specified operations]

Exercise 7:

Write C programs that use both recursive and non-recursive functions

i) To find the factorial of a given integer.

ii) To find the GCD (greatest common divisor) of two given integers.

Exercise 8:

a) Write a C Program to solve the Towers of Hanoi problem by using recursive function.

b) Writea C Program to demonstrate the various storage classes, which are supported by the C language. [i.e., automatic, external, static and register]

Exercise 9:

a) Write a C Program to demonstrate that, how to pass an entire array as an argument to a function with a suitable example.

b) Write a C Program to perform various operations on given two strings using string handling functions.

Exercise 10:

a) Write a C Program to perform various arithmetic operations on pointer variables.

b) Write a C Program to demonstrate the following parameter passing mechanisms:
i) call-by-value ii) call-by-reference

Exercise 11:

a) 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 the specified position.
ii) To delete '**n**' Characters from a given position in a given string.

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

Exercise 12:

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'.

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

REFERENCE BOOKS

1. Programming in C, Pradeep Dey, Manas Ghosh, Oxford Heigher Education
2. The Spirit of C, an introduction to modern programming, M.Cooper, Jaico Publishing House.
3. Mastering C, K.R. Venugopal and S.R. Prasad, TMH Publications.
4. Computer Basics and C Programming, V. Raja Raman, PHI Publications.

I-B.Tech, I-Sem (EEE) P 3 C 2

(A1291152) IT WORKSHOP

(Common to all branches)

OBJECTIVES:

- The IT Workshop for engineers is a training lab course.
- The modules include training on PC Hardware, Internet & World Wide Web and Productivity tools including Word, Excel, Power Point and Publisher. It enables the students to understand and fix the common hardware, software issues & makes the students to install either Windows or UNIX based Operating system in the machines.
- Enable students to understand how computers work, different types of computers, functions of applications, input and data storage devices, different operating systems, ethics, data communications, and systems analysis and design
- It makes the students to understand and use the common office suite tools like word, excel etc effectively in their daily usage.
- To ensure the students to understand the basic networking concepts like IP Address etc

COURSE OUTCOMES:

By the end of module students will be expected to demonstrate

1. PC Hardware- introduces the students to a personal computer and its basic peripherals, the process of assembling a personal computer. In addition hardware and software level troubleshooting process, tips and tricks would be covered. The students should work on working PC to disassemble and assemble to working condition. Students are suggested to work similar tasks in the Laptop scenario wherever possible.
2. To do installation of system software like MS Widows and Linux and the required device drivers.
3. Internet & World Wide Web module introduces the different ways of hooking the PC on to the internet from home and workplace and effectively usage of the internet. Usage of web browsers, email, newsgroups and discussion forums would be covered. In addition, awareness of cyber hygiene, i.e., protecting the personal computer from getting infected with the viruses, worms and other cyber-attacks would be introduced.
4. Productivity tools- module would enable the students in crafting professional word documents, excel spread sheets and power point presentations using the Microsoft suite of office tools

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	-	2	-	-	-	-	-	-	-	-	-	-	-
CO2	2	2	-	2	-	-	-	-	-	-	-	-	-	-	-
CO3	2	2	-	-	-	-	-	-	-	3	-	-	-	-	-
CO4	2	2	-	2	3	-	-	-	-	-	-	-	-	-	-

PC Hardware introduces the students to a personal computer and its basic peripherals, the process of assembling a personal computer, installation of system software like MS Windows, Linux and the required device drivers. In addition hardware and software level troubleshooting process, tips and tricks would be covered. The students should work on a working PC (PIV or higher)to disassemble and assemble back to working condition and install Windows and Linux on the same PC. Students are suggested to work similar tasks in the Laptop scenario wherever possible.

Internet & World Wide Web module introduces the different ways of hooking the PC on to the internet from home and workplace for usage of the internet. Usage of web browsers, email, newsgroups and discussion forums would be covered. In addition, awareness of cyber hygiene, i.e., protecting the personal computer from getting infected with the viruses, worms and other cyber attacks would be introduced.

Productivity tools module would enable the students in crafting professional word documents, excel spread sheets, power point presentations and personal web sites using the Microsoft suite of office tools

PC Hardware

Exercise 1 - Task 1: Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor.

Exercise 2 - Task 2: Every student should disassemble and assemble the PC back to working condition. Lab instructors should verify the work and follow it up with a Viva. Also students need to go through the video which shows the process of assembling a PC. A video shall be given as part of the course content.

Exercise 3 - Task 3: Every student should individually install MS windows on the personal computer. Lab instructor should verify the installation and follow it up with a Viva.

Exercise 4 - Task 4: Every student should install Linux on the computer. This computer should have windows installed. The system should be configured as dual boot with both windows and Linux. Lab instructors should verify the installation and follow it up with a Viva

Exercise 5 - Task 5: Hardware Troubleshooting: Students have to be given a PC which does not boot due to improper assembly or defective peripherals. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva

Exercise 6 - Task 6: Software Troubleshooting: Students have to be given a malfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva.

OFFICE TOOLS

WORD

Exercise 7 - Word Orientation: The mentor needs to give an overview of LaTeX and Microsoft (MS) office 2007,2010/ equivalent tool word: Importance of LaTeX and MS office 2007,2010/ equivalent tool Word as word Processors, Details of the four tasks and features that would be covered in each. Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter in word.

Task 1-Task IV: Using Word to create project certificate. Features to be covered:- Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in Word.

INTRODUCTION TO LATEX

Excel

Exercise 8 - Excel Orientation: The mentor needs to tell the importance of MS office 2007, 2010/ equivalent tool Excel as a Spreadsheet tool, give the details of the four tasks and features that would be covered in each. Using Excel – Accessing, overview of toolbars, saving excel files, Using help and resources.

Task 1-Task IV: Features to be covered:- Gridlines, Format Cells, Summation, auto fill, Formatting Text, Formulas, Functions

Power Point

Exercise 9 - Task1: Students will be working on basic power point utilities and tools which help them create basic power point presentation. Topic covered during this Exercise includes :- PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in Power point. Students will be given model power point presentation which needs to be replicated (exactly how it's asked).

Exercise 10 - Task 2: Second Exercise helps students in making their presentations interactive. Topic covered during this Exercise includes: Hyperlinks, Inserting –Images, Clip Art, Audio, Video, Objects, Tables and Charts

Internet & World Wide Web 2 Exercises

Exercise 11 - Task 1: **Orientation & Connectivity Boot Camp:** Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally students should demonstrate, to the instructor, how to access the websites and email. If there is no internet connectivity preparations need to be made by the instructors to simulate the WWW on the LAN.

Web Browsers, Surfing the Web: Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers.

Exercise 12 - Task 2: **Search Engines & Netiquette:** Students should know what search engines are and how to use the search engines. A few topics would be given to the students for which they need to search on Google. This should be demonstrated by the student to the satisfaction of instructors.

Cyber Hygiene: Students would be exposed to the various threats on the internet and would be asked to configure their computer to be safe on the internet. They need to first install antivirus software, configure their personal firewall and windows update on their computer.

REFERENCES:

1) Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
2) LaTeX Companion – Leslie Lamport, PHI/Pearson.
3) Introduction to Computers, Peter Norton, 6/e Mc Graw Hill
4) Upgrading and Repairing, PC's 18th e, Scott Muller QUE, Pearson Education
5) Comdex Information Technology course tool kit, Vikas Gupta, WILEY Dreamtech
6) IT Essentials PC Hardware and Software Companion Guide, Third Edition by David Anfinson and Ken Quamme. – CISCO Press, Pearson Education.

I-B.Tech, I-Sem (EEE) P 3 C 2

(A0093152) PHYSICS LAB

(Common to all Branches)

OBJECTIVES:

- The laboratory should help the student to develop a broad array of basic skills and tools of experimental physics and data analysis.
- The laboratory should help students to understand the role of direct observation in physics and to distinguish between inferences based on theory and the outcomes of experiments.
- To learn about the optical experiments, in establishing the fundamental Interference, Diffraction phenomena which will be clearly visualized with the light and laser experiments mentioned in the syllabus.
- To learn about the basic electronic experiments such as energy gap determination, type of extrinsic semiconductor using Hall effect, Stuart – Gees experiment in field intensity determination and Solar I – V characteristics.

COURSE OUTCOMES:

1. Optical experiments, which will establish the Interference, Diffraction phenomena, the dispersive power of a prism which will be clearly visualized with the experiments.
2. Based on Diffraction phenomena with the use of a laser, a student can learn the determination of the wavelength of a light and particle size.
3. In Fiber optics experiments, a student can learn propagation of light and bending losses in the fiber.
4. The student can determine experimentally the rigidity modulus with the torsional pendulum with which he can also know the different modulus and strengths of different kind of engineering materials.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	-	1	-	-	-	-	-	-	1	1	-	-
CO2	1	-	2	1		-	-	-	-	-	-	-	1	-	-
CO3	2	-	-	-	1	-	-	-	-	-	-	-	1	-	-
CO4	2	1	-	1	2	-	-	-	-	-	-	1	1	-	-

List of experiments (Any10 Experiments)

1. Newton's rings
2. Determination of thickness of a thin film
3. Spectrometer – Transmission grating
4. Determination of wavelength of a Sodium light – Normal Incidence
5. Dispersive power of a prism - spectrometer
6. Laser experiment: wavelength determination using grating
7. Laser experiment: particle size determination
8. Determination of numerical aperture of an optical fiber
9. Field along the axis of coil carrying current – Stewart Gee's method
10. Determination of rigidity modulus – Torsional Pendulum
11. Determination of Band gap of Si or Ge – Four probe method
12. Study of B – H Curve.
13. Determination of Charge density and Hall coefficient or magnetic flux density – Hall Effect
14. Study of Solar I-V characteristics
15. Measurement of Dielectric constant

I-B.Tech, I-Sem (EEE) P 3 C 2

(A0491151) FUNDAMENTALS OF ELECTRONIC DEVICES LAB

OBJECTIVES:

- To understand the characteristics different semiconductor devices.
- To understand construction details, principle of operation and equivalent electrical model of each device.
- Usage of different semiconductor devices in applications.

COURSE OUTCOMES:

1. Understand the basics of semiconductors
2. Understand and analyze the principle of operation and equivalent electrical model for semiconductor devices like PN diode, Zener diode, Tunnel diode, BJT, JFET, MOSFET, UJT, and SCR
3. Apply the property of junction diode in rectifiers and regulators.
4. Understand and analyze the operation of half wave and full wave rectifiers with and without filters

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	-	-	-	-	-	-	-	-	-	-	3	2	-
CO2	1	3	-	-	-	-	-	-	-	-	-	-	1	3	-
CO3	2	-	3	-	-	-	-	-	-	-	-	-	2	-	3
CO4	-	2	3	-	-	-	-	-	-	-	-	-	-	2	3

EXPERIMENTS

1. Study of CRO
2. PN Junction diode characteristics
3. Zener diode characteristics and Zener as a Regulator
4. Rectifier without filters (Full wave & Half wave)
5. Rectifier with filters (Full wave & Half wave)
6. Transistor CB characteristics (Input and Output)
7. Transistor CE characteristics (Input and Output)
8. JFET Characteristics
9. UJT Characteristics
10. SCR Characteristics
11. MOSFET Characteristics

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(Autonomous)

ELECTRICAL AND ELECTRONICS ENGINEERING

I-B.Tech, II-Sem (EEE)

T	C
3+1*	3

(A0005152) PROFESSIONAL ENGLISH–II

(Common to all Branches)

Professional English II has been prescribed with specific objectives of enlightening the learners in the arena of Language competence. The curriculum has been designed to sharpen the skills of the professional students to meet the job tasks and to sustain the global milieu. This skill based curriculum will mould the young learners as competent engineers.

OBJECTIVES:

- Students will be able to read and explore for enrichment works from various genres (novels, plays, poems, essays).
- Students will be able to engage in formal writing assignments that require utilization of all stages of the writing process.
- Students will be able to evaluate their own language competence according to established criteria and rubrics like IELTS / TOEFL
- Students will be acquainted and be able to assess the LSRW skills.

COURSE OUTCOMES: Students will be able to:

Course Outcomes: After the completion of the course the student will be able to

1. Application of Advance grammar concepts
2. Acquisition of English language skills and soft skills based on rubrics like IELTS/TOEFL
3. Enriching LSRW through various genres viz. Autobiography, Essays
4. Practice Technical writing and Documentation
5. Understand engineering related concepts like environment and social media

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	-	-	3	-	3	-	-	-
CO2	3	-	-	-	-	2	1	3	2	3	-	3	-	-	-
CO3	1	-	-	-	-	-	3	-	-	3	-	-	-	-	-
CO4	2	-	-	-	-	3	-	3	-	3	-	3	-	-	-
CO5	1	-	-	-	-	2	-	3	1	3	-	3	-	-	-

UNIT I

Practical English Usage II

a) Review of Advance Grammar– Active & Passive Structures – Reported speech
b) Introduction to International English Language Testing System (IELTS) Level-2 Practice Tests – IELTS

UNIT II

a) **Listening Skills -** Active Listening – ROAR Technique – Note Making
b) **Autobiography** - *A Daughter is born* from **I am Malala** by Malala with Christina Lamb

UNIT III

a) **Technical Writing** –II - Design – Led Documentation - Online writing – E mails – Social Media – Netiquettes- Project Reports
b) **Essay**– *Green Living by* Neil Chambers

UNIT IV

a) **Concept of Communication** – Process - Principles
b) **Prose** – *Immortal Speeches – M.K.Gandhi*

UNIT V

a) **Introduction to Soft Skills** – Hard Skills vs Soft Skills – Team Dynamics
b) **Soft Skill** – *The Art of Time Management* by Ramesh & Ramesh

UNIT VI

a) **Expression through Art** - Fine Arts- Ravi Varma Paintings
b) Project / Case Studies

***Text book Prescribed:** *Falcon: Rise High, RGMCET Publication*

Reference Books

1) The Ace of Soft SkillsbyGopala Swamy Ramesh & Mahadevan Ramesh, Pearson Education.
2) The Basics of Communication by Steven Duck, Sage Publication, New Delhi.
3) I am Malala by Malala Yousazai with Christina Lamb, Phoenex, 2014.
4) The Art of Public Speaking by Dale Carneige, Cosimo, Inc., 01-Nov-2007.

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(Autonomous)

ELECTRICAL AND ELECTRONICS ENGINEERING

I-B.Tech, II-Sem (EEE)

T	C
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(A0006152) MATHEMATICS-II

(Common to all Branches)

OBJECTIVES:

- To make aware students about the importance and symbiosis between mathematics and engineering. Achieve confidence with mathematical tools which an essential weapon in modern Graduate Engineer's Armory. Balance between the development of understanding and mastering of solution techniques with emphasis being on the development of student's ability to use Mathematics with understanding to solve engineering problems by retaining the philosophy learning by doing.

COURSE OUTCOMES:

Engineering Graduates will be able to

1. Gain knowledge of Multiple Integrals, vector calculus, Fourier series, Fourier transforms and Z-transforms.
2. Understand Vector Differentiation to compute gradient of scalar fields, Curl and Divergence of vector fields and Vector Integration to find relations between line, surface and volume integrals by Green's, Stoke's and divergence theorems.
3. Analyze the Problems of Fourier series of functions satisfying Dirichlet's conditions, both in general and arbitrary periods and half range series of sines and cosines.
4. Apply Z-Transforms and Inverse Z-transforms of time invariant systems to study the analysis of the waves in communication systems which deal discrete functions.
5. Synthesize Fourier transforms and Fourier series and difference equations with Z-transforms. Fourier Transforms can be used to solve partial differential equations with lot of applications in circuit analysis.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	-	-	-	-	-	-	-	-	-	-	1	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-	1	-	-
CO3	-	2	-	-	-	-	-	-	-	-	-	-	1	-	-
CO4	-	-	-	-	3	-	-	-	-	-	-	-	1	-	-
CO5	-	-	2	-	-	-	-	-	-	-	-	-	1	-	-

UNIT I

Multiple integrals: Double and triple integrals – Change of Variables – Change of order of integration.

UNIT II

Vector Differentiation: Introduction of Vector differentiation -Scalar and vector point functions-Gradient of scalar function– Directional derivatives- Divergence and curl of a vector function- properties of Grad, Div and Curl.

UNIT III

Vector integration: Line integral - Potential function – Area , Surface and volume integrals. Vector integral theorems: Green's theorem – Stoke's and Gauss's Divergence Theorem (excluding their proof). Verification of Green's – Stoke's and Gauss's Theorems.

UNIT IV

Fourier Series: Determination of Fourier coefficients – Fourier series of Even and odd functions – Fourier series in an arbitrary interval – Even and odd periodic continuation – Half-range Fourier sine and cosine expansions.

UNIT V

Fourier integral theorem (statement only) – Fourier sine and cosine integrals Fourier transform – Fourier sine and cosine transforms – Properties – Inverse transforms.

UNIT VI

Z-transform: Inverse z-transform – Properties – Damping rule – Shifting rule – Initial and final value theorems. Convolution theorem – Solution of difference equations by z-transforms.

TEXT BOOKS:

1. Advanced Engineering Mathematics By Erwin Kreyszig.
2. Advanced Engineering Mathematics By R.K. Jain and S.R.K. Iyengar, Narosa Publications

REFERENCES:

1. A Text Book of Engineering Mathematics, Vol – 1, T.K.V. Iyengar, B. Krishna Gandhi and Others S. Chand & Company.
2. Higher Engineering Mathematics by B.S.Grewal, Khanna Publishers.
3. A Text Book of Engineering Mathematics, Thomson Book Collection.
4. Engineering Mathematics By Srimantha Pal et.al. Oxford University Press.
5. Engineering Mathematics, Sarveswara Rao Koneru, Universities Press.

I-B.Tech, II-Sem (EEE) T C
3+1* 3

(A0008152) SOLID STATE PHYSICS

(Common to ECE, EEE, CSE & IT)

OBJECTIVES:

The Solid State Physics (Physics-II) is designed to meet the educational needs of each student and to provide the foundation for future career development.

- To provide students with a broad education required to recognize, understand, and further the evolving role that materials science plays in society.
- To prepare students for careers in solid state physics and engineering, or in fields that require an understanding of materials, by providing a broad, fundamental view of materials as well as a solid foundation in science and engineering.
- To identify important scientific and engineering problems related to materials, and then design systems and processes as well as perform relevant experiments and interpret data to aid the solution of these problems;
- To understand and appreciate materials research and its application in advancing a wide range of established and emerging technologies.

COURSE OUTCOMES:

After the completion of the course the student will be able to:

1. Identify engineering material structures like Si, Ge etc. using the concepts of crystal structures.
2. Understand the origin of resistance and band structures with the study of conductors.
3. Find the suitable semiconductor materials for the fabrication of transistors.
4. Apply the concepts of magnetism, dielectric and superconductivity in electrical machines, inductors, capacitors, magnets etc.
5. Motivate towards new small scale technology where the behavior of the materials is different.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	3	-	-	-	-	-	-	-	-	-	1	1	-	-
CO2	3	-	1	-	-	-	-	-	-	-	-	-	1	-	-
CO3	-	3		1	2	-	-	-	-	-	-	-	1	-	-
CO4	2	-	3	-		-	-	-	-	-	-	-	1	-	-
CO5	1	-	2	-	3	-	-	-	-	-	-	1	1	-	-

UNIT I

CRYSTAL PHYSICS: Classification of solids - Lattice – Space lattice - Basis- Crystal Structure - Unit cell – Primitive cell – crystal systems - Bravais lattice –Atomic radius – Coordination number – Packing factor for SC, BCC, FCC structures – diamond and graphite structures - Lattice planes – Miller indices – inter planar spacing in a cubic lattice – X-Ray Diffraction - Bragg's law – Powder method of crystal structure determination - problems.

UNIT II

CONDUCTING MATERIALS: Conductors – classical free electron theory of metals – Drift Velocity - Electrical and thermal conductivity – Quantum theory – Fermi energy – Fermi level - Effect of temperature on Fermi Function - Fermi distribution function – Sources of electrical resistivity – Kroning-Penney model (qualitative results-no derivation) – Energy bands – Effective mass – classification of materials - problems.

UNIT III

SEMICONDUCTING MATERIALS: Introduction - Intrinsic semiconductor – extrinsic semiconductors – Drift and diffusion – Einstein relation - Hall effect – Determination of Hall coefficient – Applications – Direct and indirect band gap semiconductors – p-n junction – Band diagram of p-n junction – p-n junction under forward and reverse bias – energy band diagram - Diode equation – solar cell – Expressions for Vm and Im - problems.

UNIT IV

MAGNETIC AND SUPERCONDUCTING PROPERTIES: Terms and definitions - Origin of magnetic moment – Bohr magneton – Dia and para magnetism – Ferro magnetism – Hysteresis – soft and hard magnetic materials – anti – ferromagnetic materials – Ferrites – applications - problems.

Introduction to superconductors - Properties of a superconductor - Meissner's effect – London penetration depth -Type of superconductors – BCS theory of Superconductivity (Qualitative) – Applications of superconductors - problems

UNIT V

DIELECTRIC PROPERTIES: Matter polarization and relative permittivity: definition - dipole moment and polarization vector P - polarization mechanisms: electronic, ionic, orientational, interfacial and total polarization – frequency dependence - Lorentz field and Clausius-Mossotti equation - dielectric constant and dielectric loss - capacitor materials - typical capacitor constructions - ferroelectricity - $BaTiO_3$ – applications – problems.

UNIT VI

MODERN ENGINEERING MATERIALS: Nanomaterials: Introduction - Properties - synthesis – ball milling - solgel - applications.

Carbon nanotubes: introduction – types of CNTs - synthesis – chemical vapor deposition – properties and applications.

Metallic glasses – shape memory alloys (one way, two way) – applications.

REFERENCES:

1. Charles Kittel “Introduction to Solid State Physics”, John Wiley & sons, 7th edition, Singapore.
2. Ali Omer, “Elementary Solid State physics”, Person Publications 5th Edition, New Delhi.
3. M.N. Avadhanulu and PG Kshirsagar, “A Textbook of Engineering Physics”, S.Chand and company, Ltd., New Delhi, 2014.
4. D. K. Bhattacharya and Poonam Tandon, “Engineering Physics”, Oxford University Press, 2015.
5. Srivastava, “Elements of Solid State Physics”, PHI, New Delhi.
6. Charles P. Poole and Frank J. Ownen, “Introduction to Nanotechnology”, Wiley India.
7. S.P.Basavaraju, “Applied Physics”, Subhas Stores, Bangalore.
8. M. Ratner & D. Ratner –“Nanotechnology”, Pearson Ed, New Delhi.

I-B.Tech, II-Sem (EEE) T C
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(A0502152) DATA STRUCTURES THROUGH C

(Common to all Branches)

OBJECTIVES:

- To make students aware about structures and unions in C language.
- To provide exposure on various searching and sorting techniques.
- To provide exposure on various data structures like stacks, queues, circular queues and linked lists etc.,
- To develop solutions for various problems by using C Programming Language by students.

COURSE OUTCOMES:

By the end of this course, students should be able

Upon completion of the subject, students will be able to

1. To understand how to develop C programs to solve various kinds of problems by using different C programming concepts like structures and unions.
2. To develop programs by performing I/O operations through Files.
3. To implement different linear data structure stacks and applications of stacks.
4. To implement different linear data structure queues and types of queues.
5. To implement different linear data structures linked lists and its types.
6. To implement various searching and sorting techniques.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	3	2	2	1	-	-	2	-	1	2	-	-	-
CO2	2	1	2	2	1	1	-	-	2	1	1	1	-	-	-
CO3	2	2	2	2	1	2	-	-	2	1	1	3	-	-	-
CO4	2	2	2	2	1	2	-	-	2	1	1	3	-	-	-
CO5	2	2	2	2	1	2	-	-	2	1	1	3	-	-	-
CO6	3	3	3	2		2	-	-	1	1	1	1	-	-	-

UNIT I

Structure and Unions in C Language: Structures – Introduction, Features of Structures - Declaration and Initialization of Structures, Accessing structure members, structure initialization. Nested Structures, Array of Structures, Arrays within structures and Pointers to Structures, Structures and Functions, Bit Fields, Unions, Union of Structures. Example Programs on the topics mentioned above.

UNIT II

File Input/Output: Introduction, Types of Files, File I/O Operations- High level I/O functions- Open & Close a file, Read and Write data into a file, Searching data in the file, Error handling during I/O operations on files. Command Line Arguments, Applications of Command Line Arguments. Example Programs on the topics covered in this Unit.

UNIT III

Introduction to data structures: classification of data structures, dynamic memory allocation functions in C language. **Stacks:** Definition, Various representation methods, operations on stacks and their implementation in C language, applications of stacks.

UNIT IV

Queues: Definition, Various representation methods, operations on queues and their implementation in C language, applications of queues. Circular queues- operations on circular queues and their implementation in C language.

UNIT V

Linked lists: Definition, Various representation methods, operations on linked lists and their implementation in C language.

UNIT VI

Searching and Sorting Techniques:

Searching Techniques- Linear search and Binary Search Techniques.

Sorting techniques- Bubble Sort, Selection Sort, Quick Sort, Insertion Sort, and Merge Sort. Implementation of all the above mentioned techniques in C language and trace them by giving different test data.

TEXT BOOKS:

1. Programming in C ,Pradeep Dey, Manas Ghosh,Oxford Heigher Education
2. Computer programming and Data Structures, E.Balaguruswamy, Tata Mc Graw Hill. 2009 revised edition.
3. The C Programming Language, Brian W.Kerninghan, Dennis M.Ritchie
4. Programming in C , Dr. N. Uday Bhaskar, Winger publications

REFERENCES:

1. Let us C – Yeshwanth kanetkar, 8th Edition.BPB Publications
2. C Programming with problem solving, J.A. Jones & K. Harrow, Dreamtech Press
3. Data Structures using C – A.M.Tanenbaum, Y.Langsam, and M.J. Augenstein, Pearson Education / PHI, Eighth Edition.
4. C Programming & Data Structures, B.A.Forouzan and R.F. Gilberg, Third Edition, Cengage Learning.

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous)

ELECTRICAL AND ELECTRONICS ENGINEERING

I-B.Tech, II-Sem (EEE)

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(A0003151) MODERN ENGINEERING CHEMISTRY

(Common to all Branches)

OBJECTIVES:

- To know the importance of water and sustainable utilization of water resources and alternative methods for potable water like Reverse osmosis and the problems raised in the Production of steam by using the boilers are included in Water technology.
- To identify the structure of organic molecules using photo chemistry and chemical spectroscopy.
- To acquaint the student with concepts of important photo physical and Photochemical processes and spectroscopy.
- To make the students conversant with basics of polymer chemistry
- To develop an understanding of the basic concepts of phase rule and its applications to single and two component systems.
- To Understand and apply the concepts in electrochemistry and corrosion science

COURSE OUTCOMES:

Upon completion of the subject, students will be able to

1. Apply the concepts of Organic chemistry for synthesis.
2. Synthesize polymers.
3. Estimate the hardness of water in terms of Calcium and magnesium ions.
4. Standardize solutions using titration, conductivity meter and colorimeter.
5. Know the fundamentals of spectroscopy like electromagnetic spectrum, UV visible, IR spectroscopy.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	1	-	-	-	-	-	-	-	-	-	-	-	-
CO2	1	-	3	-	-	-	-	-	-	-	-	1	-	-	-
CO3	-	3	-	-	2	-	-	-	-	-	-	-	-	-	-
CO4	-	3	-	1	1	-	-	-	-	-	-	1	-	-	-
CO5	3	-	-	-	1	-	-	-	-	-	-	-	-	-	-

UNIT I

WATER TECHNOLOGY: Sources of Water- Types of impurities in Water- Hardness of Water – Temporary and Permanent hardness - Disadvantages of hard water-Estimation of hardness by EDTA Method, Numerical Problems on Hardness.

Boiler troubles (Sludge, Scale, Caustic Embrittlement, Priming and foaming)–Softening of water (Ion exchange, Zeolite Methods).Desalination-Reverse Osmosis Method. Analysis of Water- Alkalinity Dissolved Oxygen.

UNIT II

SURFACE CHEMISTRY:

Adsorption: Definition – Types-Langmuir Adsorption isotherm-Applications.

Phase Rule: Statement-Explanation of Terms involved with examples –One component System – Water & Sulphr Systems-Condensed Phase Rule- Pb-Ag System.

Engineering Materials: Abrasives –Mho·s Scale of Hardness-Natural &Synthetic Abrasives-Engineering Applications.

Refractories: Introduction, Classification & Properties Refractories-Reasons for failure of Refractories.

UNIT III

ELECTRO CHEMISTRY: Conductance – Specific Conductance -Equivalent Conductance – Molar Conductance – Determination of conductance by Wheat Stone Bridge Method-Effect of dilution On Conductance – Conductometric Titrations(Acid Base & Precipitative Titration)- Electrode Potential- Reference Electrodes(SHE,Calomel)-Nernst equation-Numerical Problems. Representation of Cell- electro chemical cells- concentration cells.Ion Selective Electrode-Principle & Applications.

Chemically Modified Electrodes (CMEs): CMEs as Potentiometric and amphereometric sensors.

UNIT IV

CHEMISTRY OF CORROSION& ITS PREVENTION: Definition, Mechanism of Dry(oxidation),Wet(Evolution of hydrogen & Absorption of Oxygen) Types of corrosion- Dry Corrosion, and Wet Corrosion, Theories and Mechanism- Galvanic Series- Galvanic Corrosion, Concentration Cell Corrosion, Water line corrosion, Pitting Corrosion. Factors Influencing Corrosion.

Control of Corrosion – Proper designing and material selection-Cathodic Protection – Sacrificial anode and Imprest Current methods.Use of Inhibitors.

Protective coatings: Metallic coatings & applications.

Electro Plating of Chromium&Nickel

UNIT V

PHOTO CHEMISTRY & SPECTROSCOPY: Photo Chemistry: Principles-Growthers Droppers law-Stark Einstein law-Lamberts Beers law-Flouroscence-Phosphorescence-Chemiluminiscence-Photosensitization-Quantum efficiency determination-problems

Spectroscopy: Electromagnetic spectrum-absorption of radiation-Electronic, Vibrational and Rotational Transitions.

UV-Visible and IR Spectroscopy Principles, Instrumentation (block diagrams) & applications (Qualitative)

UNIT VI

POLYMERS AND FUELS:

Polymer: Basic concepts- Types of Polymerization – Addition and Condensation Polymerization. Mechanism of Addition polymerization.

Plastics: Definition, Thermo& plastics. Preparation, Properties and Engineering Uses of Poly ethylene, Poly vinyl chloride, Teflon, Bakelite,& Nylons.

Elastomers: Processing of Natural Rubber, Compounding of Rubber Drawbacks of Raw Rubber, Vulcanization of Rubber. Preparation, Properties & Uses of Buna-S, Buna-N, Silicone Rubber.

Fuels: Definition, Classification of fuels. Characteristics of a good fuel. Calorific Value and its Units. Determination Calorific Value by Bomb Calorimeter.

Solid Fuel: Analysis of Coal (Proximate & Ultimate)

Liquid Fuels: Petroleum, Refining, Knocking, Octane, Cetane Number.

Gaseous Fuels: Producer Gas, Water Gas.

Combustion: Principles and Numerical Problems- Flue gas analysis by Orsat's apparatus.

TEXT BOOKS:

1. Text book of Engineering Chemistry by Jain & Jain, Dhanpat Rai Publishing Company, 15th edition New Delhi (2008).
2. Text book of Engineering Chemistry by sashi chawla, Dhanpat Rai Publishing Company, 12th edition New Delhi (2011).

REFERENCE:

1. A text book of Engineering Chemistry by S.S. Dara, S.Chand & Co, New Delhi (2008)
2. Dara S.S Text Book Of Engineering Chemistry, S.Chand & Company Ltd, NewDelhi 2003.
3. Chemistry of Engineering Materials by C.V. Agarwal, Tara Publication, Varanasi.2008.
4. Physical Chemistry - Glasston & Lewis.

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(Autonomous)

ELECTRICAL AND ELECTRONICS ENGINEERING

I-B.Tech, II-Sem (EEE) T C
3+1* 3

(A0202152) FUNDAMENTALS OF ELECTRICAL ENGINEERING

(Common to EEE & IT)

OBJECTIVES::

The course will enable the students to

- Get exposed to the basics in Electrical terms
- Get exposed to the basics in DC and AC circuits

COURSE OUTCOMES:

After completion of the course the students are expected to be able to

1. Solve the basic electrical terms
2. Gain the knowledge about the DC.
3. Gain the knowledge about the AC fundamentals.
4. AC fundamentals electromagnetic and electrostatic field

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	2	-	-	-	-	-	-	-	-	-	2	-	-
CO2	2	-	2	-	-	-	-	-	-	-	-	-	2	-	-
CO3	2	2	-	2	-	-	-	-	-	-	-	-	2	-	-
CO4	2	2	2	2	-	-	-	-	-	-	-	-	2	-	-

UNIT I

CONDUCTING MATERIALS: Hardening, Annealing - Low Resistive Materials – requirements – properties and applications of copper and aluminium - Comparison between Copper and Aluminium - ACSR Conductors, AAAC - High Resistive Materials - properties – applications.

UNIT II

ELECTRICAL FUNDAMENTALS: Concept of charge- Electromotive force – Current--potential difference Resistance –Factors affecting the resistance- Conductance –Effect of temperature on resistance--ohms law –Electrical Work-Electric Power –Electrical Energy-Network Terminology- Classification of Electrical Network-problems

UNIT III:

DC FUNDAMENTALS: DC Voltage-DC Current- their representation- Resistance in series, parallel and series parallel combinations, Comparison of series and parallel circuits-Voltage division in series circuit- Current division in parallel circuit-Short and Open Circuits-Kirchoff's current law- Kirchoff's Voltage law-Steps to apply Kirchoff's laws for closed electrical circuit-problems

UNIT IV

AC FUNDAMENTALS: AC Voltage-AC Current- their representation- Types of AC waveforms- Advantages of Sinusoidal waveform-Instantaneous Value- Amplitude- Time period- Frequency- Different forms of EMF equation- Different values of Alternating quantities-Form Factor- Peak Factor-Phase Difference- Phasor Representation- Addition and subtraction of AC quantities

UNIT V

ELECTRO MAGNETIC INDUCTION: Faraday's laws - Dynamically and statically induced E.M.F -Lenz's Law & Fleming's right hand rule- Fleming's left hand rule-thumb rule -Self and mutual inductance - Co-efficient of coupling – equivalent inductance in series and parallel- Energy stored in a magnetic field - Energy stored per Unit volume

UNIT VI

ELECTROSTATICS: Atom-Ion-positive and Negative charges -Laws of Electrostatics – Permittivity - Electrostatic induction -Electrostatic field - lines of force -Comparison of electrostatic and magnetic lines of force -Strength of electric field- Flux density -Gauss theorem –Polarization - Dielectric Loss - Application of Dielectrics – Dielectric strength - dielectric constant - Capacitance -Capacitor - Capacitors in series and parallel

TEXT BOOKS:

1. Electrical Technology Vol.I by B.L. Theraja
2. Electrical Engg. Materials G.V. Baradhwajan
3. Electrical Technology by Hughes
4. Electrical Techology Vol.I by J.B.Gupta

REFERENCE BOOKS:

1. Electrical Engineering Materials - T.T.T.I Publications
2. Electronic Components- Dr. K. Padmanabham
3. Electronic Components-D.V. Prasad
4. Basic electronics and linear circuits – Bhargava, TMH Publishers
5. Electronic Principles – Malvino

I-B.Tech, II-Sem (EEE) P C
3 2

(A0592152) DATA STRUCTURES THROUGH C LAB

(Common to all Branches)

OBJECTIVES

- To introduce different constructs of C language like structures and unions to the students to solve various kinds of problems.
- To introduce different types of linear data structures like stacks, queues, circular queues and linked lists etc.
- To make the students to implement different kinds of sorting algorithms like selection sort, bubble sort, insertion sort, and quick sort and merge sort etc.
- To make the students to implement different kinds of searching algorithms like linear search and binary search etc.
- To implement various searching and sorting techniques

COURSE OUTCOMES

By the end of this course, students should be able

1. To understand how to develop C programs to solve various kinds of problems by using different C programming concepts like structures and unions.
2. To develop programs by performing I/O operations through Files.
3. To implement different linear data structures like stacks, queues, circular queues and linked lists etc.,
4. To implement various searching and sorting techniques.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	3	2	2	1	-	-	2	-	-	-	-	-	-
CO2	2	1	2	2	1	1	-	-	2	-	-	-	-	-	-
CO3	2	2	2	2	1	2	-	-	2	-	-	-	-	-	-
CO4	3	3	3	2		2	-	-	1	-	-	-	-	-	-

RECOMMENDED SYSTEMS /SOFTWARE REQUIREMENTS:

- Intel based desktop PC with ANSI C Compiler and Supporting Editors

Exercise 1:

a) Write a C Program to copy the contents of one structure variable to another structure variable.
b) Write a C program to implement nested structure to store and display the student information. The structure student contains the field's S.no, name, and date. Date is the nested structure and it contains the fields day, month and year.

Exercise 2:

a) Write a C program to simulate the multiplication of two fractions by passing individual structure members to a function.
b) Write a C program to simulate the multiplication of two fractions by passing the whole structure to a function.

Exercise 3:

a) Write a C program that uses functions to perform the following operations:
i) Reading a complex number
ii) Writing a complex number
iii) Addition of two complex numbers
iv) Multiplication of two complex numbers (Note: represent complex number using a structure.)
b) Write a C program to implement Union Concept.

Exercise 4:

a) Write a C program which copies last 'n' characters from one file to another.
b) Write a C program to reverse the first 'n' characters in a file.
c) Write a C program to merge two files into a third file.

Exercise 5:
Write a C program to implement the following operations on Stack using array representation

a) Push b) Pop c) Display

Exercise 6:
Write a C program to implement the following operations on Queue using array representation

a) Insert b) Delete c) Display

Exercise 7:
Write a C program to implement the following operations on Singly Linked list using linked representation

a) Insert b) Delete c) Display d) Search

Exercise 8:
Write a C program that implements the following sorting methods to sort a given list of integers in ascending order.

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

Exercise 9:
Write a C program that implements the following sorting methods to sort a given list of integers in ascending order.

a) Quick Sort b) Merge sort

Exercise 10:
Write C program to implement the following searching methods to search an element in a given list of integers

a) Linear Search b) Binary Search

REFERENCE BOOKS

1. Programming in C, Pradeep Dey, Manas Ghosh, Oxford Heigher Education
2. Computer programming and Data Structures, E.Balaguruswamy, Tata Mc Graw Hill. 2009 revised edition.
3. Mastering C, K.R. Venugopal and S.R. Prasad, TMH Publications.

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ELECTRICAL AND ELECTRONICS ENGINEERING

I-B.Tech, II-Sem (EEE) P 3 C 2

(A0391151) ENGINEERING WORKSHOP

(Common to all branches)

OBJECTIVES:

- The budding Engineer may turn out to be a technologist, scientist, entrepreneur, practitioner, consultant etc. There is a need to equip the engineer with the knowledge of common and newer engineering materials as well as shop practices to fabricate, manufacture or work with materials. Essentially he should know the labor involved, machinery or equipment necessary, time required to fabricate and also should be able to estimate the cost of the product or job work. Hence engineering work shop practice is included to introduce some common shop practices and on hand experience to appreciate the use of skill, tools, equipment and general practices to all the engineering students.

COURSE OUTCOMES:

1. A student should know the basic knowledge of various tools and their use in different sections of manufacturing such as fitting, carpentry, tin smithy, welding etc. and basic engineering practices such as plumbing, electrical wiring, electronic circuits, machine shop practice.
2. Ability to design and model various basic prototypes in the trade of fitting such as Straight fit, V- fit.
3. Ability to make various basic prototypes in the trade of Tin smithy such as rectangular tray, and open Cylinder.
4. Ability to perform various basic House Wiring techniques such as connecting one lamp with one switch, connecting two lamps with one switch, connecting a fluorescent tube, Series wiring, Go down wiring.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	1	2	2	1		-	-	2	-	2	1	-	-	-
CO2	-	-	-	-	2	1	-	-	2	2	2	-	-	-	-
CO3	-	-	-	-	2	1	-	-	2	2	2	-	-	-	-
CO4	-	-	-	-	2	1	-	-	2	2	2	-	-	-	-

Note: At least two exercises to be done from each trade.

1. **TRADES FOR EXERCISES:**

A] Carpentry 1. T-Lap Joint 2. Cross Lap Joint
3. Dovetail Joint 4. Mortise and Tennon Joint

B] Fitting 1. Vee Fit 2. Square Fit
3. Half Round Fit 4. Dovetail Fit

C] House Wiring 1. Parallel / Series Connection of two/three bulbs
2. Stair Case wiring 3. Tube Light Wiring
4. Measurement of Earth Resistance/Go down Wiring

D] Tin Smithy 1. Rectangular Tray 2. Square Box without lid
3. Open Scoop 4. Funnel

E] Welding 1. Single V butt joint 2. Lap joint
3. Double V butt joint 4. T fillet joint.

F] Soldering 1.Soldering & Desoldering Practice
2. Series Circuit 3. Parallel Circuit

2. TRADES FOR DEMONSTRATION:

a) Plumbing
b) Machine Shop
c) Bosch Power Tools

REFERENCE BOOKS:

1. Engineering Work shop practice for JNTU, V. Ramesh Babu, VRB Publishers Pvt. Ltd., 2009.
2. Work shop Manual / P.Kannaiah/ K.L.Narayana/ SciTech Publishers.
3. Engineering Practices Lab Manual, Jeyapoovan, Saravana Pandian, 4/e Vikas.
4. Dictionary of Mechanical Engineering, GHF Nayler, Jaico Publishing House.

I-B.Tech, II-Sem (EEE) P 3 C 2

(A0091151) ENGINEERING CHEMISTRY LAB

(Common to all branches)

OBJECTIVES:

- Chemistry is one subject which gives adequate knowledge about the applications involved in the aerospace, mechanical, environmental and other engineering fields. Knowledge of chemistry plays a vital role in engineering profession enabling the potential engineers to understand and to perform successfully while working on multidisciplinary tasks.
- The main objective of the department is to develop the necessary theoretical and practical aspects required for understanding intricacies of the subject and also give adequate exposure to the applied chemistry aspects in different disciplines of engineering. Our faculty educates the engineering students with all necessary concepts related to chemistry and develops a scientific attitude by means of distinguishing, analyzing and solving various engineering problems. We are training the students to develop their experimental skills and important practical knowledge in engineering by providing sophisticated chemistry laboratory.

COURSE OUTCOMES:

1. Keen Observation and Skills developed.
2. Knowledge of estimation of Quality of water.
3. They acquired the knowledge of synthesis of polymering organic compounds.
4. The total alkalinity of water and total dissolved oxygen calculated and this will useful while using the water for industrial applications
5. Take the time to discuss the procedure, the data, and the results of the experiment with the lab partner.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	-	2	-		1	-	-	-	-	1	-	-	-
CO2	-	-	-	2	2	1	1	-	-	-	-	-	-	-	-
CO3	-	-	-	-	3	-	1	-	-	-	-	-	-	-	-
CO4	-	1	1	-	3	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	2	1	-	-	-	-	-	-	-	-	-

Detailed Syllabus:

1. Standardization of KMnO4 By using Mohr,s salt.

Complexometric Titrations:

2. Determination of Hardness of water by using EDTA titration method.
3. Estimation of Magnesium ion by using EDTA titration method.
4. Estimation of copper ion by using EDTA titration method.
5. Estimation of dissolved oxygen by Winklers Method.

Dichrometry:

6. Determination of Ferrous ion by using potassium dichromate.

Conductometric titration:

7. Determination of Strength of the given HCl by using conductometric titration.
8. Determination of Strength of the given CH3COOH by using conductometric titration.
9. Determination of Alkalinity Present in a given solution.
10. Verification of Beer,s-Lambert,s Law by KMnO4.
11. Determination of Strength Manganese by Colorometric Method

12. Determination of Calorific Value of Solid/Liquid fule using Bomb Calorimetre.
13. Determination of Viscosity by using Red wood Viscometer-I (or) II
14. Potentiometric Determination of iron using Standard K2Cr2O7 Solution.

Demonstration:

1. Determination of Bulk density.
2. Determination of Refractive index of a given Sollution.
3. Preparation of Ethyl Acetate.
4. Preparation of Bakelite.
5. Determination of pH of Water and various other samples.

REFERENCES:

1. Laboratory Manual on Engineering Chemistry, Sudharani (Dhanpat Rai Publishing Company).
2. Vogel's Textbook of Quantitative chemical analysis, J. Mendham et.al. (Pearson Education).
3. Advanced Inorganic Analysis, Agarwal & Keemtilal, Pragati prakashan.
4. Chemical tables, Dr N. S. Gnanapragasam, (Sultan Chand & sons).

I-B.Tech, II-Sem (EEE) P 3 C 2

(A0092151) ENGLISH LANGUAGE & COMMUNICATIONS LAB

(Common to all Branches)

English Language Lab acts as a platform for learning, practicing and producing language skills through interactive lessons and communicative mode of teaching. Communicative method for learning languages combines extensive, high-quality content with flexible and interactive multimedia technology. Learners can act and respond in a variety of ways at their own pace. Through a wide range of activities, a variety of skills are aimed to develop in a learner. A learner needs to communicate: oral and written comprehension, as well as oral and written expression. It also addresses the concepts of grammar, lexicon, phonetics and conjugation.

OBJECTIVES:

- To develop language learning through accuracy in grammar
- To enrich the discourse competence, to prepare the learner to be able to produce contextualize written text and speech.
- To achieve good pronunciation patterns and accent.
- To acquire strategic competence to use both spoken & written language to use in a wide range of communication strategies.

COURSE OUTCOMES:

Students will be able to

1. Social interactions, greetings, self-introductions and small talk
2. Practice standard pronunciations of through phonetics
3. To present oral and technical presentations
4. Acquire communication skills
5. Learn participate in GDs

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	-	-	-	2	1	2	2	3	-	2	-	-	-
CO2	1	1	-	-	-	2	1	2	2	3	-	2	-	-	-
CO3	1	1	-	-	-	2	1	2	2	3	-	2	-	-	-
CO4	1	1	-	-	-	2	1	2	2	3	-	2	-	-	-
CO5	1	1	-	-	-	2	1	2	2	3	-	2	-	-	-

UNIT I

Functional English – self Introduction - Greetings – Requests – seeking information - Invitations - Ice breaking activities

UNIT II

Multi Media Lab Practice

Introduction to Phonetics I – Speech sounds –Vowels – Diphthongs – Consonants

UNIT III

Multi Media Lab Practice

Phonetics II– Word Accent – Intonation –Rhythm

UNIT IV

Information Transfer – Activity -Description of Technical Objects

UNIT V

Oral Presentations - Activity – JAM

UNIT VI

Group Communication – Activity – GD/Role plays

Licensed Software available in the Language Lab:

1. K-VAN , SOFTX Technologies: English Language and Communication Skills Software IV.0
2. Alania Series, English Mastery, Visual & Media Works: Listening Comprehension – Grammar – Vocabulary

3. Rosetta Stone Software, Visual & Media Works: LSRW Skills
4. EL Client, Globerena Technologies: Phonetics – Job Skills
5. K-VAN Solutions: Advanced Communication Skills Lab Software.

Reference Books:

1. Better English Pronunciation by J.D. O' Connor, Cambridge University Press,1980
2. Longman Dictionary of Contemporary English for Advanced Learners, Pearson Education Ltd.
3. Speak with Power and Confidence: Tested Ideas for Becoming a More Powerful Communicator by Patric Collins, 2007
4. Professional Communication Skills,by Praveen S.R. Bhatia (Author), A.K. Jain (Author), A.M. Sheikh (Author),2006.

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ELECTRICAL AND ELECTRONICS ENGINEERING

II-B.Tech I-Sem (EEE)

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(A0015153) MATHEMATICAL METHODS

(Common to CE, EEE, ME, ECE & IT)

OBJECTIVES:

- To make aware students about the importance and symbiosis between mathematics and engineering. Achieve confidence with mathematical tools which an essential weapon in modern Graduate Engineer's Armory. Balance between the development of understanding and mastering of solution techniques with emphasis being on the development of student's ability to use Mathematics with understanding to solve engineering problems by retaining the philosophy learning by doing.

COURSE OUTCOMES:

1. Get knowledge of algebra of Matrices, curve fitting, Partial Differential Equations and Numerical Methods to solve various Engineering Problems.
2. Understand Numerical methods including the study of iterative solutions of equations, interpolation, curve fitting, numerical differentiation and integration and the solution of ordinary differential equations.
3. Analyze the numerical solutions of ODE's to various real time problems in quantum mechanics, electrical networks etc.
4. Apply Trapezoidal rule and Simpson's rules in numerical differentiation and integration
5. Synthesize problems of one and two dimensional Partial Differential Equations for the wave equation, heat equation, Laplace's equation subject to simple boundary conditions.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-
CO5	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-

UNIT I

Matrices: Elementary row transformations – Rank – Echelon form, Normal form – Solutions of Linear System of Homogenous and Non Homogeneous equations

Eigen Values, Eigen vectors – Properties. Cayley – Hamilton Theorem – Inverse and powers of a matrix by Cayley–Hamilton theorem

UNIT II

Real matrices – Symmetric, skew – Symmetric, orthogonal matrices.

Complex matrices: Hermitian, Skew-Hermitian and Unitary matrices – Eigen values and Eigen vectors and their properties. Quadratic forms –Linear Transformation – Reduction of quadratic form to canonical form and their nature(Signature and Index).

UNIT III

Solution of Algebraic and Transcendental Equations: Introduction – The Bisection Method – The Method of False Position – The Iteration Method – Newton-Raphson Method.

Interpolation: Introduction – Finite differences – Forward Differences – backward Differences –Newton's forward and backward difference formulae for interpolation – Lagrange's Interpolation formula.

UNIT IV

Curve fitting: Fitting a straight line – Second degree curve – Exponential curve-Power curve by method of least squares.

Numerical Differentiation and Integration – Trapezoidal rule – Simpson's 1/3 Rule – Simpson's 3/8 Rule.

UNIT V

Numerical solution of Ordinary Differential equations: Solution by Taylor's series-Picard's Method of successive Approximations-Euler's Method-Runge-Kutta Method– Milne's Predictor-Corrector Method.

UNIT – VI

Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions – method of separation of variables – solutions of one dimensional wave equation, heat equation and two-dimensional Laplace equation under initial and boundary conditions

Text books:

1. Advanced Engineering Mathematics by Erwin Kreyszig.
2. Advanced Engineering Mathematics by R.K. Jain and S.R.K. Iyengar, Narosa publications.

References:

1. A Text book of Engineering Mathematics, vol – 1, T.K.V. Iyengar, B. Krishna Gandhi and others s. Chand & company.
2. Higher Engineering Mathematics by B.S.Grewal, Khanna Publishers.
3. A Text Book of Engineering Mathematics, Thomson Book Collection.
4. Engineering Mathematics by Srimantha pal et.al. Oxford university Press.
5. Engineering Mathematics, Sarveswararao Koneru, Universities Press.

II-B.Tech I-Sem (EEE) T C
3+1* 3

(A0203153) FIELD THEORY

OBJECTIVES:

- The objective of this course is to introduce the concepts of electric field
- To introduce magnetic fields concepts which will be utilized in the development of the theory for power transmission lines and electrical machines?

COURSE OUTCOMES:

1. To apply knowledge of basic mathematics and physics for the determination of electric and magnetic quantities.
2. Application of electrostatic and magneto static theorems to determine electric field intensity and magnetic field intensity
3. To determine the self and mutual inductance of simple practical current carrying systems
4. To solve the problems related to electromagnetic field using dealt theorems
5. To understand time varying electromagnetic fields as governed by the maxwell's equations
6. To analyze the behavior of the conductors using ohms law, inductors using Faraday's law and capacitors using dielectric principles.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	-	2	-	-	-	-	2	1	-	2	3	-	-
CO2	3	3	-	2	-	-	-	-	2	1	-	2	3	-	-
CO3	3	3	-	2	-	-	-	-	2	1	-	2	3	-	-
CO4	1	2	-	2	-	-	-	-	2	1	-	2	3	-	-
CO5	2	2	-	2	-	2	-	-	2	1	-	2	3	-	-
CO6	1	3	-	2	-	-	-	-	2	1	-	2	3	-	-

UNIT I

Electrostatics-I

Coulomb's law and electrical field intensity: Coulomb's law, Field due to different charge distributions.

Electric flux density, Gauss's law and divergence: Concept of electric flux density, Gauss's law and its applications, Maxwell's first eqn. and divergence theorem for electric flux density.

Electrical potential & Dipole: Energy expanded in moving a point charge in electrical field, Line integral, Definition of potential difference and potential, Potential field of a point charge and system of charges, Potential gradient, Electric Dipole, potential and EFI due to an electric dipole, Torque on an Electric dipole in an electric field.

UNIT II

Electrostatics-II

Conductors, dielectrics and capacitance: Definition of currents and current density, Continuity equation, Behavior of conductors inside an electric field, Dielectric materials, Characteristics, Dielectric polarization, Boundary conditions, Energy density in electrostatic field, Capacitance of a parallel plate capacitor, Coaxial cable and spherical capacitors. Poisson's and Laplace equation, Examples of solution of Laplace and Poisson's equations

UNIT III

Magneto statics

Biot–savart Law and its applications: Magnetic field intensity – Biot–savart Law -Magnetic field due to straight conductors, circular loop and solenoid current Carrying wire –Magnetic flux density (B) – B in free space, Maxwell's second Equation.

Ampere's circuital law and its 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, Field due to a circular loop, rectangular and square loops.

UNIT IV

Magnetic forces: Lorentz Law of force ,Force on a moving charge, Force on a differential current element, Force on a straight and a long current carrying conductor in a magnetic field, Force between two straight long and parallel current carrying conductors ,Force and torque on a close circuit.

UNIT V

Magnetic potential and inductance: Scalar Magnetic potential and its limitations, vector magnetic potential and its properties, vector magnetic potential due to simple configurations, vector Poisson's equations. Self and Mutual inductance, Neuman's formulae, Determination of self-inductance of a solenoid and toroid and mutual inductance between a straight long wire and a square loop wire in the same plane, energy stored and density in a magnetic field.

UNIT VI

Electro Dynamic Fields: Faraday's laws and its integral and point forms, induced emf – Transformer and motional EMF –Maxwell's equations (differential and integral forms) – Displacement current – Relation between field theory and circuit theory - Modification of Maxwell's equations for time varying fields, Poynting Theorem and poynting vector

TEXT BOOKS:

1. " Electromagnetic Fields"- Sadiku, Oxford Publications

REFERENCE BOOKS:

1. Schaums Outline of Theory and Problems of Electromagnetics- EDMINISTER JOSEPH. A.
2. Engineering Electromagnetics- William H.Hayt & John.A.Buck Mc.Graw-Hill Companies.
3. Antennaand Wave Propagation by K.D.Prasad- Galgotia puplication.

II-B.Tech I-Sem (EEE) T 3+1* C 3

(A0310154) FLUID MECHANICS & HYDRAULIC MACHINERY

(Common to EEE & ME)

OBJECTIVES:

At the end of this course,

- The object is to impart fundamental aspects of fluid motion, including important fluid properties, regions of flow, and pressure variations in fluids at rest and in motion, fluid kinetics.
- To discuss about the laws and equations related to the fluid mechanics.
- Emphasis is placed on understanding how flow phenomena are described mathematically. The effects of fluid friction on pressure and velocity distributions are also considered in some detail.
- The similitude, dimensional analysis and flow measurement should be able to apply to the analysis and of hydraulic machines.
- The student should able to apply the knowledge to solve more complicated problems and study the effect of problem parameters and able to describe the construction and working of different types of hydraulic machines and also plot the performance curves of hydraulic machines.
- The student should be prepared to continue the study and analyze the fluid flows and hydraulic machines to solve the complicated practical problems.

COURSE OUTCOMES:

1. Knowledge and understanding
2. Extending the student's knowledge of hydraulic machines and learning the design of such systems. Cognitive skills (thinking and analysis)
3. The students should link the scientific concepts they are learning with real applications by giving live examples
4. Where the subject concepts are applied.
5. Students gain a lot of information by searching through the internet and references and from local industrial
6. Companies in order to design and solve the problems associated with this subject.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	-	-	2	-	-	-	-	2	2	-	-	-	-
CO2	3	2	-	2	2	-	-	-	-	2	-	-	-	-	-
CO3	3	3	-	-	2	1	-	-	-	2	2	-	-	-	-
CO4	2	2	-	2	-	-	-	-	-	3	-	1	-	-	-
CO5	3	3	-	2	2	2	2	-	-	-	-	-	-	-	-

UNIT I

FLUID STATICS: DIMENSIONS AND UNITS: Physical properties of fluids-specific gravity, viscosity, vapor pressure and their influence on fluid motion- atmospheric gauge and vacuum pressure –measurement of pressure- Piezometer, U-tube and differential manometers. Hydrostatic force on a plane area, Buoyancy, centre of Buoyancy, meta-centre, meta-centre height, conditions of equilibrium of a floating and submerged bodies.

UNIT II

FLUID KINEMATICS: 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 dimensional flow

Fluid dynamics: Surface and body forces –Euler's and Bernoulli's equations for flow along a stream line, momentum equation and its application on force on pipe bend.

UNIT III

CLOSED CONDUIT FLOW: Laminar and turbulent flow through pipes: Reynolds experiment significance of Reynold's number, formulae for laminar flow through circular pipes, Turbulent flow-Darcy Weisbach equation, friction factor and Mody's diagram - Minor losses in pipes- pipes in series and pipes in parallel- total energy line-hydraulic gradient line. Measurement of flow: pilot tube, venturimeter, and orifice meter.

UNIT IV

BOUNDARY LAYER FLOW: Introduction, Definitions, Drag force on a flat plate due to Boundary layer, Turbulent Boundary layer on a flat plate, Analysis of Turbulent Boundary layer, Separation of Boundary layer

UNIT V

BASICS OF TURBO MACHINERY: Hydrodynamic force of jets on stationary and moving flat, inclined, and curved vanes, jet striking centrally and at tip, velocity diagrams, work done and efficiency, flow over radial vanes.

UNIT VI

HYDRAULIC TURBINES: Classification of turbines, impulse and reaction turbines, Pelton wheel, Francis turbine and Kaplan turbine-working proportions, work done, efficiencies, hydraulic design –draft tube theory-functions and efficiency, Unit and specific quantities, characteristic curves.

Hydraulic Pumps: Working principle of Centrifugal and Reciprocating pump. (No-derivations and No-problems)

TEXT BOOKS

1. Fluid Mechanics and Hydraulic Machinery MODI and SETH, S.Chand & co, New Delhi
2. Fluid Mechanics and Hydraulic Machines by R. K. Rajput, Lakshmi Publications.
3. Fluid Mechanics and Hydraulic Machines by R.K. Bansal, Standard Book House, New Delhi.

REFERENCES:

1. Fluid Mechanics and Fluid Power Engineering by D.S. Kumar, Kotaria & Sons.
2. Fluid Mechanics and Machinery by D. Rama Durgaiah, New Age International.
3. Hydraulic Machines by Banga & Sharma, Khanna Publishers.
4. Instrumentation for Engineering Measurements by James W. Dally, William E. Riley, John Wiley & Sons Inc. (Chapter 12 – Fluid Flow Measurements).

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ELECTRICAL AND ELECTRONICS ENGINEERING

II-B.Tech I-Sem (EEE)

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(A0205153) CIRCUIT THEORY

COURSE OBJECTIVE

- This course introduces the basic concepts of circuit analysis which is the foundation for all subjects of the Electrical Engineering& Electronics Engineering discipline.
- The emphasis of this course if laid on the basic analysis of circuits which include single phase circuits, magnetic circuits, theorems, transient analysis and network topology.

COURSE OUTCOMES:

1. Learn various techniques to find electrical parameters for a given electrical circuit.
2. Distinguish between AC Circuits and DC Circuits
3. Find performance of series and parallel RL, RC&RLC Circuits with the help of Locus diagrams.
4. Learn concept of Resonance.
5. Analyses &design a circuit with the help of theorems.
6. Focus on basics of magnetic circuits and analyses them.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	2	-	2	-	-	-	-	-	3	3	-	-
CO2	2	3	2	2	-	3	-	-	-	--	-	2	3	-	-
CO3	3	3	2	2	-	1	-	-	-	-	-	2	3	-	-
CO4	1	2	1	2	-	2	-	-	-	-	-	2	3	-	-
CO5	2	2	2	3	-	2	-	-	-	-	-	2	3	-	-
CO6	1	3	1	2	-	1	-	-	-	-	-	2	3	-	-

UNIT I

DC CIRCUITS: Introduction of Circuit Concept – R-L-C parameters – Types of Voltage and Current sources – Source transformation – Voltage-Current relationship for passive elements – Kirchhoff's laws – Network Reduction Techniques – Series, Parallel, Series-Parallel, Star-to-Delta or Delta-to-Star transformation, Nodal Analysis, Mesh Analysis, Super Node and Super Mesh Analysis

UNIT II

AC CIRCUITS: R.M.S. and Average values and form factor of different periodic wave forms, Steady state analysis of R, L and C (in series, parallel and series parallel combinations) with sinusoidal excitation – Concept of Reactance, Impedance, Susceptance and Admittance – Phase and Phase difference - Concept of Power factor, Real and Reactive Powers - j-notation, Complex and Polar forms of representation, Complex Power

UNIT III

LOCUS DIAGRAMS: Locus diagrams - Series R-L, R-C, R-L-C and parallel combinations with variation of various parameters

UNIT IV

RESONANCE: Resonance – Series, Parallel circuits, Concept of Bandwidth and Q-factor

UNIT V

NETWORK THEOREMS: Network theorems : (Without proof) : Thevenin's, Norton's, Maximum Power Transfer, Superposition, Reciprocity, Millman's, Tellegen's and Compensation theorems for dc and ac excitations

UNIT VI

MAGNETIC CIRCUITS: Magnetic Circuits – Faraday's Laws of electromagnetic induction – Concept of self and mutual inductances – dot convention – coefficient of coupling – Composite Magnetic Circuits – Analysis of Series and Parallel Magnetic Circuits

TEXT BOOKS:

1. Network Theory – Sudhakar and Shymmohan, TMH Publications
2. Circuit Theory (Analysis & Synthesis) – A.Chakrabarthi, Dhanpat Rai & Co

REFERENCE BOOKS:

1. Electric Circuits - J. Edminister & M. Nahvi, - Schaum's Outlines, Tata Mc Graw-Hill Publishing Company Ltd.
2. Engineering Circuit Analysis - by William Hayt and Jack E. Kemmerly, Mc Graw-Hill Companies.
3. Network Analysis –M.E Van Valkenberg.

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ELECTRICAL AND ELECTRONICS ENGINEERING

II-B.Tech I-Sem (EEE)

T	C
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(A0206153) ELECTRICAL MACHINES-I

OBJECTIVES:

- Electrical machines course is one of the important courses of the electrical discipline.
- In this course different types of DC generators and motors which are widely used in industry are covered and their performance aspects will be studied.

COURSE OUTCOMES:

1. Understand the construction and working principle of operation of DC Generator.
2. Analyze the effect of armature reaction and the process of commutation in DC generator and its improvement methods.
3. Understand the characteristics of DC Generator and its specific applications. Analyze parallel operation of DC Generators.
4. Understand the working of DC motor along with its characteristics and applications.
5. Apply the theory for controlling the speed of all DC Motors and need of starters
6. Test the performance DC motor and DC Generator.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	-	-	-	-	-	-	1	-	-	3	-	3	-
CO2	3	3	1	-	-	-	-	-	1	-	-	1	-	3	-
CO3	2	-	-	1	-	-	-	-	-	-	-	2	-	3	-
CO4	3	1	-	1	-	-	-	-	2	-	-	3	-	3	-
CO5	2	1	-	-	-	-	-	-	2	-	-	2	-	3	-
CO6	3	2	1	-	-	-	-	-	1	-	-	1	-	3	-

UNIT I

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

UNIT II

ARMATURE REACTION IN D.C. GENERATOR: Armature reaction – Cross magnetizing and de-magnetizing AT/pole – compensating winding – commutation – reactance voltage – methods of improving commutation.

UNIT III

TYPES OF DC GENERATORS &LOAD 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 – parallel operation of d.c series generators – use of equalizer bar and cross connection of field windings – load sharing.

UNIT IV

D.C. MOTORS: 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.

UNIT V

SPEED CONTROL OF D.C. MOTORS: Speed control of d.c. Motors: Armature voltage and field flux control methods- Ward-Leonard system-Principle of 3 point and 4 point starters – protective devices

UNIT VI

TESTING OF D.C. MACHINES: 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 – Retardation test – separation of stray losses in a d.c. motor test.

TEXT BOOKS:

1. Electrical Machinary – P.S. Bimbra., Khanna Publishers
2. Electric Machines by I.J. Nagrath & D.P. Kothari, Tata Mc Graw – Hill Publishers.
3. Theory & performance of Electrical Machines- J.B.Gupta, S.K.Kataria & Sons.

REFERENCE BOOKS:

1. Electric Machinary – A. E. Fritzgerald, C. Kingsley and S. Umans, Mc Graw-Hill Companies.
2. Performance and Design of D.C Machines – by Clayton & Hancock, BPB Publishers
3. Electrical Machines –B.L.Theraja, Vol-II

II-B.Tech I-Sem (EEE) T 3+1* C 3

(A0402153) ELECTRONIC CIRCUITS

OBJECTIVES:

- To introduce the electronic circuit concepts.
- To develop the analytical skills of student in semiconductor devices applications.

COURSE OUTCOMES:

1. This course helps to understand the electronic circuits from basic level to tedious circuits
2. Electronic circuits also help students in analyzing the performance of different semiconductor devices when they used in applications.
3. Understand the Small signal equivalent model of BJT and JFET
4. Understand the Tuned Amplifiers

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	-	-	-	-	-	-	-	-	-	3	-	-
CO2	3	-	3	-	-	-	-	-	-	-	-	-	3	-	-
CO3	2	3	-	3	-	-	-	-	-	-	-	-	3	-	-
CO4	-	3	3	2	-	-	-	-	-	-	-	-	3	-	-

UNIT I

SWITCHING CHARACTERISTICS OF DEVICES: Diode as a switch, diode switching times: diode forward recovery time, diode reverse recovery time; Transistor as a switch, conditions for a transistor to act as a switch, Transistor switching times: delay time, rise time, transistor on-time, storage time, fall time, transistor off-time, improving transistor switching times, Design of a transistor switch.

UNIT II

TRANSISTOR BIASING AND STABILISATION: Review of BJT operation, Importance of Biasing, Operating point, Load line(DC and AC) Types of Biasing: Fixed bias, Collector to Base, Voltage Divider bias, Bias stability, Stabilization factors, (S, S', S''), Compensation techniques, (Compensation against variation in V_{BE}, I_{co},) Thermal run away, Thermal stability in CE configuration, Transistor as an amplifying device.

UNIT III

FET BAISING: Introduction, Fixed-Bias Configuration, Self-Bias Configuration, Voltage-bias Configuration, Depletion-type MOSFETs, Enhancement-type MOSFETs, illustrative problems

UNIT IV

SINGLE STAGE AMPLIFIERS: Small signal equivalent model of BJT and JFET, Analysis of single stage transistor amplifier (CE, CB, and CC) using h-parameters: Input impedance, Output impedance, voltage gain and current gain, Comparison of transistor configurations in terms of A_I,R_i , A_v , R_o, design consideration of small signal amplifiers, Darlington pair Amplifier, illustrative problems

UNIT V

FET AMPLIFIERS: Introduction, FET Small-Signal model, JFET Fixed-bias Configuration, self-Bias Configuration, Voltage-bias Configuration, JFET Common-drain Configuration, JFET Common gate Configuration Boot strapped Amplifier and illustrative problems.

UNIT VI

TRANSISTOR TUNED AMPLIFIERS: Tuned Amplifiers Distinction between Tuned and Other Amplifiers, Advantages of Tuned Amplifiers, Frequency Response of Tuned Amplifiers, Relation between Q and Bandwidth, Single Tuned Amplifiers, Analysis of Single Tuned Amplifiers

TEXT BOOKS:

1. Integrated Electronics – J. Millman and C.C. Halkias, McGraw-Hill.
2. Electronic Devices and Circuits Theory – Robert L. Boylestad and Louis Nashelsky, Pearson/Prentice Hall.

REFERENCES:

1. Micro Electronic Circuits – Sedra A.S. and K.C. Smith, Oxford University Press.
2. Electronic Circuit Analysis and Design – Donald A. Neaman, McGraw Hill.
3. Principles of Electronic Circuits – S.G.Burns and P.R.Bond, Galgotia Publications.
4. Pulse and Digital Circuits – A. Anand Kumar, PHI.
5. Pulse and Digital Electronics – G.K.Mithal

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ELECTRICAL AND ELECTRONICS ENGINEERING

II-B.Tech I-Sem (EEE) T C
1+2* 1

(A0010153) APTITUDE ARITHMETIC REASONING AND COMPREHENSION

(Skill Development Course)

(Common to ECE, EEE & EIE)

OBJECTIVES:

- To make the students ready to the recruitment drives.
- To raise the confidence of the students to face the written test of any Company.
- To train the students regarding employability skills.

COURSE OUTCOMES:

1. Acquire knowledge of Number Systems, Time and Work, Time and Distance , Geometry and Menstruation ,Coding, Decoding and Reasoning
2. Understand to solve Quadratic Equations, Mixtures & Allegations, Simple Interest, Compound Interest, Permutations & Combinations and Non Verbal Reasoning.
3. Analyze Data Interpretation, Data Sufficiency, Probability, Coding, Decoding, Connectives Clocks and Calendars Analytical.
4. Apply Verbal and Non Verbal Reasoning to solve Analytical Puzzles, Sequencing, Routes& Networks
5. Synthesize Quantitative Techniques and Data Interpretation for Data Sufficiency

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-
CO2	-	-	-	2	-	-	-	-	-	-	-	1	-	-	-
CO3	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-
CO5	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-

UNIT I

Numbers, Number Systems Simple Equations, Ratio, Proportion, Variation Quadratic Equations, Progressions Percentages

UNIT II

Profit, Loss, Partnerships Averages, Mixtures & Allegations, Simple Interest, Compound Interest, Time and Work-Pipes, indices, surds, inequalities ,Cisterns Time and Distance Geometry and Menstruation.

UNIT III

Permutations & Combinations and Probability Data Interpretation & Data Sufficiency

UNIT IV

Number & Letter Series, Analogies, Coding Decoding, Odd Man Out Blood Relations.

UNIT V

Direction Sense, Symbols and Notations Deductions & Connectives Clocks, Calendars Analytical

UNIT VI

Reasoning (Distribution+ Binary Logic + Puzzles) Cubes, Venn Diagrams Analytical Puzzles (Linear + Circular +Selections + Sequencing + Routes & Networks + Comparisons) and Non Verbal Reasoning

REFERENCES BOOKS:

1. R.S.Agarwal " Quantitative Techniques" S.Chand Series
2. Shankuntala Devi " Techniques of Reasoning" S.Chand Series

II-B.Tech, I-Sem (EEE) P 3 C 2

(A0492153) ELECTRONIC CIRCUITS & SIMULATION LAB

OBJECTIVES:

- To understand analysis and design of electronic circuits
- To illustrate operation of electronic amplifiers and transistors also switch
- To understand the nature and scope of electronics

COURSE OUTCOMES:

1. Become familiar with the basic circuit components and know how to connect them to make a real electrical circuit.
2. Become familiar with basic electrical measurement instruments and know how to use them to make different types of measurements.
3. Be able to verify the laws and principles of electrical circuits, understand the relationships and differences between theory and practice.
4. Be able to gain practical experience related to electrical circuits, stimulate more interest and motivation for further studies of electrical circuits.
5. Be able to carefully and thoroughly document and analyze experimental work.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	3	2	3	-	-	-	3	2	1	1	3	-	-
CO2	3	3	2	3	3	-	-	-	3	2	1	1	3	-	-
CO3	3	2	3	2	2	-	-	-	3	3	2	2	3	-	-
CO4	2	3	2	3	2	-	-	-	3	2	1	2	3	-	-
CO5	2	2	3	2	3	-	-	-	2	3	3	1	3	-	-

LIST OF EXPERIMENTS:

1. Transistor as a switch
2. Finding of operating point in CE configuration
3. Common Emitter amplifier
4. Common Collector amplifier
5. P- Channel JFET Boot strapped Amplifier
6. To Draw VI Characteristics of Diode
7. To draw dc transfer characteristics of Zener diode
8. To draw output characteristics of BJT
9. To draw input output characteristics of JFET
10. Single Tuned Amplifier
11. Simulation of Common source amplifier
12. Simulation of Darlington pair Amplifier
13. Simulation of two stage Transistor Amplifier

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(Autonomous)

ELECTRICAL AND ELECTRONICS ENGINEERING

II-B.Tech, I-Sem (EEE) P 3 C 2

(A0396154) FLUID MECHANICS AND HYDRAULIC MACHINERY LAB

(Common to EEE & ME)

OBJECTIVES:

- This course "Fluid Mechanics and Hydraulic Machines" lab imparts intensive and extensive practical knowledge of the lab so that students can understand the importance of concepts of "Fluid Mechanics and Hydraulic Machines" in the field of engineering. The student should able to develop theoretical / practical capabilities so that they can characterize, transform, use and apply in engineering from the knowledge gained in solving related engineering problem.

COURSE OUTCOMES:

1. Calibrate flow measuring devices used in pipes, channels and tanks
2. Determine fluid flow properties
3. Characterize laminar and turbulent flows
4. Determine the performance characteristics of various fluid machines like pumps, turbines etc.
5. Establish the specific energy curve
6. Determine Energy loss in Hydraulic jump

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	-	-	-	-	-	-	3	1	-	-	-	-	-
CO2	1	3	-	-	-	-	-	-	3	1	-	-	-	-	-
CO3	1	3	-	-	-	-	-	-	3	1	-	-	-	-	-
CO4	2	3	-	-	-	-	-	-	3	1	-	-	-	-	-
CO5	2	3	-	-	3	-	-	-	3	1	2	-	-	-	-
CO6	2	3	-	-	3	-	-	-	3	1	2	-	-	-	-

LIST OF EXPERIMENTS:

1. Verification of Bernoulli's Equation
2. Calibration of Mouthpiece/orifice
3. Calibration of Triangular/Rectangular Notch
4. Calibration of Venturi meter
5. Calibration of Orifice meter
6. Determination of Friction Factor for a given pipe line
7. Impact of Jet on Vanes
8. Performance Test on Pelton Wheel
9. Performance Test on Francis Turbine
10. Performance Test on Kaplan Turbine
11. Performance Test on Single Stage Centrifugal Pump
12. Performance Test on Reciprocating Pump

II-B.Tech, I-Sem (EEE) P 3 C 2

(A0292154) BASIC ELECTRICAL LAB

OBJECTIVES:

- This course introduces the basic concepts in electric circuits and networks.
- To acknowledge students about charge, current and basic electric laws.

COURSE OUTCOMES:

1. To Understand the AC fundamentals.
2. To Measure the Various electrical quantities.
3. To Understand various measuring instruments and fluorescent lamp wiring.
4. To Analyze various configurations of electric circuit
5. To understand the behavior and characteristics of different equipments
6. Verification of theoretical concepts through experimentation.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	-	-	2	-	-	1	-	-	1	3	-	-
CO2	3	3	1	-	-	2	-	-	1	1	-	1	3	-	-
CO3	3	1	1	-	-	2	-	-	1	-	-	1	3	-	-
CO4	3	3	1	-	-	1	-	-	2	1	-	1	3	-	-
CO5	2	2	1	-	-	1	-	-	1	2	-	1	3	-	-
CO6	3	2	1	-	-	1	-	-	2	1	-	1	3	-	-

LIST OF EXPERIMENTS:

1. Verification of ohm's law
2. Resistors in series & parallel
3. Capacitors in series & parallel
4. Verification of Kirchhoff's laws
5. Fluorescent lamp
6. Determination of R M S & average values, form factor & peak factor
7. Lightening in series, & parallel
8. Resistor colour coding
9. Star-delta & delta-star transformation
10. Calculation of inductive and capacitive reactance in ac circuits

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous)

ELECTRICAL AND ELECTRONICS ENGINEERING

II-B.Tech, II-Sem (EEE)

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3+1*	3

(A0207154) ELECTRICAL MACHINES-II

OBJECTIVES

- As an extension of Electrical machines-I course, this subject facilitates to study of the performance of three phase transformers and induction motors, single phase motors which are the major part of industry and agricultural sectors.

COURSE OUTCOMES

1. To apply knowledge of basic engineering for understanding the operation of transformer and induction motor.
2. To solve problems related to transformers and induction motor.
3. To understand the performance of transformer and induction motor by conducting tests.
4. To apply the various types of transformers, transformers connections in the field of power systems and various types of induction motors in industries.
5. To understand the various starting methods and speed control methods of induction motor.
6. To acquire the knowledge of using simulation tools to understand the mathematical modeling of Transformers and Induction motor.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	1	-	-	-	-	2	-	2	2	-	3	-
CO2	3	3	2	1	-	-	-	-	2	-	2	1	-	3	-
CO3	3	2	3	2	-	-	-	-	2	-	2	1	-	3	-
CO4	3	2	2	2	-	-	-	-	2	-	2	2	-	3	-
CO5	3	3	3	2	-	-	-	-	2	-	2	2	-	3	-
CO6	3	3	2	2	-	-	-	-	2	-	2	1	-	3	-

UNIT I

SINGLE PHASE TRANSFORMERS – CONSTRUCTION & OPERATION: Single phase transformers-types - constructional details-minimization of hysteresis and eddy current losses-emf equation - operation on no load and on load - phasor diagrams - Equivalent circuit - losses and efficiency-regulation- All day efficiency - effect of variations of frequency & supply voltage on iron losses.

UNIT II

TESTING OF SINGLE PHASE TRANSFORMER AND AUTOTRANSFORMER: OC and SC tests - Sumpner's test - predetermination of efficiency and regulation-separation of losses test-parallel operation with equal and unequal voltage ratios - auto transformers-equivalent circuit - comparison with two winding transformers

UNIT III

POLYPHASE 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; Scott connection.

UNIT IV

POLYPHASE INDUCTION MOTORS: Polyphase induction motors-construction details of cage and wound rotor machines-production of a rotating magnetic field - principle of operation - rotor emf and rotor frequency - rotor reactance, rotor current and pf at standstill and during operation- Rotor power input, rotor copper loss and mechanical power developed and their inter relation-torque equation-deduction from torque equation - expressions for maximum torque and starting torque - torque slip characteristic

UNIT V

CHARACTERISTICS OF INDUCTION MOTORS: Double cage and deep bar rotors - equivalent circuit - phasor diagram - crawling and cogging. Circle diagram-no load and blocked rotor tests-predetermination of performance-methods of starting and starting current and torque calculations

UNIT VI

SPEED CONTROL METHODS: Speed control-change of frequency; change of poles and methods of consequent poles; cascade connection- injection of an emf into rotor circuit (qualitative treatment only)-induction generator-principle of operation.

TEXT BOOKS:

1. Electrical Machinary – P.S. Bimbra., Khanna Publishers
2. Electric Machines by I.J. Nagrath & D.P. Kothari, Tata Mc Graw – Hill Publishers.
3. Theory & performance of Electrical Machines- J.B.Gupta, S.K.Kataria & Sons.

REFERENCE BOOKS:

1. Electric Machinary – A. E. Fritzgerald, C. Kingsley and S. Umans, Mc Graw-Hill Companies.
2. Performance and Design of A.C Machines – by MG Say, BPB Publishers.

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous)

ELECTRICAL AND ELECTRONICS ENGINEERING

II-B.Tech, II-Sem (EEE)

T	C
3+1*	3

(A0244154) NETWORK THEORY

OBJECTIVES

- To impart strong foundation in network analysis and synthesis
- To introduce three phase circuit and analysis
- To give strong foundation in all electrical core subjects

COURSE OUTCOMES

1. Learn various techniques to find electrical parameters for a given electrical circuit.
2. Distinguish between AC Circuits and DC Circuits.
3. Find performance of series and parallel RL,RC & RLC Circuits with the help of Locus diagrams.
4. Learn concept of Resonance.
5. Analyses &design a circuit with the help of theorems.
6. Focus on basics of magnetic circuits and analyses them.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	2	-	2	-	-	-	-	-	3	3	-	-
CO2	2	3	2	2	-	3	-	-	-	--	-	2	3	-	-
CO3	3	3	3	2	-	1	-	-	-	-	-	2	3	-	-
CO4	1	2	2	2	-	2	-	-	-	-	-	2	3	-	-
CO5	2	2	3	3	-	2	-	-	-	-	-	2	3	-	-
CO6	1	3	1	2	-	1	-	-	-	-	-	2	3	-	-

UNIT I

GRAPH THEORY: Network topology - Definitions – Graph – Tree, Basic cutset and Basic Tie set matrices for planar network – Loop and Nodal methods of analysis of Networks with dependent and 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 – Application of Millman's theorem to unbalanced circuits - Measurement of 3 phase power, active power and reactive power.

UNIT III

DC TRANSIENT ANALYSIS: Transient response of RL, RC, RLC circuits (Series and Parallel combinations) for D.C excitation - Initial conditions –Classical method and Laplace transform methods of solutions – Response of RL, RC, RLC for step, ramp, pulse and impulse excitations using Laplace transform methods.

UNIT IV

AC TRANSIENT ANALYSIS: Transient response of RL, RC, RLC circuits (Series and Parallel combinations) for sinusoidal excitations - Initial conditions –Classical method and Laplace transform methods of solutions.

UNIT V

TWO PORT NETWORKS-I: Two Port network parameters – Z, Y, (ABCD) Transmission and Hybrid parameters for Resistive Networks and their relations

UNIT VI

TWO PORT NETWORKS-II: Concept of Transformed Network – 2 port network parameters using transformed variables-cascaded networks - Filters – Low pass- High pass and Band pass filters – Constant K and M-derived filters and composite filter design.

TEXTBOOKS:

1. Network Theory – Sudhakar and Shymmohan, TMH Publications
2. Circuit Theory (Analysis & Synthesis) – A.Chakrabarthi, Dhanpat Rai & Co
3. Electric circuits and Network- Wilson.

REFERENCES BOOKS:

1. Electric Circuits - J. Edminister & M. Nahvi, - Schaum's Outlines, Tata Mc Graw-Hill Publishing Company Ltd.
2. Engineering Circuit Analysis - by William Hayt and Jack E. Kemmerly, Mc Graw-Hill Companies.
3. Network Analysis –M.E Van Valkenberg
4. Network Analysis and Synthesis by Kuo

II-B.Tech, II-Sem (EEE) T 3+1* C 3

(A0403154) ANALOG ELECTRONIC CIRCUITS

OBJECTIVES:

- To study the analysis and design of single stage and multistage amplify at low and high frequencies.
- Study of small signal and large signal amplifiers and their area of applications.
- To understand the concepts of feedback and their applications (Voltage feedback amplifiers and oscillators)

COURSE OUTCOMES:

1. To learn the basics of different Amplifiers, wave shaping circuits and multivibrators.
2. To analyze the performance of amplifiers and wave shaping circuits.
3. To understand working operation of various feedback amplifiers.
4. To apply the knowledge of various electronic circuits.
5. Design various types of multi vibrator and Time base generator circuits.
6. Applications of various electronic amplifiers.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	-	-	-	-	-	-	-	-	-	3	-	-
CO2	3	3	-	-	-	-	-	-	-	-	-	-	3	-	-
CO3	2	1	1	1	-	-	-	-	-	-	-	-	3	-	-
CO4	1	2	-	1	-	-	-	-	-	-	-	-	3	-	-
CO5	2	2	-	-	-	-	-	-	-	-	-	1	3	-	-
CO6	1	3	1	-	-	-	-	-	-	-	-	1	3	-	-

UNIT I

LARGE SIGNAL AMPLIFIERS: Class-A Power Amplifier, Maximum value of efficiency of Class-A Amplifier, Transformer coupled Amplifier - Push Pull Amplifier – Complimentary Symmetry Circuits (transformer less Class B power Amplifier) – Phase Inverters, Transistor Power Dissipation, Thermal Runaway, Heat sinks.

UNIT II

FEEDBACK AMPLIFIERS: Concept of feedback, Classification of feedback amplifiers, General characteristics of negative feedback amplifiers, Effect of Feedback on input and output characteristics, Voltage series, voltage shunt, current series, and current shunt feedback amplifiers –simple problems

UNIT III

OSCILLATORS: Condition for oscillations - RC-phase shift oscillators with Transistor and FET, Hartley and Colpitts oscillators, Wein bridge oscillator, Crystal oscillators, Frequency and amplitude stability of oscillators,

UNIT IV

LINEAR WAVE SHAPING: High pass, low pass RC circuits, their response for sinusoidal, step, pulse, square and ramp inputs. RC network as differentiator and integrator, attenuators, RL and RLC circuits and their response for step input, Ringing circuit.

UNIT V

NON-LINEAR WAVE SHAPING: Diode clippers, Transistor clippers, clipping at two independent levels, Transfer characteristics of clippers, Emitter coupled clipper, Comparators, applications of voltage comparators, clamping operation, clamping circuits using diode with different inputs, Clamping circuit theorem, practical clamping circuits, effect of diode characteristics on clamping voltage, Transfer characteristics of clampers.

UNIT VI

MULTIVIBRATORS & TIME BASE GENERATORS: Analysis and Design of Bistable, Monostable, Astable Multivibrators and Schmitt trigger using transistors. General features of a time base signal, methods of generating time base waveform, Miller and Bootstrap time base generators.

TEXT BOOKS:

1. Electronic Devices and Circuits – R.L. Boylestad and Louis Nashelsky, Pearson/Prentice Hall.
2. Solid State Pulse circuits - David A. Bell, PHI.

REFERENCE BOOKS:

1. Electronic Devices and Circuits – J.Millman, C.C.Halkias, and Satyabratha Jit Tata McGraw Hill.
2. Pulse, Digital and Switching Waveforms - J. Millman and H. Taub, McGraw-Hill.
3. Applied Electronics by R.S. Setha.

II-B.Tech, II-Sem (EEE) T C
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(A0208154) GENERATION AND DISTRIBUTION OF ELECTRIC POWER

OBJECTIVE:

- Power Systems-I is one of the important courses of the electrical discipline.
- This course helps to know different means of Electrical Generation, Distribution of power considering economical aspects.

COURSE OUTCOMES:

1. To know the general system that involves how the electrical power is generated at source and consumed at load side.
2. To know the concepts and phenomenon of Power Generation by some conventional sources.
3. To know the importance and different parts involved in substations.
4. To know the several economic aspects involved in generating stations.
5. To know the different ways of distribution of electrical power after transmission from generating station.
6. Understand different cost involved in generation of electric power and how the tariff is fixed for different types of loads and consumers.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	1	2	-	1	3	3	2	1	-	3	-	-	3
CO2	3	2	1	2	-	3	2	2	3	2	2	3	-	-	3
CO3	-	2	1	2	1	2	2	1	2	2	2	2	-	-	3
CO4	2	2	-	2	2	-	1	2	1	1	2	2	-	-	3
CO5	3	3	2	-	1	-	-	-	2	1	2	2	-	-	3
CO6	3	2	-	1	1	-	-	1	2	2	2	2	-	-	3

UNIT I ENERGY GENERATION WITH CONVENTIONAL SOURCES:

Thermal Power Stations (TPS): Line Diagram of TPS, description of various parts like Economizers, Boilers, Super Heaters, Turbines, Condensers, Chimneys, electrostatic precipitator, Cooling Towers, Paths of air, coal, Flue gases.

Hydro Power Stations (HPS): Selection of site, Classification, Layout, description of Main Components.

UNIT II NUCLEAR POWER STATION (NPS): Nuclear Fission, Chain reaction, Nuclear Fuels-Principle of operation of Nuclear reactor-its Parts, Radiation Hazards, Shielding and Safety Precautions-Types of nuclear reactors and brief description of PWR, BWR & FBR.

UNIT III SUBSTATIONS: Classification of Substations - Air insulated substations (AIS)-indoor and outdoor substations. Bus bar arrangements in substations: simple arrangements like single bus bar, sectionalized single bus bar, main and transfer bus bar system with relevant diagrams.

Gas insulated Substations (GIS): advantages, different types, single line diagram, bus bar, construction aspects, installation and maintenance of GIS. Comparison of AIS and GIS

UNIT IV DISTRIBUTION SYSTEM: Classification and comparison of AC & DC Distribution Systems - Comparison of Underground and over head Distribution System - Voltage drop calculations in DC distribution for following cases – Radial Distributor-fed one end, both ends (equal and unequal voltages), Ring main Distributor, and inter grid-Voltage drop calculations in AC distribution for following cases – p.f. refer to receiving end voltage and w.r.t load voltages.

UNIT V ECONOMIC ASPECTS OF POWER GENERATION: Load Curve, Load duration Curves- Load, demand, Diversity, Capacity, Utilization and plant use factors-numerical problems.

UNIT VI TARIFF METHODS: Cost of generation & their division into fixed, semi fixed & running cost - Desirable characteristics of tariff method – tariff methods – flat rate, block-rate tariff, two part tariff, three part tariff & power factor tariff methods & numerical problems.

TEXT BOOKS:

1. A Text Book on Power System Engineering by M.L.Soni, P.V.Gupta, U.S.Bhatnagar, A.Chakrabarthy, Dhanpat Rai & Co Pvt. Ltd.
2. Principles of power systems - by V.K.Mehata and Rohit Mehata S.Chand
3. Power Systems Engineering by R.K Rajput,Laxmi Publishhers

REFERENCES BOOKS:

1. Element Power station design and practice by M.V Deshpande,wheeler Publishing
   Power System Analysis and Design by B.R.Gupta, Wheeler Publishing.
2. Electrical Power Generation, Transmission and distribution by S.N Singh.
3. Electrical Power Systems by C.L.Wadwa.

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ELECTRICAL AND ELECTRONICS ENGINEERING

II-B.Tech, II-Sem (EEE)

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(A0404154) SWITCHING THEORY & LOGIC DESIGN

(Common to EEE & ECE)

OBJECTIVES:

- Understand the different number system, its conversions and binary arithmetic.

COURSE OUTCOMES:

1. Convert one number system to other number system, Classifications of BCD codes.
2. Simplify the given logical function by using Boolean algebra, k-map and tabular methods.
3. Understand the concepts of PLD's (ROM/PROM, PAL & PLA).
4. Design and analyze combinational and sequential logic circuits.
5. Optimize combinational and sequential logic circuits.
6. Design of Sequential circuits using ASM charts.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	1	-	-	-	-	-	-	-	-	-	1	2	-
CO2	-	3	3	-	-	-	-	-	-	-	-	-	1	2	-
CO3	-	2	3	-	-	-	-	-	-	-	-	1	1	-	2
CO4	2	3	2	-	-	-	-	-	-	-	-	1	1	1	1
CO5	2	3		-	-	-	-	-	-	-	-	1		2	1
CO6	1	2	2	-	-	-	-	-	-	-	-	1	1	2	1

UNIT I

NUMBER SYSTEMS, CODES AND BOOLEAN ALGEBRA: Philosophy of number systems – complement representation of Negative numbers, Binary arithmetic, Binary codes, Error Detecting &Error Correcting codes, Hamming codes. Fundamental postulates of Boolean algebra, Basic theorems and properties

UNIT II

SWITCHING FUNCTIONS AND IT'S MINIMIZATION: Switching functions, Canonical and standard forms, Algebraic simplification Digital Logic Gates, properties of XOR gates, Universal Gates ,Multilevel NAND/NOR realizations. K-map method, Prime Implicants, Don't care combinations, Minimal SOP and POS forms, Tabular Method, Prime - Implicant chart, simplification rules.

UNIT III

COMBINATIONAL LOGIC DESIGN: Half adder, Full adder, Ripple carry adder, Carry look ahead generator, BCD adder, Half substractor, Full substractor, Encoder, Decoder, Multiplexer, De-Multiplexer, MUX realization of Switching functions, Parity bit generator, Code-converters, multiplier.

UNIT IV

PROGRAMMABLE LOGIC DEVICES, THRESHOLD LOGIC: Basic PLD's-ROM, PROM, PLA, PAL Realization of switching function using PLD's. Capabilities and limitations of Threshold gate, realization basic logic gates and universal logic gates using threshold gates, analysis of simple threshold gates.

UNIT V

SEQUENTIAL CIRCUITS: Classification of sequential circuits, Basic Flip-Flops, Excitation and Characteristic Tables. Steps in Synchronous Sequential circuit design. Design of modulo-N counters, Ring and Johnson counters, Universal shift register, Serial Binary adder, Sequence Detector. FSM-capabilities and Limitations, Mealy and Moore models, Minimization of completely specified Sequential Machines using partition method.

UNIT VI

ASM CHARTS: Salient features of the ASM chart, components ASM charts, difference between ASM chart and conventional flow chart, difference between ASM chart and state diagram, system design using control logic, examples sequence detector, MOD-N counter, binary multiplier.

TEXTBOOKS:

1. Digital Logic Systems By Floyd.
2. Digital Design-Morries Mano, PHI.
3. Switching Theory and Logic design-A. Anand Kumar.

REFERENCES:

1. An Engineering Approach to Digital Design-Fletcher, PHI.
2. Fundamentals of Logic Design-Charles H.Roth. Thomson publications.
3. Digital Logic Applications and Design-John M.Yarbrough. Thomson Publications.
4. Switching & Finite Automata theory- Zvi Kohavi, TMH.

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ELECTRICAL AND ELECTRONICS ENGINEERING

II-B.Tech, II-Sem (EEE)

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(A0209154) CONTROL SYSTEMS

(Common to ECE & EEE)

OBJECTIVES:

- Be prepared to apply mathematics, established scientific and engineering knowledge, for the development and implementation of a broad range of electronic systems
- Be knowledgeable about current technologies and be prepared to adapt to technology advances and ensure professional growth through an appreciation for lifelong learning.
- Basic skill in methods of design and analysis across a broad range of electrical and computer engineering areas

COURSE OUTCOMES:

1. Analyze electromechanical systems by mathematical modeling.
2. Determine Transient and Steady State behavior of systems using standard test signals.
3. Analyze linear and non-linear systems for steady state errors, absolute stability and relative stability.
4. Determine stability analysis in s-domain using RH criterion and Root Locus Techniques.
5. Able to observe stability using the analysis of polar, nyquist and bode plots.
6. Using state space analysis state models can be obtained.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	2	-	-	-	-	2	-	1	2	-	3	-
CO2	3	3	3	2	-	-	-	-	2	-	1	2	-	3	-
CO3	3	3	2	2	-	-	-	-	1	-	2	1	-	3	-
CO4	3	3	2	2	-	-	-	-	2	-	2	2	-	3	-
CO5	3	3	3	2	-	-	-	-	1	-	2	2	-	3	-
CO6	3	3	3	2	-	-	-	-	2	-	1	1	-	3	-

UNIT I

INTRODUCTION: Concepts of control systems – Open loop and closed loop control systems and their differences, examples – Types of feedback control systems

Mathematical modeling of Electrical & Mechanical(translational & rotational) systems, differential equations- Electrical analogous (F-V,F-I) of mechanical system- use of Laplace transforms in control systems-Transfer function: concepts, features-Transfer functions of above systems

UNIT II

BLOCK DIAGRAM REDUCTION & SIGNAL FLOW GRAPH REPRESENTATION: Block diagram representation of electrical systems and reduction techniques - Signal flow graphs and reduction using mason's gain formula- Transfer function of DC servomotor, AC servomotor Control system components-DC Servo motor-AC Servo motor

UNIT III

TIME RESPONSE ANALYSIS: Definition & classification of time response- Standard test signals – Type & order of a system- Transient response of fist order and 2nd order systems for step input- Transient response specifications- Steady state response- Steady sate errors and error constants- Effects of PD, PI & PID controllers.

UNIT IV

STABILITY ANALYSIS IN S-DOMAIN: The concept of stability - Routh stability criterion, special cases, advantages and limitations

Root locus technique: The root locus concept, construction of root loci- Effects of adding poles and zero's to G(s) H(s) on the root loci.

UNIT V

FREQUENCY RESPONSE ANALYSIS: Introduction – Steady state response to sinusoidal input (frequency response) - Bode diagrams- Phase margin and gain margin- Stability analysis from Bode plots- Determination of transfer function from Bode diagram.

UNIT VI

POLAR AND NYQUIST PLOTS: Polar plots - Nyquist plots- Stability analysis

TEXT BOOKS:

1) Control System Engineering – I.J. Nagarath and M.Gopal, New age international (P) limited.

REFERENCE BOOKS:

1) Automatic control systems – B.C. Kuo, Jhon wiley and son's.
2) Modern control engineering – Katsuhiko Ogata, PHI.
3) Control Systems Engineering- NISE,John Wiley.

II-B.Tech, II-Sem (EEE) T C
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(A0011154) CORPORATE MANAGEMENT SKILLS

(Skill Development Course)
(Common to All Branches)

OBJECTIVE:

- To improve the communication skills of the students
- To raise the confidence of the student with respect to the interpersonal communication.
- To make them to habituate to the team culture and teamwork.
- To ensure the students take up the challenges of group discussion and personal interview.
- To improve the overall personality of the students.
- To awareness of the concept of emotions and emotional intelligence.

OUTCOME:

The student will be….

1. Able to improve the communication skills.
2. Able to obtain confidence of the student with respect to the interpersonal communication.
3. Able to cultivate the team culture and teamwork.
4. Able to take the challenges of group discussion.
5. Able to perform better way in personal interviews and presentations.
6. Able to identify the emotions of the people.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	-	-	3	-	1	-	-	-
CO2	-	-	-	-	-	-	-	-	3	1	-	1	-	-	-
CO3	-	-	-	-	-	-	1	-	3	-	-	1	-	-	-
CO4	-	-	-	-	-	-	-	-	2	2	-	1	-	-	-
CO5	-	-	-	-	-	-	1	2	2	2	-	1	-	-	-
CO6	-	-	-	-	-	-	-	3	2	-	-	-	-	-	-

UNIT-1:

Concept of Communication: Significance-Functions of Communication-Process-Different types of Communication-Essentials of good communication-Channels of communication-Formal and informal communication networks.

UNIT-2:

Types of Communication: Oral Communication-Tips to make oral communication effective-Merits and Demerits of oral communication-Written Communication-Steps in Writing-Merits and Demerits of written communication-Non verbal communication and Different types in it.

UNIT-3:

Barriers to Communication: Types of barriers-Technological, Sociopsychological-How to overcome the barriers-Different communication styles and models.

UNIT-4:

Interviews: Resume preparation, Interview Process-Types-Common mistakes in interview-Preparation for interviewer- Preparation for interviewee.

UNIT-5:

Emotional Intelligence: Felt Vs Displayed emotions-Emotional dimensions- External constraints on emotion-Gender and emotion-Importance of emotional intelligence.

UNIT-6:

Personality and Perception: Determinants of personality-Theories of personality-Components of perception-Factors influencing the perception process-Johari Window

REFERENCE BOOKS:

1) Business communication Meenakshi Raman oxford university prof
2) Business communication Lalitha Ramakrishna
3) Business communication Hudson,5 /E,Jaico publication
4) Effective communication Harward Business school, Harward Business review no 1214
5) Management and organization Behaviour by P.Subbarao

II-B.Tech, II-Sem (EEE) P 3 C 2

(A0293154) CIRCUITS SIMULATION LAB

OBJECTIVES:

- To understand basic concepts of MATLAB tool.
- To understand the basic concept of electrical circuits.
- To understand the various techniques that can be used to analyze electric circuits using MATLAB tool.

COURSE OUTCOMES:

1. To become familiar with the basic circuit components and know how to connect them to make a real electrical circuit.
2. To become familiar with basic electrical measurement instruments and knows how to use them to make different types of measurements.
3. To be able to verify the laws and principles of electrical circuits, understand the relationships and differences between theory and practice.
4. To be able to gain practical experience related to electrical circuits, stimulate more interest and motivation for further studies of electrical circuits.
5. To be able to carefully and thoroughly document and analyze experimental work.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	2	3	-	-	-	2	2	2	3	-	3	-
CO2	3	3	3	2	3	-	-	-	3	2	2	2	-	3	-
CO3	3	2	2	2	3	-	-	-	2	3	2	3	-	3	-
CO4	2	3	3	2	3	-	-	-	3	2	2	2	-	3	-
CO5	3	2	3	3	3	-	-	-	2	2	3	3	-	3	-

SIMULATION OF THE ANY 10 EXPERIMENTS USING MATLAB

1. Verification of Superposition Theorem
2. Verification of Thevenin's Theorem
3. Verification of Norton's Theorem
4. Verification of Maximum Power Transfer Theorem & Reciprocity Theorem
5. Verification of Power Triangle of RLC Series Circuit
6. Resonance of Series & Parallel Circuit
7. Locus Diagram of Circuit
8. Transient Analysis of Series RL & RC circuits
9. Determination of Z & Y Parameters
10. Determination of Hybrid & ABCD Parameters
11. Verification of Relation between line and phase voltages and currents in balanced systems(STAR & DELTA)

II-B.Tech, II-Sem (EEE) P 3 C 2

(A0294154) CIRCUIT THEORY LAB

OBJECTIVES:

- To understand basic concepts of electric circuits.
- To understand the various techniques that can be used to analyze electric circuits.
- To understand nature of response of electric circuits.

COURSE OUTCOMES:

1. Analyze response of series and parallel resonant circuits.
2. Effect of parameter variation on electrical current and voltage.
3. Analyze and Verification of network theorems.
4. Measurement of three phase power by using two single phase watt meters.
5. Evaluate steady state behavior of single port networks for DC and AC excitations.
6. Finding of magnetic circuits parameters.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	3	2	-	-	-	-	2	2	2	3	3	-	-
CO2	3	2	2	2	-	-	-	-	3	2	2	2	3	-	-
CO3	3	2	3	2	-	-	-	-	2	3	2	3	3	-	-
CO4	3	3	2	2	-	-	-	-	3	2	2	2	3	-	-
CO5	3	2	2	3	-	-	-	-	2	2	3	3	3	-	-
CO6	2	3	3	2	-	-	-	-	3	2	2	3	3	-	-

LIST OF EXPERIMENTS:

1. Experimental verification of Series and Parallel Resonance
2. Experimental verification of Locus Diagram of RL & RC Series Circuits
3. Experimental Verification of Thevenin's Theorem
4. Experimental Verification of Maximum Power Transfer and Reciprocity Theorem
5. Experimental Verification of Superposition & Millmann's Theorem
6. Experimental Verification of Compensation Theorem
7. Experimental verification of Measurement of Active Power for Star and Delta Connected Balanced Loads
8. Experimental verification of Measurement of Three Phase Power By Two Wattmeter Method For Unbalanced Loads
9. Experimental verification of Z & Y Parameters
10. Experimental verification of Hybrid & ABCD Parameters
11. Experimental verification of Self, Mutual Inductances and Coefficient of Coupling

II-B.Tech, II-Sem (EEE) P C
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(A0295154) ELECTRICAL MACHINES–I LAB

OBJECTIVES:

- Verification of theoretical concepts through experimentation.
- Study the behavior and characteristics of different machines.

COURSE OUTCOMES:

1. Select range of equipment required based on the ratings of a DC Machines
2. Conduct test and experimental procedures on DC machines.
3. Analyze the performance of a DC machines based on the experimental data at different load conditions
4. Control the speed of DC Motor.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	-	1	-	-	-	-	2	-	-	1	-	3	-
CO2	3	2	-	-	-	-	-	-	3	-	-	2	-	3	-
CO3	3	3	-	-	-	-	-	-	1	-	-	1	-	3	-
CO4	3	-	-	-	-	-	-	-	2	-	-	2	-	3	-

LIST OF EXPERIMENTS:

1. Magnetization characteristics of DC shunt generator. Determination of critical field resistance and critical speed.
2. Load test on DC compound generator. Determination of characteristics.
3. Swinburne's test. Predetermination of efficiencies.
4. Brake test on DC compound motor. Determination of performance curves.
5. Hopkinson's test on DC shunt machines. Predetermination of efficiency.
6. Separation of losses in a DC shunt motor.
7. Load test on DC shunt generator. Determination of characteristics.
8. Brake test on DC shunt motor. Determination of performance curves.
9. Field's test on DC series machines. Determination of efficiency.
10. Speed control of DC shunt motor.
11. Study of Starters (2-point, 3-point, 4-point).
12. Experimental Verification of Critical Speed and Critical Field Resistance.

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(Autonomous)

ELECTRICAL AND ELECTRONICS ENGINEERING

III-B.Tech, I-Sem (EEE)

T	C
3+1*	3

(A0210155) ELECTRICAL MACHINES-III

OBJECTIVES:

- This subject is an extension of previous machines courses. It deals with the detailed analysis of Synchronous generators and motors which are the prime source of electrical power generation and its utilities.

COURSE OUTCOMES:

1. Familiarize the working of AC Machine &their performance behavior.
2. Have laboratory exercise to AC Machine principle &application.
3. Analyze the synchronous generator & motor which are the prime source of electrical power generation & its utilization.
4. Have knowledge of parallel operation of synchronous generator.
5. To find performance parameter of synchronous machine using power circles.
6. To learn the construction, principle &application of various special machines.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	2	-	-	-	-	1	1	-	2	-	3	-
CO2	3	3	-	2	-	-	-	-	1	2	-	2	-	3	-
CO3	3	2	3	2	-	-	-	-	1	3	-	2	-	3	-
CO4	1	2	-	2	-	-	-	-	1	2	-	2	-	3	-
CO5	1	3	3	2	-	2	-	-	1	2	-	2	-	3	-
CO6	1	3	-	2	-	-	-	-	1	1	-	2	-	3	-

UNIT I

SYNCHRONOUS GENERATOR – CHARACTERISTICS: Constructional Features of round rotor and salient pole machines – Armature windings – Integral slot and fractional slot windings; Distributed and concentrated windings – distribution, pitch and winding factors – E.M.F Equation-Harmonics in generated e.m.f. – suppression 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, M.M.F. 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 GENERATOR: 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.

UNIT V

POWER CIRCLE DIAGRAM: Excitation and power circles – hunting and its suppression – Methods of starting – synchronous induction motor.

UNIT VI

SINGLE PHASE MOTORS: Single phase Motors: Single phase induction motor – Constructional features- Double revolving field theory – Elementary idea of cross-field theory – split-phase motors – shaded pole motor.

TEXT BOOKS:

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

REFERENCE BOOKS:

1. The Performance and Design of A.C.Machines – by M.G.Say, ELBS and Ptiman & Sons.
2. Electric Machinery – by A.E. Fitzgerald, C.Kingsley and S.Umans, Mc Graw-Hill Companies.

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ELECTRICAL AND ELECTRONICS ENGINEERING

III-B.Tech, I-Sem (EEE)

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(A0211155) POWER ELECTRONICS-I

OBJECTIVE:

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

OUTCOME:

1. Understand the basic of power electronics.
2. Learn the details of power semi converter switches.
3. Understand the working of gate drive circuits.
4. Understand the working of various types of converters.
5. Learn how to analyze and design the components of the various load types.
6. Learn about the control methods of various converters.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	1	1	-	-	-	-	-	2	2	3	-	-
CO2	3	3	2	2	2	-	-	-	-	-	2	1	3	-	-
CO3	2	3	1	2	1	-	-	-	2	-	2	-	3	-	-
CO4	2	2	1	2	2	-	-	-	2	-	2	1	3	-	-
CO5	2	2	1	2	2	2	-	-	2	-	2	-	3	-	-
CO6	2	3	2	2	2	-	-	-	2	-	3	-	3	-	-

UNIT I

POWER SEMI-CONDUCTOR DEVICES – REVIEW: Introduction- Structure, Symbol, static and dynamic Characteristics of Power Devices: Power Diode-Metal oxide semiconductor field effect transistor (MOSFET)-Insulated Gate Bipolar Transistor (IGBT)-Thyristor (SCRs)-Limitations and comparison of above devices- Turn on and Turn off methods of SCR-Two transistor analogy of SCR.

UNIT II

GATE TRIGGERING CIRCUITS AND STRING OPERATION OF THYRISTORS: Gate Triggering circuits of thyristor: R, RC and UJT triggering circuits-Protection circuits for SCR–Specifications and Ratings of SCR's-Series operation of thyristors -Parallel operation of thyristors-String efficiency- Derating factor -Numerical Problems

UNIT III

SINGLE PHASE FULLY CONTROLLED CONVERTERS: Principle of phase control technique-single phase midpoint converter for R load, RL load - fully controlled rectifier for R load, RL load and RLE load-Derivation of average load voltage and current- without and with freewheeling Diode-performance factors of single phase full converter –line commutated inverter-Numerical Problems.

UNIT IV

SINGLE PHASE HALF CONTROLLED CONVERTERS: single phase half controlled rectifier for R load, RL load & RLE load - continuous conduction mode and discontinuous conduction mode of operation- Derivation of average load voltage and current - performance factors of single phase half controlled converter-Effect of source inductance-Numerical problems.

UNIT V

THREE PHASE FULLY CONTROLLED CONVERTERS: Three phasehalf-wave converter for R and RL load–three phase fully controlled converter for R and RL load-average load voltage and Current-Effect of Source inductance for six pulse converter–Waveforms–Numerical Problems.

UNIT VI

THREE PHASE SEMI-CONVERTERS AND DUAL CONVERTERS: Three phase Semi-converter for R and RL load-average load voltage and Current- principle of dual converter-practical dual converter with RL Load- circulating current mode of operation-Non-circulating current mode of operation (Only Operation and Waveforms).

TEXT BOOKS:

1. Power Electronics - by P.S. Bimbhra, Khanna Publications.
2. Power Electronics – by M. D. Singh & K. B. Kanchandhani, Tata Mc Graw – Hill Publishing Company.

REFERENCE BOOKS:

1. Power Electronics Handbook: Circuits, Devices and Applications – by M. H. Rashid, Prentice Hall of India.
2. Power Electronics - by V.R.Murthy, OXFORD University Press.
3. Power Electronics - Essentials & Applications by L. Umanand, Wiley India Pvt. Ltd.
4. Power Electronics by V Ramanarayanan.

III-B.Tech, I-Sem (EEE) T 3+1* C 3

(A0405155) LINEAR & DIGITAL IC APPLICATIONS

OBJECTIVE:

- This course introduces all varieties of linear and digital IC's. It also deals with Timers, PLL's, D-A and A-D converters.
- Design the linear and non-linear applications of an op-amp and special application IC's.
- Explain and compare the working of multivibrators using special application IC 555 and general purpose op-amp.
- Classify and comprehend the working principle of data converters.
- Illustrate the function of application specific ICs such as Voltage regulators, PLL and its application in communication.

COURSE OUTCOMES:

1. Understand the characteristics of op-amps
2. analysis and design of the linear and non-linear applications of an opamps
3. Analysis and design of active filters,
4. Analysis and Design of multi vibrators using IC555 and understand working principle of PLL
5. Classify and comprehend the working principle of data converters.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	-	2	-	-	-	1	-	-	-	-	2	2	-	-
CO2	1	2	2	1	-	-	-	-	-	-	-	1	2	-	-
CO3	-	1	-	-	-	-	-	-	-	-	-	1	2	-	-
CO4	1	1	-	-	-	-	-	-	-	-	-	1	2	-	-
CO5	-	2	2	-	-	-	-	-	-	-	-	1	2	-	-

UNIT I

INTEGRATED CIRCUITS: Classification, chip size and circuit complexity, basic information of Op-amp, ideal and practical Op-amp, internal circuits, Op-amp characteristics, DC and AC characteristics, 741 op-amp and its features, modes of operation-inverting, non-inverting, differential.

UNIT II

OP-AMP APPLICATIONS: Basic application of Op-amp, instrumentation amplifier, ac amplifier, Voltage to Current and Current to Voltage converters, sample & hold circuits, multipliers and dividers, Differentiators and Integrators, Comparators, Schmitt trigger, Multivibrators, introduction to voltage regulators, features of 723.

UNIT III

ACTIVE FILTERS &OSCILLATORS : Introduction, 1st order LPF, HPF filters. Band pass, Band reject and all pass filters. Oscillator types and principle of operation – RC, Wien and quadrature type, waveform generators – triangular, sawtooth, 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.

UNIT V

D-A AND A- D CONVERTERS: Introduction, basic DAC techniques, weighted resistor DAC, R-2R ladder DAC, inverted R-2R DAC, and IC 1408 DAC, Different types of ADCs - parallel comparator type ADC, counter type ADC, successive approximation ADC and dual slope ADC. DAC and ADC specifications

UNIT VI

LOGIC FAMILIES: Classification of Integrated circuits, comparison of various logic families, standard TTL NAND Gate- Analysis& characteristics, TTL open collector O/Ps, Tristate TTL, MOS & CMOS open drain and tristate outputs, CMOS transmission gate, IC interfacing- TTL driving CMOS & CMOS driving TTL .

TEXT BOOKS:

1. Linear Integrated Circuits –D. Roy Chowdhury, New Age International (p) Ltd.
2. Op-Amps & Linear ICs – Ramakanth A. Gayakwad, PHI.
3. Digital Fundamentals – Floyd and Jain, Pearson Education.

REFERENCE BOOKS:

1. Operational Amplifiers and Linear Integrated Circuits – R.F. Coughlin and Fredrick F. Driscoll, PHI.
2. Operational Amplifiers and Linear Integrated Circuits: Theory and Applications – Denton J. Daibey, TMH.
3. Design with Operational Amplifiers and Analog Integrated Circuits - Sergio Franco, McGraw Hill.
4. Digital Fundamentals – Floyd and Jain, Pearson Education.

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ELECTRICAL AND ELECTRONICS ENGINEERING

III-B.Tech, I-Sem (EEE)

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(A0212155) TRANSMISSION OF ELECTRICAL POWER

OBJECTIVE:

- This course is an extension of GENERATION & DISTRIBUTION OF ELECTRIC POWER course.
- It deals with basic theory of transmission lines modeling and their performance analysis.
- This course gives emphasis on mechanical design of transmission lines, cables and insulators.

OUTCOME:

1. Know the basic knowledge on different types of conductors, along with its virtual parameters in transmission system.
2. To calculate the parameters(R, L, C) of transmission lines.
3. To analyze how these parameters affect the performance of different Types of transmission lines.
4. To understand about transients that exists in transmission system.
5. To know the importance of different insulators provided in transmission system and erection of lines and the concept of corona.
6. To know about the importance of underground cables for transmission system with its parameters and their applications.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	-	2	2	1	-	-	1	-	-	1	2	-	-	3
CO2	3	3	2	2	1	-	-	-	1	-	1	2	-	-	3
CO3	3	3	2	2	1	-	-	-	1	-	1	2	-	-	3
CO4	3	3	3	2	2	-	-	-	1	1	-	2	-	-	3
CO5	1	3	3	1	1	-	-	-	-	1	-	2	-	-	3
CO6	3	3	3	2	-	1	1	-	2	-	1	2	-	-	3

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 ALL TYPES OF 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. Numerical Problems. Mathematical Solutions to estimate regulation and efficiency of all types of lines - Numerical Problems.

Long Transmission Line-Rigorous Solution, evaluation of A,B,C,D Constants, Interpretation of the Long Line Equations – Representation of Long lines – Equivalent T and Equivalent – π – surge Impedance and surge Impedance loading - wavelengths and Velocity of propagation – Skin Effect, Ferranti effect , Proximity effect.

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 (for all the cases mentioned with numerical examples).

UNIT IV

CORONA: Corona - Description of the phenomenon, factors affecting corona, critical voltages and power loss, Radio Interference.

UNIT V

STUDY OF INSULATORS AND SAG ON OVERHEAD LINES: 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 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 VI

UNDERGROUND CABLES: Types of Cables, Construction, Types of Insulating materials, Calculations of Insulation resistance and stress in insulation, Numerical Problems. Capacitance of Single and 3-Core belted cables, Numerical Problems. Grading of Cables. Numerical problems.

TEXT BOOKS:

1. Principles of Power Systems by V. K. Mehta & Rohith Mehta.
2. Electrical power systems - by C.L.Wadhwa, New Age International (P) Limited, Publishers.

REFERENCE BOOKS:

1. A Text Book on Power System Engineering by M.L.Soni, P.V.Gupta, U.S.Bhatnagar, A Chakrabarthy, Dhanpat Rai & Co Pvt. Ltd.
2. Power System Analysis and Design by B.R.Gupta, S. Chand & Co.
3. Modern Power System Analysis by I.J.Nagarath and D.P.Kothari, Tata McGraw Hill.
4. Power System Engineering by R. K. Rajput, Laxmi Publications.

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ELECTRICAL AND ELECTRONICS ENGINEERING

III-B.Tech, I-Sem (EEE)

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(A0009153) ENVIRONMENTAL SCIENCE

(Common to All Branches)

OBJECTIVES:

- Creating the awareness about environmental problems among people.
- Imparting basic knowledge about the environment and its allied problems.
- Developing an attitude of concern for the environment.
- Motivating public to participate in environment protection and environment improvement.
- Acquiring skills to help the concerned individuals in identifying and solving environmental problems.
- Striving to attain harmony with Nature.
- Environmental education should be compulsory, right from the primary up to the post graduate stage.
- Environmental education should have an interdisciplinary approach by including physical, chemical, biological as well as socio-cultural aspects of the environment. It should build a bridge between biology and technology.
- Environmental education should take into account the historical perspective, the current and the potential historical issues.
- Environmental education should emphasise the importance of sustainable development i.e., economic development without degrading the environment.
- Environmental education should emphasise the necessity of seeking international cooperation in environmental planning.
- Environmental education should lay more stress on practical activities and first hand experiences.

OUTCOMES:

- Understand environmental problems arising due to developmental activities.
- Realize the importance of ecosystem and biodiversity for maintaining ecological balance.
- Identify the natural resources and suitable methods for conservation and sustainable development.
- Identify the environmental pollutants and abatement devices.
- Adopt practices that help in promoting balance in nature by making judicious utilization of recourses.

CO-PO MAPPING:

CO/ PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	2					1	3	2				2			
CO2	1	2					3	1	2			2			
CO3	1				1	1	3	1	1		1	2			
CO4		1	1		2	1	1	1			1	2			1
CO5		1	1				2	1				2			1

UNIT I

MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL SCIENCE: Environment - Definition, scope and importance, Segments of Environment-Importance, Productivity, Aesthetical& Optional values of nature, need for public awareness.

UNIT II

RESOURCES AND UTILIZATION: Renewable and non-renewable resources.

a) Natural Resources: soil & water sources(salinity intrusion –conflictsof over utilization of water Resources-water logging,Hydro power project-problems), forest & mineral resources – Utilization-problems.
b) Non conventional resources of energy(Solar Energy,wind energy and their applications)
c) Chemical fertilizers and pesticides-problems.
d) Green Revolution-white revolution- blue Revolution.
e) Non equitable distribution of Resources.

UNIT III

a) CONCEPTS OF ECO-SYSTEM

Structure and functions of an ecosystem: producers, consumers and decomposers- Interaction between biotic and abiotic factors in an ecosystem- Energy flow and its importance- Trophic levels- food chain- Food web –Ecological Pyramid, Ecological succession

b) TYPES OF ECOSYSTEM

Understanding the types of ecosystem:

(i) Terrestrial (forest, grassland and desert) and

(ii) Aquatic (fresh water and salt water) with an example of each.

UNIT IV

BIODIVERSITY: Introduction – Definition - genetic, species and ecosystem diversity- -

Biogeographical classification of India- Value of biodiversity- Hot-sports of biodiversity- Biodiversity at global, National and local levels- India as a mega diversity nation - Hot-spots of biodiversity- Threats to biodiversity- IUCN Red data book.

Conservation of bio diversity (IN-SITU and EX-SITU conservation)

UNIT V

ENVIRONMENTAL POLLUTION: Introduction - Cause, effects and control measures of

a. Air pollution

b. Water pollution

c. Soil pollution

d. Marine pollution

e. Noise pollution

f. Thermal pollution

g. Nuclear hazards

Municipal Solid waste Management: Sources and Disposable methods.

Disaster management: floods, earthquake, cyclone.

UNIT VI

HUMAN POPULATION:

a) Population and Environment:- Definition of species, community, population; Population growth rate curves, Sex ratio, From unsustainable to sustainable development, Diseases-HIV, Malaria, Diaharia, Cancer.
b) Human rights, fundamental duties and value education.
c) Women and child welfare & Family welfare programs.

SOCIAL ISSUES:

a) Resettlement and rehabilitation of people.
b) Energy Crisis – urban and rural sectors.
c) Greenhouse effect and global warming.
d) Climatic changes.
e) Acid rain.
f) Ozone layer depletion.
g) Sustainability- water conservation methods- Rain water harvesting.

TEXT BOOKS:

1. Deswal, S and Deswal A., (2004), A Basic Course in Environmental Studies, Dhanpat Rai & Co. Delhi.
2. Anubha Kousik and C P Kousik ., New age international publishers.
3. Garg, S.K and Garg, R., (2006), Ecological and Environmental Studies, Khanna Publishers, Delhi.
4. Chauhan, A.S., (2006), Environmental Studies, Jain Brothers, New Delhi

REFERENCES:

1. Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.
2. Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad –380 013, India, Email:mapin@icenet.net (R)
3. Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p
4. Clark R.S., Marine Pollution, Clanderson Press Oxford (TB)
5. Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001, Environmental Encyclopedia, Jaico Publ. House, Mumabai, 1196p
6. De A.K., Environmental Chemistry, Wiley Eastern Ltd.

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ELECTRICAL AND ELECTRONICS ENGINEERING

III-B.Tech, I-Sem (EEE) T 3+1* C 3

(A0213155) MICROPROCESSORS AND MICROCONTROLLERS

(Common to ECE & EEE)

OBJECTIVES:

- Understand need of microprocessors and microcontrollers in development of various projects.
- To know complete architectural, programming, interfacing details of 8085, 8086 microprocessors and 8051 microcontroller.

COURSE OUTCOMES:

1. Learn and understand the instruction set of 8086 and 8051.
2. Develop skill in simple assembly program writing for 8086, 8051 and applications.
3. Learn and understand concept of interfacing of peripheral devices and their applications.
4. Ability to learn Microprocessor and Microcontroller Architecture.
5. Understand & design of microprocessors and microcontrollers based systems (small).

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	-	-	2	-	-	-	-	-	2	-	2	-	-
CO2	2	-	3	1	2	1	-	-	-	-	2	-	2	-	-
CO3	2	-	3	2	2	1	-	-	-	-	2	-	2	-	-
CO4	2	-	2	-	2	-	-	-	-	-	2	-	2	-	-
CO5	2	-	3	2	2	-	-	-	-	-	2	-	2	-	-

UNIT I

8085 MICROPROCESSOR: Evaluation of microprocessors -**Overview of 8085:** Architecture, Pin diagram, addressing modes, register organization, Simple ALU programs using 8085 instruction set.

UNIT II

8086 MICROPROCESSOR: Architecture, Register organization, signal description, physical memory organization, general bus operations, I/O addressing capability, special processor activities, Minimum mode and maximum mode of operation, Timing diagram.

UNIT III

8086 INSTRUCTION SET AND ASSEMBLER DIRECTIVES: Addressing modes of 8086, Instruction set of 8086, Assembler Directives and operators.

UNIT IV

8086 ASSEMBLY LANGUAGE PROGRAMMING: 8086 Assembly language programs involving logical, branch and call instructions, sorting, evaluation of arithmetic expressions, string manipulation.

UNIT V

PROGRAMMABLE PERIPHERAL DEVICES AND THEIR INTERFACING: Memory interfacing to 8086 (static RAM and EPROM). 8255 PPI-various modes of operation, Interrupt structure of 8086, Vector interrupt table. Interrupt service routines.8259 PIC architecture and interfacing cascading of interrupt controller and its importance.

UNIT VI

8051MICROCONTROLLER: Evaluation of microcontrollers, Architecture of 8051 microcontroller. Pin Diagram of 8051, and external memories, counters and timers, serial

communication, interrupts, Instruction set of 8051, Addressing modes of 8051, Assembly Language Programming examples using 8051.

TEXT BOOKS:

1. Microprocessor Architecture, Programming and Applications with8085 By Ramesh S Gaonkar
2. Advanced microprocessor and peripherals-A.K. Ray and K.M.Bhurchandi, 2nd edition, TMH, 2000.
3. 8051 microcontroller and embedded systems by mazidi and mazidi ,pearson education 2000.

REFERENCES:

1. Microprocessors Interfacing-Douglas V.Hall, Revised 2nd edition, 2007.
2. The 8088 and 8086 Microprocessors- Walter A. Triebel, Avtar Singh, PHI, 4th Edition, 2003.
3. 8051 Microcontroller-Internals, Instructions, Programming and Interfacing by SubrataGhoshal, Pearson, 2010.

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III-B.Tech, I-Sem (EEE) T C
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(A0013156) PROFESSIONAL ETHICS AND SOFT SKILLS

(Common to all Branches)
Skill Development Course

OBJECTIVES:

- The main objective of Engineering Ethics is to increase the awareness in engineering failures. Engineering decisions can impact public health, safety, business practices and politics .Engineering ethics is the field of applied ethics and system of moral principles that apply to the practice of engineering. The field examines and sets the obligations by engineers to society, to their clients, and to the profession. Engineering ethics in academic institutions has been undertaken by the directives of Supreme Court for creating awareness interactively among engineering students of all disciplines. By studying engineering ethics, the students develop awareness and assessment skill of the likely impact of their future decisions on moral and ethical grounds.

COURSE OUTCOMES:

The student would be able to

1. To apply Ethical theories and Moral Reasoning to a good professional
2. Understand the professional behavior and implementation of process of communication
3. To approach of corporate communication problem solving techniques
4. To have a practical orientation of Interpersonal Communication
5. Aware of Intellectual Property Rights

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	-	-	-	-	2	2	3	3	3	1	2	-	-	-
CO2	1	-	1	-	-	2	1	3	3	3	1	2	-	-	-
CO3	1	-	2	-	-	2	1	2	3	2	1	2	-	-	-
CO4	2	-	-	-	-	2	1	3	2	2	1	3	-	-	-
CO5	3	-	-	-	-	2	1	3	2	3	1	3	-	-	-

UNIT I

Nature and Scope of Engineering Ethics: Definition, Nature, Scope – Moral Dilemmas – Moral Autonomy – Kohlberg's theory – Gilligan's theory- Moral Reasoning and Ethical theories – Theories of Right Action-Self –Utilitarianism interest- Use of ethical Theories-case study.

UNIT II

Professional Etiquettes : Professional Etiquettes **–** Mobile Etiquettes – Email Etiquettes - Kinesics – Proxemics - Chronemics – Chromatics – Olfacts - Haptics – Case study.

UNIT III

Corporate Communication: Communication Models- Types of Communication – Downward and Upward Communication- Business Deliberations – Meetings – Negotiation Skills - Case Study.

UNIT IV

Soft Skills: Interpersonal Communication – Johari Window – Interpersonal conflict resolutions- Daniel Goleman's Emotional Intelligence.

UNIT V

Global Issues: Multinational Corporations – Corporate Governance - Corporate Social Responsibility Environmental Ethics – case study.

UNIT VI

Introduction to Intellectual Property: Meaning and Types of Intellectual Property – Recent developments of the copy right act –Trademark Protection – Patent Law - Plagiarism.

TEXT BOOKS:

1. Professional Ethics by R.Subramanian, OXFORD
2. Business Communication , P.D. Chaturvedi, Mukesh Chaturvedi

REFERENCES:

- The ACE of Soft Skills(Attitude, Communication and Etiquette for success) by – Gopalaswamy Ramesh & Mahadevan Ramesh, Pearson 2010.
- Essentials of Business Communication, Rajendra Pal, JS.Korlahhi, S.Chand
- Intellectual Property Right , Deborah E. BouchouxS, Cengage, 2005
- Business Ethics and Professional Values, A.B. Rao, Excel,2009
- M.P. Raghavan [2006], Professional Ethics and Human Values, Scitech Publications, Chennai.

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous)

ELECTRICAL AND ELECTRONICS ENGINEERING

III-B.Tech, I-Sem (EEE) P 3 C 2

(A0493155) IC AND PDC LAB

OBJECTIVES:

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

- Linear and non linear wave shaping circuits
- Astable and mono stable multi vibrators.
- IC 741 OP-AMP applications.

COURSE OUTCOMES:

1. Analyze and design the RC circuits.
2. Design the circuits for generating desired wave shapes (Clippers and Clampers)
3. Study the working principle of various Multivibrators (Bi-stable, Mono-stable, and Astable Multivibrators).
4. Realize simple logic gates using diodes and transistors
5. Realize Adder, integrator & differentiator using OP-Amp
6. Realize different types of active filters.
7. Realize different oscillator circuits and Function generator using IC741.
8. Realize different multivibrators using IC555 timer
9. Use IC723 for voltage regulator & three terminal voltage regulators.
10. Realize 4-bit DAC using OP-Amp.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2	2	-	-	-	-	-	3	-	-	-	2	-	-
CO2	1	-	3	-	-	-	-	-	3	-	-	-	2	-	-
CO3	2	-	-	-	-	-	-	-	3	-	-	-	2	-	-
CO4	-	2	1	-	-	-	-	-	3	-	-	-	2	-	-
CO5	-	2	-	-	-	-	-	-	3	-	-	-	2	-	-
CO6	-	2	-	-	-	-	-	-	3	-	-	-	2	-	-
CO7	-	2	-	-	-	-	-	-	3	-	-	-	2	-	-
CO8	-	2	-	-	-	-	-	-	3	-	-	-	2	-	-
CO9	1	-	-	-	-	-	-	-	3	-	-	-	2	-	-
CO10	-	2	-	-	-	-	-	-	3	-	-	-	2	-	-

LIST OF EXPERIMENTS:

1. Linear wave shaping
2. Non Linear Wave Shaping – Clippers
3. Non Linear Wave Shaping – Clampers
4. Study of Logic Gates & Some Applications
5. Astable Multivibrator, Monostable Multivibrator using transistors
6. Bistable Multivibrator, Schmit Trigger using transistors
7. IC 741 OP AMP Applications – Adder, Integrator and Differentiator Circuits
8. Active Filters – LPF, HPF (first order)
9. Function Generator using 741 OP AMP
10. IC 555 Timer – Monostable Operation Circuits, Astable Operation Circuits
11. Schmitt Trigger Circuits – Using IC 741 and IC 555
12. Voltage Regulator using IC 723
13. 4 bit DAC using 741 OP AMP

III-B.Tech, I-Sem (EEE) P 3 C 2

(A0296155) ELECTRICAL MACHINES-II LAB

OBJECTIVES:

- To provide the students a practice knowledge of machines.
- To get familiar with DC machines, Transformers, Synchronous machines and Induction motors to give the experimental skills.
- To calculate the various parameters and characteristics of electrical machines.

COURSE OUTCOMES:

1. Select range of equipment required based on the ratings of a AC Machines
2. Conduct test and experimental procedures on AC machines.
3. Analyze the performance of a AC machines based on the experimental data at different load conditions
4. Determine the equivalent Circuits of AC Machines.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	-	-	2	-	-	-	-	3	-	-	2	-	3	-
CO2	2	2	-	-	-	-	-	-	3	-	-	2	-	3	-
CO3	2	2	-	-	-	-	-	-	3	-	-	2	-	3	-
CO4	2	-	-	-	-	-	-	-	3	-	-	2	-	3	-

The following experiments are required to be conducted compulsorily

1. OC & SC tests on single phase transformer (equivalent circuit, efficiency & regulation)
2. Scott connection of transformers
3. Parallel operation of single phase transformers
4. Separation of core losses in a single phase transformer
5. No-load & Blocked rotor tests on three phase Induction motor
6. Brake test on three phase Induction Motor
7. Regulation of three-phase alternator by a) Synchronous Impedance Method and b) MMF method
8. V and Inverted V curves of a 3 phase synchronous motor.
9. Equivalent Circuit of a single phase induction motor

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

10. Determination of X_d and X_q of a salient pole synchronous machine
11. Regulation of three-phase alternator by Z.P.F. method
12. Load test on three phase induction generator
13. Synchronization of three phase alternator by using Dark Lamp Method

TEXT BOOKS:

1. Electrical Machines Lab manual with MATLAB Programs by Dr. D. K. Chaturvedi, University Science Press.

III-B.Tech, I-Sem (EEE) P 3 C 2

(A0297155) CONTROL SYSTEMS & SIMULATION LAB

OBJECTIVES:

- To help the students understand and practice the modeling, simulation and to implementation of a physical dynamical system by a linear time invariant ordinary differential equation.
- To highlight the electrical modeling of a second order system and analyze the under damped, over damped and critically damped cases.
- To experimentally determine the transfer function of servo motor skills and techniques.

COURSE OUTCOMES:

1. Obtain the moment of inertia experimentally and develop the transfer function of the given DC Servo System, (a) Armature controlled and (b) Field controlled cases.
2. Study the AC servo motor and its characteristics. Also to set up a closed loop position control system and study the system performance.
3. Set up a system for closed loop voltage regulation for a dc shunt generator its characteristics.
4. Obtain the characteristics of the synchro systems and set up a synchro link position.
5. To understand the behavior and characteristics of BODE PLOT, ROOT LOCUS, NYQUIST PLOT.
6. Verification of theoretical concepts through experimentation.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	1	2	2	-	-	1	1	-	-	3	-	-
CO2	3	3	1	-	2	2	-	-	1	1	-	-	3	-	-
CO3	3	3	2	1	1	1	-	-	1	1	-	-	3	-	-
CO4	2	3	2	1	1	-	-	1	1	1	-	-	3	-	-
CO5	2	2	1	2	1	-	-	1	1	2	-	1	3	-	-
CO6	3	2	1	1	2	-	-	-	2	1	-	-	3	-	-

Note: The minimum of 10 experiments are to be performed from the following, out of which at least two should be software based.

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. Speed-torque characteristics of DC servo motor
5. Transfer function of DC motor
6. Effect of P, PD, PI, PID Controller on a second order systems
7. Transfer function of DC generator
8. Temperature controller using PID
9. Characteristics of magnetic amplifiers
10. Characteristics of AC servo motor
11. DC Position Control System

Software based experiments

12. To plot root locus diagram of an open loop transfer function and determine range of gain 'k' for stability.
13. To plot a Bode diagram of an open loop transfer functions and examines the stability of the system.
14. To draw a Nyquist plot of an open loop transfer functions and examines the stability of the closed loop system.
15. To determine response of first order and second order systems for step input and compare theoretical and practical results.

III-B.Tech II-Sem (EEE) T 3+1* C 3

(A0214156) POWER ELECTRONICS-II

COURSE OBJECTIVE

- This subject is an extension of previous power electronics course.
- This course introduces the basic concepts ac voltage controllers, Cycloconverters, inverters, choppers and Modern Power Semi-conductor devices.

COURSE OUTCOME

1. Understand the basic of power electronics.
2. Learn the details of various types of power converters.
3. Understand the working of various commutation methods.
4. Understand the working of various types of converters.
5. Learn how to analyze and design the components of the various load types.
6. Understand the application of various power electronics converters.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	1	1	-	-	-	-	-	2	2	3	-	-
CO2	3	3	2	2	2	-	-	-	-	-	2	1	3	-	-
CO3	3	3	1	1	2	-	-	-	1	-	2	-	3	-	-
CO4	2	2	1	2	1	-	-	-	1	-	2	1	3	-	-
CO5	3	2	1	1	2	1	-	-	-	-	2	-	3	-	-
CO6	2	2	2	1	2	-	-	-	1	-	2	-	3	-	-

UNIT I

AC-AC CONVERTERS: AC voltage controller: half and Full wave ac voltage controllers for R and RL load-Derivation of RMS output voltage and power factor-Integral cycle control of AC voltage controller-AC voltage controller using TRIAC.

CYCLOCONVERTERS: Single phase step-down Cycloconverters with midpoint and Bridge type configurations for R and RL load- Single phase step-up Cycloconverters with midpoint and Bridge type configurations for R and RL load (Only operation and Waveforms).

UNIT II

DC-DC CONVERTERS: Introduction-principle of Step-down and Step-up Chopper-Derivation of load voltage and current-Time ratio control and Current limit control strategies–first quadrant chopper-second quadrant chopper- Steady state time domain analysis of first and second quadrant choppers for RLE -Two quadrant choppers-Four quadrant choppers (principle of operation only).

UNIT III

THYRISTOR COMMUTATION CIRCUITS: Thyristor commutation techniques: Forced commutation-Self commutation (Class A)-resonant pulse commutation (Class B)-Complementary commutation (Class C)-Impulse commutation (Class D).

Thyristor Chopper Circuits: Voltage commutated chopper-Current commutated chopper-Load commutated chopper-Jones Chopper-Morgan chopper.

UNIT IV

SINGLE PHASE INVERTERS: Introduction-single phase VSI and CSI-Single phase half and full bridge inverters – Simple forced commutated inverters: Basic series inverter-Basic parallel inverter-Mc Murray and Bedford inverters-Voltage control techniques for inverters--Numerical problems.

UNIT V

THREE PHASE INVERTERS: Three phase voltage source bridge inverters for 180^0 conduction mode and 120^0 conduction mode of operations-waveforms-RMS voltage and current expressions- Pulse width modulation techniques: single PWM-multiple PWM-SPWM-Numerical problems.

UNIT VI

POWER SUPPLIES: Introduction of UPS –on line UPS –off line UPS- Linear Power Supply - SMPS-comparison between linear power supply and SMPS- DC power supplies (Block Diagram and operation)- AC power supplies (Block Diagram and operation).

TEXT BOOKS:

1. Power Electronics - by P.S. Bimbhra, Khanna Publications.
2. Power Electronics – by M. D. Singh & K. B. Kanchandhani, Tata Mc Graw – Hill Publishing company
3. Power Electronics: Circuits, Devices and Applications – by M. H. Rashid, Prentice Hall of India.

REFERENCE BOOKS:

1. Power electronics: converters, applications, and design by Ned Mohan, Tore M. Undeland, by John Wiley & Sons.
2. Power Electronics - by V.R.Murthy, OXFORD University Press.
3. Power Electronics-by P.C.Sen, Tata Mc Graw-Hill Publishing.

III-B.Tech II-Sem (EEE) T 3+1* C 3

(A0215156) POWER SYSTEM PROTECTION

OBJECTIVES:

- This course introduces all varieties of circuit breakers, relays, relay protection for generators, transformers, transmission lines, feeders & bus bars.

COURSE OUTCOMES:

1. To apply a basic knowledge of the nature of the modern power system, including the behavior of the constituent components and sub-systems.
2. Student gains knowledge on different Protective Equipments or Power Systems.
3. Demonstrate an understanding of the role of protection in modern power systems and to describe the operation of a range of protection schemes.
4. Describe the role of insulation co-ordination in the design and operation of power networks, including the role of circuit breakers.
5. Design a protection system for an item of electrical plant.
6. Demonstrate the ability to conduct experiments in the Electrical Engineering Laboratory in accordance with Health and Safety Regulations and to record, interpret and report on the experimental results.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	-	2	-	-	-	-	2	2	-	1	-	-	3
CO2	3	3	2	2	-	-	-	-	2	1	-	2	-	-	3
CO3	3	3	2	2	-	-	-	-	2	1	3	2	-	-	3
CO4	1	2	3	2	2	-	-	-	2	1	2	2	-	-	3
CO5	2	2	-	2	-	2	-	-	2	1	2	2	-	-	3
CO6	1	3	-	2	2	-	-	-	2	1	2	3	-	-	3

UNIT I

CIRCUIT BREAKERS: Circuit Breakers: Elementary principles of arc interruption, Recovery, 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 circuit breakers.

UNIT II

ELECTROMAGNETIC RELAYS: Basic Requirements of Relays – Primary and Backup protection - Construction details of – Attracted armature, balanced beam, inductor type and differential relays – Universal Torque equation –Over current, Direction and Distance relays

UNIT III

STATIC RELAYS: Static Relays – Advantages and Disadvantages – Definite time, Inverse and IDMT static relays – Comparators – Amplitude and Phase comparators.

UNIT IV

GENERATOR & TRANSFORMER PROTECTION: Protection of generators against Stator faults, Rotor faults, and Abnormal Conditions. Restricted Earth fault and Inter-turn fault Protection. Numerical Problems on % Winding Unprotected Protection of transformers: Percentage Differential Protection, Numerical Problem on Design of CT s Ratio, Buchholtz relay Protection

UNIT V

PROTECTION OF FEEDERS, TRANSMISSION LINES & BUS-BARS: Protection of Feeder (Radial & Ring main) using over current Relays Protection of Transmission line – 3 Zone protection using Distance Relays - Carrier current protection Protection of Bus bars – Differential protection

UNIT VI

NEUTRAL GROUNDING & PROTECTION AGAINST OVER VOLTAGES: Ungrounded & grounded neutral systems-merits of neutral grounded systems-methods of neutral grounding-Solid, Resistance, Reactance and Resonance Grounding-problems - Generation of Over Voltages in Power Systems.-Protection against Lightning Over Voltages - Valve type and Zinc-Oxide Lighting Arresters

TEXT BOOKS:

1. Switchgear and Protection – by Sunil S Rao, Khanna Publishers
2. Power System Protection and Switchgear by Badari Ram , D.N Viswakarma, TMH Publications.

REFERENCE BOOKS:

1. Electrical Power Systems – by C.L. Wadhwa, New Age international (P) Limited, Publishers.
2. Fundamentals of Power System Protection by Y. G. Paithankar and S. R. Bhide, PHI.
3. Electrical power System Protection by C. Christopoulos and A. Wright, Springer International Edition.

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous)

ELECTRICAL AND ELECTRONICS ENGINEERING

III-B.Tech II-Sem (EEE) T C
3+1* 3

(A0216156) ELECTRICAL MEASUREMENTS

OBJECTIVE:

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

OUTCOME:

1. To acquire the basic knowledge of different measuring meter (Voltmeter, Ammeter, p.f meter, wattmeter and energy meter).
2. To analyze different kind of measuring meters with their relevant equations analysis and solutions to numerical problems.
3. To understanding the concept of construction and working operation of measuring devices.
4. To apply the knowledge for the measuring of different electrical parameters with the dealt measuring meters.
5. To calibration of DC, AC bridges and Potentiometers.
6. To justify the usage of different measuring devices for the ranges of different electrical parameters.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	-	-	-	-	-	-	-	3	-	2	-	3	-	-
CO2	2	-	-	2	-	-	-	-	2	-	2	-	3	-	-
CO3	2	2	2	2	2	-	-	-	2	-	2	-	3	-	-
CO4	2	-	-	2	-	-	-	-	3	-	2	-	3	-	-
CO5	2	-	-	-	-	-	-	-	2	-	2	-	3	-	-
CO6	2	-	-	-	-	-	-	-	3	-	2	-	3	-	-

UNIT I

MEASURING INSTRUMENTS : Classification – deflecting, control and damping torques – Ammeters and Voltmeters – PMMC, Dynamometer, moving iron type instruments – expression for the deflecting torque and control torque – Errors and compensations, extension of range using shunts and series resistance

UNIT II

INSTRUMENT TRANSFORMERS AND P.F METER: CT and PT – Ratio and phase angle errors. Types of P.F. Meters – dynamometer and moving iron type – 1-ph and 3-ph meters

UNIT III

MEASUREMENT OF POWER: Single phase dynamometer wattmeter, LPF and UPF, Double element dynamometer wattmeter, expression for deflecting and control torques.

UNIT IV

MEASUREMENT OF ENERGY: Single phase induction type energy meter – driving and braking torques – errors and compensations-Adjustments.

UNIT V

D.C POTENTIOMETERS: Principle and operation of D.C. Crompton's potentiometer – standardization – Measurement of unknown resistance, current, voltage

UNIT VI

D.C & A.C BRIDGES: Method of measuring low, medium and high resistance – sensitivity of Wheatstone's bridge – Kelvin's double bridge for measuring low resistance, measurement of high resistance – loss of charge method & Meggar. Measurement of inductance - Maxwell's bridge, Hay's bridge, Anderson's bridge - Measurement of capacitance and loss angle - Desauty bridge, Wien's bridge – Schering Bridge.

TEXT BOOKS:

1. Electrical & Electronic Measurement & Instruments by A.K.Sawhney Dhanpat Rai & Co. Publications.
2. Electrical Measurements and measuring Instruments – by E.W. Golding and F.C. Widdis, Reem Publications.
3. Electronic Instrumentation by H. S. Kalsi, Tata Mc Grawhill.

REFERENCE BOOKS:

1. Electrical & Electronic Measurement & Instrumentation by R. K. Rajput, S. Chand & Co.
2. Electrical Measurements – by Buckingham and Price, Prentice – Hall
3. Electrical Measurements: Fundamentals, Concepts, Applications – by Reissland, M.U, New Age International (P) Limited, Publishers.

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous)

ELECTRICAL AND ELECTRONICS ENGINEERING

III-B.Tech II-Sem (EEE) T C
3+1* 3

(A0014157) MANAGERIAL ECONOMICS & FINANCIAL ANALYSIS

(Common to CE, EEE & ECE)

OBJECTIVE:

- To enhance the knowledge of the students regarding importance of management and Managerial problems with optimum solutions.
- To provide the knowledge regarding the concept of Demand and demand Forecasting-methods
- To provide the knowledge regarding forms of business organisations
- To provide awareness regarding Capital Budgeting decisions(Long term Investment decisions)
- To introduce the concepts- Financial Accounting and Financial Analysis.
- To give an idea of practicing techniques of Ratio Analysis

OUTCOME:

The student will be able to.....

- Identify managerial problems with optimum solutions.
- Analyze the demand factors on a product that may be existed/new.
- Know various methods of Demand forecasting
- Understand different business organizations.
- Know techniques and evaluation of capital budgeting.
- Understand financial performance through financial statements

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	3	2	1	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	-	1	2	-	-	-	-	-	-	-	-	-	-
CO3	-	-	-	2	-	-	2	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	1	2	2	-	-	-	-	-
CO5	-	3	2	1	1	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	1	3	-	-	-	-

UNIT I: INTRODUCTION TO MANAGERIAL ECONOMICS: Definition, nature and scope of managerial economics- relation with other disciplines- Demand Analysis: Demand Determinants, Law of Demand and its exceptions

UNIT II: ELASTICITY OF DEMAND: Definition, Types, Measurement and Significance of Elasticity of Demand. Demand forecasting, factors governing demand forecasting, methods of demand forecasting (Survey methods, Statistical methods, Expert opinion method, Test marketing, Controlled experiments, Judgmental approach to Demand Forecasting)

UNIT III: TYPES OF BUSINESS ORGANISATIONS AND NEW ECONOMIC ENVIRONMENT: Characteristic features of business, features and evaluation of sole proprietorship, partnership, Joint Stock Company, public enterprises and their types, changing business environment in post-liberalization scenario.

UNIT IV: CAPITAL AND CAPITAL BUDGETING: Capital and its significance, types of capital, estimation of fixed and working capital requirements, methods and sources of raising finance.

Nature and scope of capital budgeting, features of capital budgeting proposal, methods of capital budgeting – payback method, accounting rate of return (ARR) and Net present value method (Simple problems).

UNIT V: INTRODUCTION TO FINANCIAL ACCOUNTING: Double-Entry Book Keeping, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments).

UNIT VI: FINANCIAL ANALYSIS THROUGH RATIOS

Computation, Analysis and Interpretation of financial statements through Liquidity Ratios (Current and Quick ratio), Activity ratios (Inventory Turnover Ratio and Debtor Turnover Ratio), Capital Structure Ratios (Debt- Equity Ratio, Interest Coverage Ratio) and Profitability ratios (Gross Profit Ratio, Net Profit Ratio, Operating Ratio, P/E Ratios and EPS), Du Pont Chart.

TEXT BOOKS:

1. Management Economics and Financial Analysis, Aryasri, 4/e, TMH, 2009.
2. Managerial Economics, Varshney & Maheswari, Sultan Chand, 2009.

REFERENCES

1. Financial Accounting and Analysis, Premchand Babu, Madan Mohan, Himalaya, 2009
2. Managerial Economics and Financial Analysis, S.A. Siddiqui, and A.S. Siddiqui, New Age
3. Principles of Business Economics, Joseph G. Nellis and David Parker, 2/e, Pearson.
4. Managerial Economics in a Global Economy, Domnick Salvatore, Cengage, 2009.
5. Managerial Economics, H.L.Ahuja, 3/e, S.Chand, 2009

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous)

ELECTRICAL AND ELECTRONICS ENGINEERING

III-B.Tech II-Sem (EEE)

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(A0217156) POWER SYSTEM ANALYSIS

(Department Elective-I)

OBJECTIVE:

- This course introduces formation of Z bus of a transmission line, power flow studies by various methods, short circuit analysis

OUTCOME:

1. To apply a basic knowledge of network under both balanced and unbalanced fault conditions.
2. Apply load flow analysis to an electrical power network and interpret the results of the analysis.
3. To understand construction, operation and equivalent circuit of power system elements.
4. To examine the need of various analysis like fault analysis, short circuit analysis.
5. Identify and analyze various power quality issues in power systems.
6. To design power systems modals using MATLAB/Simulink.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	-	2	-	-	-	-	2	1	-	1	-	-	3
CO2	3	3	2	2	-	-	-	-	2	1	-	2	-	-	3
CO3	3	3	2	2	1	-	-	-	2	1	3	2	-	-	3
CO4	1	2	1	2	2	2	-	-	2	1	2	2	-	-	3
CO5	2	2	3	2	2	2	-	-	2	1	2	2	-	-	3
CO6	1	3	1	2	3	2	-	-	2	1	3	2	-	-	3

UNIT I

POWER SYSTEM NETWORK MATRICES-I: Graph Theory: Definitions, Bus Incidence Matrix, Y_{bus} formation by Direct and Singular Transformation Methods, Numerical Problems on Y_{bus} with mutual coupling(max size 3x3) and without mutual coupling.

UNIT II

POWER SYSTEM NETWORK MATRICES-II: Formation of Z_{Bus}: Partial network, Algorithm for the Modification of Z_{Bus} 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).

UNIT III

POWER FLOW STUDIES-I: 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.

UNIT IV

POWER FLOW STUDIES-II: Newton Raphson Method in Rectangular & Polar Co-Ordinate Form: Load Flow Solution with or without PV Busses- Algorithm and Flowchart. Decoupled and Fast Decoupled Methods. Comparison of Different Methods

UNIT V

SHORT CIRCUIT ANALYSIS-I: 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.

UNIT VI

SHORT CIRCUIT ANALYSIS-II: 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.

TEXT BOOKS:

1. Modern Power system Analysis – by I.J.Nagrath & D.P.Kothari: Tata McGraw-Hill Publishing Company.
2. Power System Analysis by Nagsarkar and Sukhija, OXFORD University Press.

REFERENCE BOOKS:

1. Computer Methods in Power Systems, Stagg El – Abiad & Stags, Mc Graw-hill Edition.
2. Computer Techniques in Power System Analysis by M A Pai, Second Edition, TMH.
3. Computer Techniques and Models in Power Systems by K. Uma Rao, I. K. International.

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(Autonomous)

ELECTRICAL AND ELECTRONICS ENGINEERING

III-B.Tech II-Sem (EEE)

T	C
3+1*	3

(A0218156) LINEAR SYSTEM ANALYSIS

(Department Elective-I)

OBJECTIVE:

- Basic operation in matrices, analysis of various signals, verification of linearity and time invariance property of a given continuous system, & z-transforms

COURSE OUTCOMES:

1. To Apply Fourier Transformations to the electrical quantities
2. To Apply Laplace Transformations to the Electrical Networks
3. To Understand the testing concepts of Polynomials
4. To Synthesize the Electrical Circuits such as RL & RC Networks
5. To Apply the Z-Transformations for the Electrical Signals

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	2	-	-	-	-	-	2	-	-	-	2	-	-
CO2	2	2	2	-	-	-	-	-	2	-	-	-	2	-	-
CO3	2	3	2	-	-	-	-	-	2	-	-	-	2	-	-
CO4	2	3	2	-	-	-	-	-	2	-	-	-	2	-	-
CO5	2	3	2	-	-	-	-	-	2	-	-	-	2	-	-

UNIT I

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.

UNIT II

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 realisability-Hurwitz polynomials-positive real functions-Properties-Testing-Sturm's Test, examples.

UNIT V

NETWORK SYNTHESIS: Network synthesis: Synthesis of one port LC networks-Foster and Cauer methods-Synthesis of RL and RC one port networks-Foster and Cauer methods

UNIT VI

Z-TRANSFORMS: Fundamental difference between continous and discrete time signals, discrete time complex, exponential and sinusoidal signals, periodicity of discrete time complex exponential, concept of 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 Publication.
2. Network Analysis and Synthesis – Umesh Sinha- Satya Prakashan Publications

REFERENCE BOOKS:

1. Linear System Analysis – A N Tripathi, New Age International
2. Network and Systems – D Roy Chowdhary, New Age International
3. Engineering Network Analysis and Filter Desgin- Gopal G Bhisk & Umesh
4. Linear System Anlysis by A.Cheng, Oxford publishers.

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ELECTRICAL AND ELECTRONICS ENGINEERING

III-B.Tech II-Sem (EEE) T C
3+1* 3

(A0219156) OPERATIONS & QUALITY MANAGEMENT

(Department Elective-I)

OBJECTIVES:

- The O & QM objective is to improve the performance of the organisation, and achieve a sustained success that allows the business to continually improve and develop.

COURSE OUTCOMES:

1. The students are expected to come with Understanding customer needs, requirements and expectations.
2. Promote leadership and teamwork towards common goals and purpose.
3. Efficient utilization of resources while working to pre-determined targets.
4. Identify and manage working systems that improve the organization's efficiency and effectiveness.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	-	-	-	-	2	2	2	-	-	-	2	-	-	-
CO2	2	-	-	-	-	2	2	2	-	-	-	2	-	-	-
CO3	-	-	-	-	-	2	2	2	-	-	-	2	-	-	-
CO4	-	-	-	-	-	2	2	2	-	-	-	2	-	-	-

UNIT I

INTRODUCTION TO OR: OR - An Overview – Features of operations research-Typical application of Operations Research-Models in operations research

UNIT II

PROGRAMMING TECHNOLOGY: Linear Programming and Applications: Linear Programming- Graphical Method -Linear Programming - Simplex Method

UNIT III

TRANSPORTATION MODEL: Definition and application of the Transportation Model, Solution of the Transportation Problem

UNIT IV

INTRODUCTION TO QUALITY: Quality management philosophies-Juran, Deming, Crosby, Feigenbaum, Ishikawa– Stages of Evolution– continuous improvement – objectives – internal and external customers.

UNIT V

QUALITY STANDARDS: Need of standardization- ISO certification process-ISO 9000 series – ISO 14000 series – other contemporary standards

UNIT VI

SIX SIGMA APPROACH: Application of six sigma approach to various industrial situations

REFERENCE BOOKS:

1. F.S. Hillerand G.J. Lieberman: Introduction to Operations Research Holden - Day Inc., San Francisco.
2. Cook, T.M. and R.A. Hussel: Introduction to Management Science, Prentice-Hall, Englewood – Cliffs.

3. Gupta M.P. and J.K. Sharma, Operations Research for Management, National Publishing House, New Delhi.Lock D. Project Management Handbook, Gower, London
4. Total Quality Management, Joseph & Susan Berg
5. Total Quality Management, Besterfield, Pearson.
6. Quality management, Howard Giltow-TMH

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(Autonomous)

ELECTRICAL AND ELECTRONICS ENGINEERING

III-B.Tech II-Sem (EEE) T C
3+1* 3

(A0220156) HVDC TRANSMISSION

(Department Elective-II/ Massive Online Open Course-MOOC)

OBJECTIVE:

- This subject deals with the importance of HVDC transmission, analysis of HVDC converters, Faults and protections, Harmonics and Filters.

COURSE OUTCOMES:

1. To understand the economical aspects of Transmission System
2. To analyze the usage of HVDC convertors
3. To understand the working of convertors and its control in HVDC system.
4. To understand the reactive power control and alternate control strategies using shunt capacitors and synchronous condensers.
5. To analyze the convertor faults and protection using filters, surge arrestors and smoothing reactors.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	2	-	-	-	-	-	-	-	-	-	-	-	2
CO2	2	3	2	2	-	-	-	-	-	-	-	-	-	-	2
CO3	2	3	2	2	-	-	-	-	-	-	-	-	-	-	2
CO4	2	3	2	-	-	-	-	-	-	-	-	-	-	-	2
CO5	2	3	2	-	-	-	-	-	-	-	-	-	-	-	2

UNIT I

BASIC CONCEPTS: Economics & Terminal equipment of HVDC transmission systems: Types of HVDC Links – Apparatus required for HVDC Systems – Comparison of AC &DC Transmission, Application of DC Transmission System – Planning & Modern trends in D.C. Transmission.

UNIT II

ANALYSIS OF HVDC CONVERTERS: Choice of Converter configuration – analysis of Graetz – characteristics of 6 Pulse & 12 Pulse converters – Cases of two 3 phase converters in star –star mode – their performance

UNIT III

CONVERTER & HVDC SYSTEM CONTROL

Principal of DC Link Control – Converters Control Characteristics – Firing angle control – Current and extinction angle control – Effect of source inductance on the system; Starting and stopping of DC link; Power Control.

UNIT IV

REACTIVE POWER CONTROL IN HVDC: Reactive Power Requirements in steady state-Conventional control strategies-Alternate control strategies-sources of reactive power-AC Filters – shunt capacitors-synchronous condensers.

UNIT V

CONVERTER FAULT & PROTECTION: Converter faults – protection against over current and over voltage in converter station – surge arresters – smoothing reactors – DC breakers – Audible noise-space charge field-corona effects on DC lines-Radio interference.

UNIT VI

HARMONICS& FILTERS: Generation of Harmonics –Characteristics harmonics, calculation of AC Harmonics, Non Characteristics harmonics, adverse effects of harmonics –

Calculation of voltage & Current harmonics – Effect of Pulse number on harmonics -Types of AC filters, Design of Single tuned filters –Design of High pass filters.

TEXT BOOKS:

1. HVDC Power Transmission Systems: Technology and system Interactions – by K.R.Padiyar, New Age International (P) Limited, and Publishers.
2. EHVAC and HVDC Transmission Engineering and Practice – S.Rao.

REFERENCE BOOKS:

1. HVDC Transmission – J.Arrillaga.
2. Direct Current Transmission – by E.W.Kimbark, John Wiley & Sons.
3. Power Transmission by Direct Current – by E.Uhlmann, B.S.Publications.

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ELECTRICAL AND ELECTRONICS ENGINEERING

III-B.Tech II-Sem (EEE) T C
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(A0221156) HIGH VOLTAGE ENGINEERING

(Department Elective-II/ Massive Online Open Course-MOOC)

OBJECTIVE:

- This subject deals with the detailed analysis of Breakdown occur in gaseous, liquids and solid dielectrics.
- Information about generation and measurement of High voltage and current. In addition the High voltage testing methods are also discussed.

COURSE OUTCOMES:

1. To introduce High Voltage technologies and applications.
2. To analyze the breakdown in solid , gases and liquid dielectrics.
3. To understand the generation and measurement of high voltages and currents.
4. To coordinate over voltage phenomenon and insulation.
5. To improve the testing skills in the field of high voltage electrical operators

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	2	-	-	-	-	-	-	-	-	-	-	-	2
CO2	2	3	2	2	-	-	-	-	-	-	-	-	-	-	2
CO3	2	3	2	2	-	-	-	-	-	-	-	-	-	-	2
CO4	2	3	2	-	-	-	-	-	-	-	-	-	-	-	2
CO5	2	3	2	-	-	-	-	-	-	-	-	-	-	-	2

UNIT I

INTRODUCTION TO HIGH VOLTAGE TECHNOLOGY AND APPLICATIONS: Electric Field Stresses, Gas / Vacuum as Insulator, Liquid Dielectrics, Solids and Composites, Estimation and Control of Electric Stress, Numerical methods for electric field computation, Surge voltages, their distribution and control, Applications of insulating materials in transformers, rotating machines, circuit breakers, cable power capacitors and bushings.

UNIT II

BREAK DOWN IN SOLID, GASEOUS AND LIQUID DIELECTRICS: Intrinsic breakdown, electromechanical breakdown, thermal breakdown, breakdown of solid dielectrics in practice, Breakdown in composite dielectrics, solid dielectrics used in practice
Gases as insulating media, collision process, Ionization process, Townsend's criteria of breakdown in gases, Paschen's law - Liquid as Insulator, pure and commercial liquids, breakdown in pure and commercial liquids

UNIT III

GENERATION& MEASUREMENT OF HIGH VOLTAGES AND CURRENTS: Generation of High Direct Current Voltages, Generation of High alternating voltages, Generation of Impulse Voltages, Generation of Impulse currents, Tripping and control of impulse generators. Measurement of High 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 VOLTAGE PHENOMENON AND INSULATION CO-ORDINATION: Natural causes for over voltages – Lightning phenomenon, Overvoltage due to switching surges, system faults and other abnormal conditions, Principles of Insulation Coordination on High voltage and Extra High Voltage power systems.

UNIT V

NON-DISTRUCTIVE TESTING OF MATERIAL AND ELECTRICAL APPARATUS: Measurement of D.C Resistivity, Measurement of Dielectric Constant and loss factor, Partial discharge measurements

UNIT VI

HIGH VOLTAGE TESTING OF ELECTRICAL APPARATUS Testing of Insulators and bushings, Testing of Isolators and circuit breakers, testing of cables, Testing of Transformers, Testing of Surge Arresters, Radio Interference measurements

TEXT BOOKS:

1. High Voltage Engineering by M.S.Naidu and V. Kamaraju – TMH Publications.
2. High Voltage Engineering: Fundamentals by E.Kuffel, W.S.Zaengl, J.Kuffel by Elsevier.

REFERENCE BOOKS:

1. High Voltage Engineering by C.L.Wadhwa, New Age Internationals (P) Limited.
2. High Voltage Insulation Engineering by Ravindra Arora, Wolfgang Mosch, New Age International (P) Limited.

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ELECTRICAL AND ELECTRONICS ENGINEERING

III-B.Tech II-Sem (EEE)

T	C
3+1*	3

(A0222156) ELECTRICAL MACHINE DESIGN

(Department Elective-II/ Massive Online Open Course-MOOC)

OBJECTIVE:

- The objective of this course is to understand and estimate the design consideration issues of different machines like DC machines, transformers, synchronous and asynchronous machines

COURSE OUTCOMES:

1. To understand the different types of materials used in machines.
2. To understand the various design specifications of DC machines to design DC machines.
3. To understand the various design specifications of transformer to design the transformer.
4. To understand the various design specifications of induction machine to design the induction machine.
5. To understand the various design specifications of synchronous machines to design the synchronous machines.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	-	3	2	-	-	-	-	-	-	3	-	-	2	-
CO2	1	-	2	-	-	-	-	-	2	-		2	-	2	-
CO3	2	-	2	-	-	-	-	-	-	-	3	--	-	2	-
CO4	2	-	3	-	-	-	-	-	3	-	-	2	-	2	-
CO5	2	-	2	-	-	-	-	-	-	-	3	-	-	2	-

UNIT I

PRINCIPLES OF ELECTRICAL MACHINE DESIGN: Introduction- considerations for the design of electrical machines-limitations- Different types of materials and insulators used in electrical machines.

UNIT II

DESIGN OF DC MACHINES: Output equation, choice of specific loadings and choice of number of poles, design of Main dimensions of the DC machines, Design of armature slot dimensions, commutator and brushes, magnetic circuit - estimation of ampere turns, design of yoke and poles- main and inter poles, field windings – shunt, series and inter poles.

UNIT III

DESIGN OF TRANSFORMERS (SINGLE PHASE AND THREE PHASE): Output equation for single phase and three phase transformers, choice of specific loadings, expression for volts/turn, determination of main dimensions of the core, types of windings and estimation of number of turns and conductor cross sectional area of Primary and secondary windings, estimation of no load current, expression for leakage reactance and voltage regulation. Design of tank and cooling tubes (round and rectangular)

UNIT IV

DESIGN OF INDUCTION MOTORS: Output equation, Choice of specific loadings, main dimensions of three phase induction motor, Stator winding design, choice of length of the air gap, estimation of number of slots for the squirrel cage rotor,

UNIT V

DESIGN OF ROTOR FOR INDUCTION MOTORS: Design of Rotor bars and end ring, design of Slip ring induction motor, estimation of No load current and leakage reactance, and circle diagram

UNIT VI

DESIGN OF SYNCHRONOUS MACHINES: Output equation, Choice of specific loadings, short circuit ratio, design of main dimensions, armature slots and windings, slot details for the stator of salient and non salient pole synchronous machines - Design of rotor of salient pole synchronous machines, magnetic circuits, dimensions of the pole body, design of the field winding, and design of rotor of non-salient pole machine

TEXT BOOKS:

1. A Course In Electrical Machine Design, A.K.Sawhney,Dhanpatt Rai & Sons
2. Design Of Electrical Machines, V. N. Mittle

REFERENCE BOOKS:

1. Performance And Design Of AC Machines, M.G.Say,CBS Publishers and Distributors Pvt.Ltd.
2. Design Data Handbook, A.Shanmugasundarm, G,Gangadharan, R.Palani, Wiley Eastern Ltd.

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING AND TECHNOLOGY

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ELECTRICAL AND ELECTRONICS ENGINEERING

III-B.Tech II-Sem (EEE)

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(A0223156) ELECTRICAL SYSTEMS SIMULATION

(ETAP & POWER WORLD)
(Skill Development Course)

OBJECTIVES OF ETAP:

- The main objective of this software is to study and analyze any electrical device and combination of different electrical components and their performance and characteristics. Stability of the system can be determined at any instant and we can estimate the performance at any stage. More over this software is user friendly for both technical and non-technical persons.

OBJECTIVES OF POWER WORLD:

1. To improve analytical skills using load flow studies about PQ bus.
2. To analyze short circuit analysis by the calculation of fault current and fault MVA.
3. To determine active power generation so as to reduce the cost of generation.
4. To improve the simulation skills using E-TAP and POWER WORLD softwares.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	-	-	3	-	-	-	2	-	-	-	2	-	-
CO2	2	2	-	-	3	-	-	-	2	-	-	-	2	-	-
CO3	2	2	-	-	3	-	-	-	2	-	-	-	2	-	-
CO4	2	2	-	-	3	-	-	-	2	-	-	-	2	-	-

UNIT I

LOAD FLOW STUDIES: Calculation of magnitude of voltage and load angle at the PQ bus, calculation of reactive power and load angle at the PV bus and real and reactive power at the slack bus.

UNIT II

SHORT CIRCUIT ANALYSIS: Calculation of fault current, fault MVA for different faults

UNIT III

ECONOMIC LOAD DISPATCH: Determination of active power generation of generators to reduce total the cost of generation

UNIT IV

P-V & Q-V CURVES: Thesecuresof a power system network are plotted to monitor system voltages, real power transfer is increased or reactive power is injected at selected buses

UNIT V

CONTINGENCY ANALYSIS: This provides the ability not only to analyze a power system in its base case topology, but also to analyze the system that results from any statistically likely dependent scenario

UNIT VI

Simulation using ETAP& power world:

The following tasks can be performed using ETAP & POWER WORLD easily:

- Calculation of magnitude of voltage and load angle at the PQ bus, calculation of reactive power and load angle at the PV bus and real and reactive power at the slack bus
- Calculation of fault current, fault MVA for different faults.
- The behavior of the motor can be determined.
- Harmonic analysis can be determined for a given power system.
- Transient stability of the system can be analyzed.

III-B.Tech, II-Sem (EEE) P 3 C 2

(A0298156) POWER ELECTRONICS LAB

OBJECTIVES:

- This course is intended to enable the students to understand the basics of triggering circuits required for various power converters.
- The students acquire the knowledge about the operation of various power converter

COURSE OUTCOMES:

1. To get Laboratory knowledge on basic power electronics circuits for control and conversion of electrical power.
2. To familiarize the students by introducing modern engineering simulation tools like P-Sim, MATLAB and help them to simulate and analyses of different power Converters.
3. To understand analysis and design of power electronics converters including AC-DC, DC-AC, and DC-DC through simulation.
4. To understand the operating characteristics of different converters, regulators and inverters.
5. To evaluate the performance factors of different converters practically.
6. To verify the performance of different converters and inverters using software tool.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	2	1	1	1	-	-	3	2	2	1	3	-	-
CO2	3	2	3	1	-	-	-	-	2	1	1	1	3	-	-
CO3	3	2	3	1	-	-	-	-	2	1	1	1	3	-	-
CO4	2	3	3	2	-	-	-	-	3	2	3	1	3	-	-
CO5	2	3	3	2	-	-	-	-	3	2	3	1	3	-	-
CO6	3	2	1	1	3	1	-	-	2	1	2	2	3	-	-

CHOOSE ANY TEN EXPERIMENTS IN THE FOLLOWING LIST

1. Single Phase fully controlled bridge converter with R and RL load.
2. Single Phase Half controlled converter with R and RL load.
3. Three Phase fully controlled bridge converter with R and RL load
4. Three Phase half controlled bridge converter with R and RL load.
5. Single Phase dual converter with R L load
6. Single Phase AC Voltage Controller with R and RL Load.
7. Single Phase Cycloconverter with R and RL Load.
8. Single Phase series inverter with R load.
9. Single Phase Parallel inverter with R load.
10. DC Jones chopper with R and RL Load.
11. Single phase full bridge Mc-Murray inverter with R load.
12. Single Phase AC Voltage Controller with R ,RL and RLE Loads.

13. Simulation of step down and step up chopper with R ,RL and RLE Loads

14. Simulation of single Phase dual converter with RL load.

15. Simulation of single phase full bridge inviter by using PWM control.

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(Autonomous)

ELECTRICAL AND ELECTRONICS ENGINEERING

III-B.Tech, II-Sem (EEE) P 3 C 2

(A0299156) MICRO PROCESSORS & MICROCONTROLLERS LAB

(Common to EEE & ECE)

OBJECTIVES:

- To enhance the programming skills of students.
- To drive the students in understanding the instruction sets of 8086, 8051 and TASM.
- To learn the programming for applications such as stepper motor, traffic light controller, LAC and ALC etc.

COURSE OUTCOMES:

1. To familiarize with developing of assembly level programs and providing the basics of the processors.
2. To provide a theoretical & practical introduction to microcontrollers and microprocessors, assembly language programming techniques.
3. To understand programmable peripheral devices and their Interfacing.
4. An in-depth knowledge of applying the concepts on real- time applications.
5. Becomes skilled in various 8086 Instruction set and Assembler Directives.
6. Design of hardware interfacing circuit, microcontroller and microprocessor system design considerations.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	1	1	-	-	-	2	2	1	-	2	-	-
CO2	3	2	2	-	1	2	-	-	1	1	-	-	2	-	-
CO3	3	2	3	1	1	-	-	-	1	1	-	-	2	-	-
CO4	2	3	2	1	1	-	-	1	1	1	-	-	2	-	-
CO5	2	3	1	2	1	-	-	1	1	2	-	1	2	-	-
CO6	3	2	1	1	2	2	-	-	2	1	-	-	2	-	-

EXPERIMENTS ON MICROPROCESSOR 8086 KITS:-

Introduction 8086

1. Arithmetic operations of 8-bit and 16-bit numbers
2. Finding of largest number in a given array
3. Finding of smallest number in a given array
4. Finding out of number of even and odd numbers
5. finding out of number of positive and negative numbers
6. Sum of square of N-numbers
7. Sorting of given numbers
8. Fibonacci series
9. Factorial of a given number
10. Decimal to Hex and Hex to decimal Conversion.

EXPERIMENTS ON COMPUTER SYSTEM:-

1. Introduction to TASM
2. Arithmetic operations of 8-bit and numbers-
3. Finding of largest and smallest number in a given array
4. Finding of smallest number in a given array
5. Finding out number of even and odd numbers
6. Finding out number of positive and negative numbers
7. Sorting of given numbers.
8. Binary addition of given two numbers

EXPERIMENTS ON MICROCONTROLLER 8051 KITS:-

Introduction

1. Arithmetic operations of 8-bit and 16-bit numbers
2. Finding of largest number in a given array
3. Finding of smallest number in a given array
4. ASCII to Decimal conversion
5. Sorting of given numbers.

INTERFACING USING EITHER 8086 OR 8051

1. Introduction
2. Stepper motor interfacing-
3. Traffic light Controller –
4. ADC and DAC conversions-
5. Constant display and Rolling Display

III-B.Tech, II-Sem (EEE) P 3 C 2

(A0281156) ELECTRICAL MEASUREMENTS LAB

OBJECTIVES:

- Electrical measurements lab introduces calibration of various meters like energy meter, power factor meter and measuring of energy, active and reactive power and testing of current transformers in measurement of unknown voltages and currents through potentiometers.

COURSE OUTCOMES:

1. To apply basic knowledge of moving coil and moving iron instrument principles.
2. To provide basic laboratory exposure to all electrical measuring instruments, their principles and applications.
3. Determine ratio error and phase errors in CTs and PTs.
4. Measure Resistance, Inductance and capacitance using AC and DC bridges.
5. To understand the behavior and characteristics of different equipments.
6. Verification of theoretical concepts through experimentation.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	1	2	-	-	-	1	1	-	-	3	-	-
CO2	3	3	1	-	2	-	-	-	1	1	-	-	3	-	-
CO3	3	3	2	1	1	1	-	-	1	1	-	-	3	-	-
CO4	2	3	2	1	1	-	-	1	1	1	-	-	3	-	-
CO5	2	2	1	2	1	1	-	1	1	2	-	1	3	-	-
CO6	3	2	1	1	2	1	-	-	2	1	-	-	3	-	-

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. Measurement of 3-Phase power with Two watt meter method (Balanced & Unbalanced)
6. Schering bridge & Anderson bridge
7. Measurement of 3-Phase reactive power with single-phase wattmeter
8. Measurement of 3-Phase active power using 2-CTs and 1-Phase wattmeter

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

1. Measurement of % ratio error and phase angle of given C.T. by comparison.
2. Dielectric oil testing using H.T. testing Kit

3. Optical bench – Determination of polar curve measurement of MHCP of filament lamps
4. Calibration LPF wattmeter – by Phantom testing
5. Transformer turns ratio measurement using AC bridge.
6. Measurement of resistance using Wheatstone's Bridge

IV-B.Tech, I-Sem (EEE)

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3+1*	3

(A0224157) INSTRUMENTATION

OBJECTIVES:

- Instrumentation is essential in monitoring and analysis of any Physical system and its control.
- This course deals with different types of transducers, digital voltmeters, oscilloscopes and measurement of non-electrical quantities.

OUTCOME:

1. To acquire the basic knowledge of measuring instruments and their characteristics.
2. To analyze the errors in measuring instruments and statistical analysis of reducing the random errors.
3. Understand the working of CRO, Digital Meters and Signal Analyzers.
4. To apply the acquired knowledge in measuring of electrical parameters such as voltage, frequency, Total Harmonic Distortion and the advantages of the above said instruments.
5. To design the Q-meter for calculation of unknown parameters of radio frequency coils.
6. Understand the principle and working operation of different kinds of electrical transducers.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	1	1	-	-	-	-	-	-	-	3	-	-
CO2	3	3	2	2	2	-	-	-	-	-	-	-	3	-	-
CO3	1	1	2	2	2	-	-	-	-	-	-	-	3	-	-
CO4	1	1	2	2	1	-	-	-	-	-	-	-	3	-	-
CO5	2	3	3	3	1	-	-	-	-	-	-	-	3	-	-
CO6	3	1	3	1	1	-	-	-	-	-	-	-	3	-	-

UNIT I

CHARACTERISTICS & ERRORS: Measuring Systems - Performance Characteristics - Static characteristics - Dynamic Characteristics; Errors in Measurement – Gross Errors, Systematic Errors, and Statistical Analysis of Random Errors.

UNIT II

OSCILLOSCOPE: Cathode ray oscilloscope - time base generator - horizontal and vertical amplifiers - CRO probes-applications of CRO - Measurement of phase and frequency - Lissajous patterns - Sampling oscilloscope - analog and digital type

UNIT III

ELECTRONIC MEASUREMENTS: Digital voltmeters - Successive approximation, ramp, dual-Slope integration, continuous balance type - Microprocessor based ramp type DVM, Digital Frequency meter-Digital Phase angle meter.

UNIT IV

SIGNAL ANALYSERS: Wave Analysers- Frequency selective analyzers, Heterodyne, Application of Wave analyzers- Harmonic Analyzers, Total Harmonic distortion, spectrum analyzers, Basic spectrum analyzers, spectral displays, vector impedance meter, Q meter - Peak reading and RMS voltmeters

UNIT V

TRANSDUCERS-I: Definition of transducers, Classification of transducers, Advantages of Electrical transducers, Characteristics and choice of transducers; Principle operation of resistor, inductor, LVDT and capacitor transducers; LVDT Applications.

UNIT VI

TRANSDUCERS-II: Strain gauge and its principle of operation, guage factor, Thermistors, Thermocouples, Synchros, Piezo electric transducers, photovoltaic, photo conductive cells, photo diodes. Measurement of strain, Gauge Sensitivity.

TEXT BOOKS:

1. A course in Electrical and Electronic Measurements and Instrumentation, A.K. Sawhney, Dhanpatrai & Co.
2. Electronic Instrumentation-by H.S.Kalsi Tata MCGraw-Hill.
3. Transducers and Instrumentation by D.V.S Murthy, Prentice Hall of India

REFERENCE BOOKS:

1. Measurements Systems, Applications and Design – by D O Doeblin
2. Principles of Measurement and Instrumentation – by A.S Morris, Pearson /Prentice Hall of India
3. Modern Electronic Instrumentation and Measurement techniques – by A.D Helfrick and W.D.Cooper, Pearson/Prentice Hall of India.
4. Transducers and Instrumentation by D.V.S Murthy, Prentice Hall of India

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ELECTRICAL AND ELECTRONICS ENGINEERING

IV-B.Tech, I-Sem (EEE)

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(A0225157) POWER SYSTEM CONTROL AND STABILITY

OBJECTIVE:

- This subject deals with Economic operation of Power Systems, Hydrothermal scheduling, Modeling of turbines, generators and automatic controllers are presented, single area and two area load frequency control and power system stability.

OUTCOME:

1. To provide students the knowledge of optimization techniques used in the power system.
2. Analyze Economic operation of power system and importance of LFC control
3. To understand of Hydrothermal scheduling in the power system
4. To model and design turbine and Automatic controller.
5. To express variation of frequency in the power system with varying load
6. To design power systems modals using MATLAB/Simulink.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	-	2	-	-	-	-	2	1	-	1	-	-	3
CO2	2	3	2	2	-	-	-	-	2	1	-	2	-	-	3
CO3	2	2	2	3	-	-	-	-	2	1	3	2	-	-	3
CO4	1	2	3	2	-	-	-	-	2	1	2	2	-	-	3
CO5	2	2	3	2	2	2	-	-	2	1	2	2	-	-	3
CO6	1	3	1	2	3	2	-	-	2	1	3	2	-	-	3

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: Short term coordination-Kirchmayers method-Plant scheduling methods - Constraints in Unit commitment - Hydro-Thermal scheduling (mathematical formulation and solution techniques)- Scheduling problems.

UNIT III

MODELING OF TURBINE & GOVERNOR: Modeling of Turbine: First order Turbine model, Block Diagram representation of Steam Turbines and Approximate Linear Models.

MODELING OF GOVERNOR: Mathematical Modeling of Speed Governing System – Derivation of small signal transfer function – Block Diagram. Generator-Load Model.

UNIT IV

LOAD FREQUENCY CONTROL – I: Necessity of keeping frequency constant-Definitions of Control area – Single area control – Block diagram representation of an isolated power system – Steady state analysis – Dynamic response – Uncontrolled case. Load frequency control of 2-area system – uncontrolled case and controlled case, tie-line bias control Proportional plus Integral control of single area and its block diagram representation-steady state response – Load Frequency Control and Economic dispatch control.

UNIT V

POWER SYSTEM STABILITY-I: 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 VI

POWER SYSTEM STABILITY-II: Derivation of Swing Equation.Determination of Transient Stability by Equal Area Criterion, Application of Equal Area Criterion, Critical Clearing Angle Calculation. Methods to improve Transient Stability

TEXT BOOKS:

1. Modern Power System Analysis – by I.J.Nagrath & D.P.Kothari Tata M Graw – Hill Publishing Company Ltd.
2. Power System Analysis Operation and Control – A. Chakravarthi and S. Halder, PHI.

REFERENCES BOOKS:

1. Elements of power system analysis by William. D Stevenson Jr. McGraw Hill.
2. Power generation, operation, and control Allen J. Wood, Bruce F. Wollenberg
3. Electric Energy Systems by O I Elgerd, Mc Graw-hill Edition.
4. Electric Power Systems by S. A. Nasar, Schaum's Outline Series, Revised, TMH.
5. Electric power distribution system engineering by Turan Gonen McGraw Hill.

IV-B.Tech, I-Sem (EEE) T 3+1* C 3

(A0226157) POWER SEMICONDUCTOR DRIVES

OBJECTIVES:

- This course is an extension of Power Electronics applications to AC and DC drives.
- Control of DC motor drives with single phase and three phase converters and choppers are given in detail.
- The control of AC motor drives with variable frequency converters and variable voltage are presented.

OUTCOME:

1. Acquire the knowledge of power electronics converters and their control to drive different AC and DC machines.
2. Analyze the working operation and solution to numerical problems of the drives and machines.
3. Understand the characteristics and waveforms related to output voltage of power electronic converters and speed control of machines.
4. Apply the acquired knowledge in implementation and choosing of power electronic converters to their relevant motors.
5. Able to design the appropriate converter power ratings which are suitable to the industries.
6. Inherent to the usage of simulation tools in power electronics and drives.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	1	-	-	-	-	2	-	2	-	2	3	-
CO2	3	3	2	2	-	-	-	-	3	-	2	-	2	3	-
CO3	3	3	2	2	-	-	-	-	3	-	2	-	2	3	-
CO4	3	3	2	1	-	-	-	-	2	-	2	-	2	3	-
CO5	2	3	2	-	-	-	-	-	1	--	2	-	2	3	-
CO6	1	3	1	-	-	-	-	-	-	-	2	-	2	3	-

UNIT I

CONTROL OF DC MOTORS BY 1-Φ CONVERTERS &3-Φ CONVERTERS: Introduction to Thyristor controlled Drives, Single Phase 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.

Three phase 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.

UNIT II

FOUR QUADRANT OPERATION OF DC DRIVES: Introduction to Four quadrant operation – Motoring operations, Electric Braking – Plugging, Dynamic and Regenerative Braking operations - Four quadrant operation of D.C motors by dual converters – Closed loop operation of DC motor (Block Diagram Only)

UNIT III

CONTROL OF DC MOTORS BY CHOPPERS: Single quadrant, Two –quadrant and four quadrant chopper fed dc separately excited and series excited motors – Continuous current operation – Output voltage and current wave forms – Speed torque expressions – speed

torque characteristics – Problems on Chopper fed d.c Motors – Closed Loop operation (Block Diagram Only)

UNIT IV

CONTROL OF INDUCTION MOTOR FROM STATOR SIDE: Variable voltage characteristics-Control of Induction Motor by Ac Voltage Controllers – Waveforms – speed torque characteristics. Variable frequency characteristics-Variable frequency control of induction motor by Voltage source and current source inverter and cyclo converters- PWM control – Comparison of VSI and CSI operations – Speed torque characteristics – numerical problems on induction motor drives – Closed loop operation of induction motor drives (Block Diagram Only)

UNIT V

CONTROL OF INDUCTION MOTOR FROM 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 VI

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.

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.

REFERENCE BOOKS:

1. Power semiconductor controlled drives – by G K Dubey
2. Power semiconductor drives -by S.B.Dewan, Gordon R.Slemon, A.Straughen
3. Modern Power Electronics and AC Drives by B.K.Bose, PHI.
4. Principles Of Electric Machines And Power Electronics by P.C.Sen
5. Thyristor DC drives by P.C.Sen

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(A0017157) MANAGEMENT SCIENCE

(Common to CSE, EEE & IT)

OBJECTIVES:

- To know the concept of management administration and organization structure.
- To know the personnel management and human resource management concept.
- To understand present effective production techniques.
- To know the marketing concept and functions.
- To know the rules for network diagram, PERT and CPM, project crashing.
- To know the concept of women entrepreneurship.

COURSE OUTCOMES:

- Students are able to know importance of management in different areas.
- Students are able to know what type of structures is using the present organization.
- Students are able to know how to design the plant layout and plant location.
- Students are able to know the importance of human resource department in organization.
- Students are able to know how to complete the project within the time by crashing the activities.
- Students are able to understand the importance of women playing a vital role in entrepreneurship.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	-	-	-	-	-	-	-	-	-	1	-	-	-
CO2	1	-	3	-	-	-	-	-	-	-	-	-	-	1	-
CO3	1	-	3	-	2	-	-	-	-	-	-	-	-	-	-
CO4	1	-	-	-	-	-	-	-	3	1	-	-	1	-	-
CO5	-	-	-	-	-	-	-	-	-	-	3	1	-	1	-
CO6	-	-	-	-	-	-	3	1	-	-	-	1	-	-	-

UNIT-I

INTRODUCTION TO MANAGEMENT: Concepts of Management and organization- nature, importance and Functions of Management, Taylor‘s Scientific Management Theory, Fayol‘s Principles of Management, Mayo‘s Hawthorne Experiments, Maslow‘s Theory of Human Needs, Douglas McGregor‘s Theory X and Theory Y, Herzberg‘s Two-Factor Theory of Motivation, Systems Approach to Management, Leadership Styles, Social responsibilities of Management.

UNIT-II

DESIGNING ORGANIZATIONAL STRUCTURES: Basic concepts related to Organization - Departmentation and Decentralization, Types of mechanistic and organic structures of organization (Line organization, Line and staff organization, functional organization, Committee organization, matrix organization, Virtual Organization, Cellular Organization, team structure, boundary less organization, inverted pyramid structure, lean and flat organization structure) and their merits, demerits and suitability.

UNIT-III

OPERATIONS MANAGEMENT: Principles and Types of Plant Layout-Methods of production (Job, batch and Mass Production), materials management: Objectives, Need for Inventory control, EOQ, ABC Analysis, Purchase Procedure, Stores Management and Stores Records-

supply chain management, Marketing: functions of marketing, marketing mix, marketing strategies based on product life cycle, channels of distribution.

UNIT-IV

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, Placement, Wage and Salary Administration, Promotion, Transfer, Separation, Performance Appraisal, Grievance Handling and Welfare Administration, Job Evaluation and Merit Rating.

UNIT-V

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-VI

WOMEN ENTREPRENEURSHIP: Scope of Entrepreneurship among women- promotional efforts in supporting women entrepreneurs in India-opportunities for women entrepreneurs –challenges or problems of women entrepreneurs-successful cases of women entrepreneurs.

TEXT BOOKS:

1. Aryasri: Management Science, TMH, 2004.
2. Stoner, Freeman, Gilbert, Management, 6th Ed, Pearson Education, New Delhi, 2004.

REFERENCES:

1. Kotler Philip & Keller Kevin Lane: Marketing Mangement 12/e, PHI, 2005.
2. Koontz & Weihrich: Essentials of Management, 6/e, TMH, 2005.
3. Thomas N.Duening & John M.Ivancevich Management—Principles and Guidelines, Biztantra, 2003.
4. Kanishka Bedi, Production and Operations Management, Oxford University Press, 2004.
5. Memoria & S.V.Gauker, Personnel Management, Himalaya, 25/e, 2005

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IV-B.Tech, I-Sem (EEE)

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(A0227157) ADVANCED CONTROL SYSTEMS

(DEPARTMENT ELECTIVE-III)

OBJECTIVE:

- This subject deals with state space, describing function, phase plane and stability analysis including controllability and Observability.
- It also deals with modern control and optimal control systems.

OUTCOME:

1. To understand how the state space system representation provides an internal description of the system including possible internal oscillations or instabilities.
2. To Design Controllability and Observability.
3. To Derive the describing function for different types of non-linearities and then do the stability analysis.
4. To understand how the system design minimizes or maximizes the selected performance index.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	-	2	-	2	2	2	-	-	-	-	2	-	-
CO2	3	2	-	-	2	-	2	2	2	-	-	-	2	-	-
CO3	3	-	-	2	3	2	2	2	2	-	-	-	2	-	-
CO4	-	2	2	-	2	2	2	2	-	-	-	-	2	-	-

UNIT I

STATE VARIABLE DESCRIPTION: Concept of State – State Equations for Linear Continuous time Models – Non uniqueness of state model – State diagrams for continuous time state models – Solution of state equations – State transmission matrix.

UNIT II

CONTROLLABILITY AND OBSERVABILITY: Tests for controllability and Observability for continuous time systems – Time varying case, minimum energy control, time invariant case, Principle of Duality, Controllability and Observability of state models in Jordan canonical form and other canonical forms.

UNIT III

DESCRIBING FUNCTION ANALYSIS: Introduction to nonlinear systems, Types of nonlinearities, Concepts of describing functions, Derivation of describing functions for Dead zone, Saturation, backlash, relay with dead zone and Hysteresis - Jump Resonance.

UNIT IV

PHASE-PLANE ANALYSIS: Introduction to phase-plane analysis, Method of Isoclines for Constructing Trajectories, Singular points, Phase-plane analysis of nonlinear control systems

UNIT V

MODAL CONTROL: Effect of state feedback on controllability and observability, Design of State Feedback Control through Pole placement - Full order observer and reduced order observer.

UNIT VI

STABILITY ANALYSIS: Stability in the sense of Lyapunov - Lyapunov's stability and Lypanov's instability theoremsdirect method of Lyapunov for the Linear and Nonlinear continuous time autonomous systems

TEXT BOOKS:

1. Modern Control System Theory – by M. Gopal, New Age International Publishers.
2. Advanced Control Theory - by A.Nagoor Kani

REFERENCE BOOKS:

1. Modern Control Engineering – by K. Ogata, Prentice Hall of India.
2. Control Systems Engineering by I.J. Nagarath and M.Gopal, New Age International (P) Ltd.
3. Systems and Control by Stainslaw H. Zak , Oxford Press.
4. Digital Control and State Variable Methods – by M. Gopal, Tata Mc Graw-Hill Companies.

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IV-B.Tech, I-Sem (EEE) T C
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(A0228157) DIGITAL CONTROL SYSTEMS

(Department Elective-III)

OBJECTIVES:

- To equip the students with the basic knowledge of A/D and D/A conversion
- To understand the basics of Z- Transform
- To study the stability analysis of digital control system
- To equip the basic knowledge of digital process control design

COURSE OUTCOMES:

1. To obtain the basic knowledge of A/D and D/A conversion
2. To Understand the basics of Z- Transform
3. To Study the stability analysis of digital control system
4. To obtain the basic knowledge of digital process control design

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	-	-	-	-	-	-	-	-	-	-	-	2	-	-
CO2	2	2	-	-	-	-	-	-	-	-	-	-	2	-	-
CO3	2	-	-	-	-	-	-	-	-	-	-	-	2	-	-
CO4	2	2	2	-	-	-	-	-	-	-	-	-	2	-	-

UNIT I

SAMPLING AND RECONSTRUCTION: Introduction, sample and hold operations, sampling theorem, reconstruction of original sampled signal to continuous time signal

Z-TRANSFORMS: Introduction, Linear difference equations, pulse response, Z-transforms, Theorems of Z transforms, the inverse Z-transforms, Modified Z-transforms

UNIT II

Z-PLANE ANALYSIS OF DISCRETE TIME CONTROL SYSTEMS: Z-transform method for solving difference equations: pulse transform function, block diagram analysis of sampled – data systems, mapping between s-plane and z-plane; primary strips and complementary strips

UNIT III

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

UNIT IV

CONTROLLABILITY AND OBSERVABILITY: Concepts of controllability and Observability, tests for controllability and Observability, duality between controllability and Observability, controllability and Observability conditions for pulse transfer functions

UNIT V

STABILITY ANALYSIS: Stability analysis of closed loop systems in the Z-plane, Jury stability criterion test-Stability analysis by use of the bilinear transformation and Routh stability criterion - Stability analysis using Liapunov theorems

UNIT VI

DESIGN OF DISCRETE TIME CONTROL SYSTEM BY CONVENTIONAL METHODS: Design of digital control based on the frequency response methods-Bilinear transformation

and design procedure in the w-plane, lead, lag and Lead-lag compensators and digital PID controllers. Design digital control through dead beat response methods.

TEXT BOOKS:

1. Discrete Time Control Systems-K.Ogata Pearson Education
2. Digital Control systems and State Variables methods by M.Gopal

REFERENCE BOOKS:

1. Digital Control Engineering Kuo, Oxford University
2. Digital Control Engineering M.Gopal

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(Autonomous)

ELECTRICAL AND ELECTRONICS ENGINEERING

IV-B.Tech, I-Sem (EEE)

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(A0229157) NEURAL NETWORKS & FUZZY SYSTEMS

(Department Elective-III)

OBJECTIVE:

- This course introduces the basics of neural networks, single &multi-layer feed forward networks, fuzzy sets & fuzzy logic components.

OUTCOME:

1. To differentiate Biological system, intelligent systems and the concepts of crisp and fuzzy set theory
2. To analyze the learning strategies of Artificial Neural networks and learning rules
3. To understand training algorithms and are able to provide adequate knowledge about feed forward and feedback neural networks.
4. To design training algorithms for associative memory network for pattern recognition problems
5. To demonstrate knowledge and understanding of fuzzy system as they apply in real time systems
6. To apply different methodologies to solve the problems related to defuzzification.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	2	1	-	-	-	-	-	-	-	1	-	-
CO2	3	3	2	2	2	-	-	-	-	-	-	-	1	-	-
CO3	3	3	3	3	2	-	-	-	-	-	-	1	1	-	-
CO4	3	3	3	2	3	-	2	-	-	-	-	2	1	-	-
CO5	3	3	3	2	1	-	-	-	-	-	-	-	1	-	-
CO6	3	3	3	3	2	-	-	-	-	-	-	2	1	-	-

UNIT I

ARTIFICIAL NEURAL NETWORKS: Introduction, Biological Neuron, Artificial Neuron, Basic concepts of Neural Networks, Basic Models of ANN Connections, McCulloch-Pitts Model, Characteristics of ANN, Applications of ANN.

UNIT II

ESSENTIALS OF ARTIFICIAL NEURAL NETWORKS: Artificial Neuron Model, Operations of Artificial Neuron, Types of Neuron Activation Function, ANN Architectures, Classification Taxonomy of ANN – Connectivity, Learning Strategies (Supervised, Unsupervised, Reinforcement), Learning Rules, Numerical problems, Types of Application

UNIT III

SUPERVISED LEARNING NETWORKS: Perceptron Network, Perceptron Learning Rule, Architecture, Perceptron Training Algorithm, ADALINE, MADALINE, Back Propagation Network, BP Learning Rule, Input Layer Computation, Hidden Layer Computation, Output Layer Computation, Radial Basis Function Demonstration through MATLAB

UNIT IV

ASSOCIATIVE MEMORY NETWORK: Training Algorithms for Pattern Association, Auto Associative Memory Network, Hetero Associative Memory Network, BAM, Hopfield Networks, Applications

UNIT V

CLASSICAL & FUZZY SETS: Introduction to classical sets - properties, Operations and relations; Fuzzy sets, Membership, Uncertainty, Operations, properties, fuzzy relations, cardinalities, membership functions.

UNIT VI

FUZZY LOGIC SYSTEM COMPONENTS: Fuzzification, Membership value assignment, development of rule base and decision making system, Defuzzification to crisp sets, Defuzzification methods, Applications

TEXT BOOKS:

1. Neural Networks and Fuzzy Logic System by Bart Kosko, PHI Publications.
2. Neural Networks, Fuzzy logic, Genetic algorithms: synthesis and applications by Rajasekharan and Pai – PHI Publications.
3. Fundamental of Artificial Neural Network and Fuzzy Logic-by Rajesh Kumar, Lakshmi publications

REFERENCE BOOKS:

1. Neural Networks – James A Freeman and Davis Skapura, Pearson Education.
2. Neural Networks – Simon Hakins , Pearson Education

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ELECTRICAL AND ELECTRONICS ENGINEERING

IV-B.Tech, I-Sem (EEE)

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(A0230157) RENEWABLE ENERGY SOURCES

(Department Elective-IV)

OBJECTIVES:

- It introduces solar energy its radiation, collection, storage and application.
- It also introduces the Wind energy, Biomass energy, geothermal energy and ocean energy as alternative energy sources.

OUTCOME:

1. To understand the fundamentals and main characteristics of renewable energy sources and their differences compared to fossil fuels.
2. Analyze the technological basis for harnessing renewable energy sources.
3. Describe the main components of different renewable energy systems.
4. Collect and organize information on renewable energy technologies as a basis for further analysis and evaluation.
5. Design renewable/hybrid energy systems that meet specific energy demands, are economically feasible and have a minimal impact on the environment.
6. Discuss how to utilize local energy resources (renewable and non- renewable) to achieve the sustainable energy system.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2	1	-	-	3	3	3	1	-	-	-	-	-	3
CO2	1	-	2	1	2	3	3	-	2	-	-	1	-	-	3
CO3	1	2	2	1	2	1	2	-	2	-	-	2	-	-	3
CO4	1	2	2	2	2	-	1	2	2	-	-	2	-	-	3
CO5	2	2	3	2	2	1	1	-	-	-	-	2	-	-	3
CO6	1	2	3	-	2	3	3	3	-	-	-	3	-	-	3

UNIT I

SOLAR RADIATION AND ITS MEASUREMENT: Availability of energy sources- energy scenario in India -Solar Constant-Spectral distribution of extraterrestrial radiation-terrestrial solar radiation-solar radiation geometry-computation of cosθ for any location having any orientation- sunrise, sunset and day length- empirical equation for estimating the availability of solar radiation-solar radiation measurements-solar radiation data for India.

UNIT II

SOLAR ENERGY COLLECTORS: Introduction-Flat Plate Collector-Effect of Design parameters on performance- laws of thermal radiation-radiation heat transfer between real bodies-transmissivity of cover system-performance analysis of a liquid flat plate collector-total loss coefficient and heat losses-concentrating collectors-types-thermodynamic limits to concentration-performance analysis of cylindrical parabolic collector-compound parabolic concentrator-tracking CPC and solar swing-performance analysis of CPC

UNIT III

SOLAR PHOTOVOLTAIC SYSTEM: Introduction-Semiconductor materials and doping- n-type and p-type semiconductors-photon energy-Fermi level- p-n junction-photovoltaic effect- PV cell characteristics- efficiency of solar cells-limits to cell efficiency-semiconductor materials for solar cells-standalone applications-solar photovoltaic hybrid system-grid interactive solar PV system –solar photovoltaics in India

UNIT IV

WIND ENERGY; Basic principles of wind energy conversion-site selection considerations-Basic components of wind energy conversion systems-classification of wind turbines-types of rotors (Horizontal & Vertical Axis) and design considerations-Aerodynamic operation of wind turbines-Wind Energy extraction- Extraction of wind turbine power- Wind characteristics- Advantages & Disadvantages of WECS

UNIT V

FUEL CELLS: Introduction- Principle of operation of an acidic fuel cell Methanol fuel cell-type of fuel cells- Energy output of fuel cell-efficiency & emf of fuel cell-Gibbs-Helmholtz equation- Characteristics of fuel cell- Thermal efficiency of fuel cell- Advantages & Disadvantages of fuel cells.

UNIT VI

BIO-MASS & GEOTHERMAL: Bio- mass Resources-Bio-Mass Conversion Technologies-Bio-Chemical Conversion-Bio-mass Gasification

Structure of Earth's Interior-Plate tectonic theory-Geothermal Field-Geo thermal Resources-geo thermal power generation-Geo thermal-Preheat hybrid with conventional plant-Utilization of geo thermal energy.

TEXT BOOKS:

1. "Renewable Energy Sources and emerging Technologies" by D.P Kothari, K.C Singhal and Rakesh Ranjan-Eastern Economy Edition-Prentice Hall of India.
2. "Renewable Energy Resources" by G N Tiwari and M K Ghosal- Narosa Publications

REFERENCE BOOKS:

1. Renewable Energy Sources by John Twidell & Tony Weir.
2. Non-Conventional Energy Systems: Principles, Progress and Prospects by K.M.Mital, Wheeler Publishing
3. Non-Conventional Energy Sources by G.D. Rai, Khanna Publishers
4. Renewable energy sources and emerging technologies by D.P.Kothari, K.C.Singhal, PHI.

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous)

ELECTRICAL AND ELECTRONICS ENGINEERING

IV-B.Tech, I-Sem (EEE)

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3+1*	3

(A0231157) PROGRAMMABLE LOGIC CONTROLLERS

(Department Elective-IV)

OBJECTIVE:

- This course is essential in monitoring and analyzing the PLC In this course Theory and implementation about PLC is discussed in detail.

OUTCOME:

1. To provide knowledge levels needed for PLC programming and operating.
2. To make the students how devices to which PLC input and output modules are connected
3. To train the students to create ladder diagrams from process control descriptions.
4. To make the students understand various types of PLC registers
5. Apply PLC Timers and Counters for the control of industrial processes
6. To make the students understand PLC functions, Data Handling Function

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2	1	-	-	3	3	3	1	-	-	-	-	-	3
CO2	1	-	2	1	2	3	3	-	2	-	-	1	-	-	3
CO3	1	2	2	1	2	1	2	-	2	-	-	2	-	-	3
CO4	1	2	2	2	2	-	1	2	2	-	-	2	-	-	3
CO5	2	2	3	2	2	1	1	-	-	-	-	2	-	-	3
CO6	1	2	3	-	2	3	3	3	-	-	-	3	-	-	3

UNIT I

PLC Basics: PLC system, I/O modules and interfacing, CPU processor, programming Equipment, programming formats, construction of PLC ladder diagrams, Devices connected to I/O modules.

UNIT II

PLC Programming: Input instructions, outputs, operational procedures, programming examples using contacts and coils. Drill press operation

UNIT III

Digital logic gates, programming in the Boolean algebra system, conversion examples Ladder Diagrams for process control: Ladder diagrams & sequence listings, ladder diagram construction and flowchart for spray process system.

UNIT IV

PLC Registers: Characteristics of Registers, module addressing, holding registers, Input Registers, Output Registers.

UNIT V

PLC Functions: Timer functions & Industrial applications, counter function & industrial applications, Arithmetic functions, Number comparison functions, number conversion functions

UNIT VI

Data Handling functions: SKIP, Master control Relay, Jump, Move, FIFO, FAL, ONS, CLR & Sweep functions and their applications. Bit Pattern and changing a bit shift register, sequence functions and applications, controlling of two-axis & three axis Robots with PLC, Matrix functions.

TEXT BOOKS:

1. Programmable Logic Controllers- Principles and Applications by John W. Webb & Ronald A. Reiss, Fifth Edition, PHI
2. Programmable Logic Controllers by W. Bolton, Elsevier.

REFERENCE BOOKS:

1. Programmable Logic Controllers- Programming Method and Applications –JR. Hackworth & F.D Hackworth Jr. –Pearson.
2. Programmable controllers, Theory and Implementation –Second edition, E.A. Bryan, An industrial text company publication, USA.

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(Autonomous)

ELECTRICAL AND ELECTRONICS ENGINEERING

IV-B.Tech, I-Sem (EEE) T C
3+1* 3

(A0406157) DIGITAL SIGNAL PROCESSING

(Common to ECE & EEE)
(Department Elective-IV)

OBJECTIVES:

The course content enables students to:

- Enhance the analytical ability of the students in facing the challenges posed by growing trends in communication, control and signal processing areas.
- Develop ability among students for problem formulation, system design and solving skills
- Demonstrate basic knowledge of Digital Signal Processing by understanding various transformations
- Understand Various Discrete-time signals and class of linear shift-invariant systems will be studied using the convolution sum, and the frequency domain, using transformations.
- Design system with digital network composed of adders, delay elements, and coefficient multipliers.

COURSE OUTCOMES:

1. Represent of DT signals analytically & Visualize them in the Time domain.
2. Ready to utilize FT.
3. To implement DFT's using FFT.
4. To determine and implement the appropriate type of design method for FIR filters.
5. Choose appropriate decimation and interpolation factors for high performance filters

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	-	-	-	-	-	-	-	1	-	-	1	-	-
CO2	2	2	-	-	1	-	-	-	-	-	-	1	1	-	-
CO3	2	2	-	-	-	-	-	-	-	-	-	-	1	-	-
CO4	2	2	-	-	-	-	-	-	-	-	-	-	1	-	-
CO5	2	2	1	-	-	-	-	-	-	-	-	1	1	-	-

UNIT I

INTRODUCTION: Review of Discrete Time Signals and Sequences, Frequency domain representation of Discrete Time Signals and Systems, DTFT.

Discrete Fourier Series: Properties of Discrete Fourier Series, DFS representation of periodic sequences.

DISCRETE FOURIER TRANSFORMS: Properties of DFT, Linear Convolution of Sequences using DFT, Computation of DFT. Review of Z-Transforms, applications of Z-Transforms, Relation between Z-Transform and DFS.

UNIT II

FAST FOURIER TRANSFORMS: Radix-2 Fast Fourier Transforms (FFT), Decimation in Time and Decimation in Frequency FFT Algorithms, Inverse FFT.

UNIT III

REALIZATION OF DIGITAL FILTERS: Solution of Difference Equations of Digital Filters, Block Diagram Representation of Linear Constant Coefficient Difference Equations, Basic structures of IIR systems: Direct form-I realization, Direct form-II realization, Cascade form realization, Parallel form realization, Basic structures of FIR systems: Direct form realization, Cascade form realization, Lattice structures of IIR systems, Lattice structures of

FIR systems. Conversion from Lattice structure to direct form, Conversion from direct from to Lattice structure, Lattice-ladder structure.

UNIT IV

IIR DIGITAL FILTERS: Analog filter approximations Butterworth and Chebyshev, Design of IIR digital filters from analog filters, Design examples, Frequency Transformations in Analog Domain and Frequency Transformations in digital domain, Illustrative Problems.

UNIT V

FIR DIGITAL FILTERS: Characteristics of FIR Digital Filters, Frequency Response - Design of FIR Digital Filters Using Window Techniques, Frequency Sampling Technique, Comparison of IIR and FIR filters, Illustrative Problems

UNIT VI

MULTIRATE DIGITAL SIGNAL PROCESSING FUNDAMENTALS: Basic Sampling Rate Alteration Devices, Multirate Structures for Sampling Rate Converters, Multistage Design of Decimator and Interpolator, Poly-Phase Decomposition.

APPLICATIONS OF DSP: Spectral analysis of non-stationary Signals, Trans multiplexers

TEXT BOOKS:

1. Digital signal processing, principles, Algorithms and applications: John G. Proakis, Dimitris G. Manolakis, Pearson Education/PHI, 4th ed., 2007.
2. Digital signal processing, A computer base approach- Sanjit K Mitra, Tata Mcgraw Hill, 3rd edition, 2009.
3. Discrete Time Signal Processing-A.V. Oppenheim and R.W. Schaffer, 2nd ed., PHI.

REFERENCES:

1. Digital signal processing: Andreas Antoniou, TATA McGraw Hill, 2006.
2. A Text book on Digital Signal processing – R S Kaler, M Kulkarni,, Umesh Gupta, I K International Publishing House Pvt. Ltd.
3. Digital signal processing: M H Hayes, Schaum's outlines, TATA Mc-Graw Hill, 2007.
4. Digital Signal Processing by Ramesh Babu.

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous)

ELECTRICAL AND ELECTRONICS ENGINEERING

IV-B.Tech, I-Sem (EEE)

T	C
3+1*	3

(A0232157) CONTROL & AUTOMATION

(Open Elective)

OBJECTIVES:

- To help the students understand concept of open loop and closed loop system.
- To study the concept of time response and frequency response of the system and the basics of stability analysis and state variable analysis.
- To Learn the major components of a Programmable Logic Controller (PLC) i.e.,CPU, input modules, and output modules in a PLC;
- To learn programming of PLC; Work with PLC programming using ladder logic

COURSE OUTCOMES:

1. Represent the mathematical model of a system
2. Determine the response of different order systems for various step inputs
3. Analyze the stability of the system.
4. Demonstrate an ability to program Programmable Logic Controllers using ladder logic and other programming standards
5. Describe the advantages, use and applications of Programmable Logic Controllers (PLC"s).

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	-	2	2	2	-	-	-	-	-	-	-	1	-	-
CO2	2	2	2	2	2	2	-	-	-	-	-	-	1	-	-
CO3	2	-	2	-	2	-	-	-	-	-	-	-	1	-	-
CO4	2	2	2	-	2	-	-	-	-	-	-	-	1	-	-
CO5	2	-	2	-	2	-	-	-	-	-	-	-	1	-	-

UNIT I

MODELING OF LINEAR CONTROL SYSTEMS: Open-loop and closed-loop systems, control system components, Advantages, disadvantages & Applications of automated control system. Servo motors, position control systems, Transfer functions, equations of electrical and mechanical systems.

UNIT II

BLOCK DIAGRAMS: Block diagram representation and manipulation, signal flow graphs-mason"s gain formula to determine overall system gain. Feedback Characteristics of Control Systems: Feedback and non-feedback systems, effects of feedback.

UNIT III

TIME RESPONSE: Types of input, transient response of second order system for step input, time-response specifications, steady state error and error constants, proportional, derivative and integral controls. Concept of Stability: Stability of systems-Routh Hurwitz criterion. Compensation (Without Design): The necessity of compensation, series and parallel compensation. Realization of basic lead, Lag and lead-Lag compensators

UNIT IV

ROOT LOCUS: Definition of Root Locus, construction Procedure, properties of typical systems analyzed by root locus techniques - Bode Plot

UNIT V

PLC BASICS: PLC system, I/O modules and interfacing, CPU processor, programming Equipment, rogramming formats, construction of PLC ladder diagrams, Devices connected

to I/O modules. **PLC Programming:** Input instructions, outputs, operational procedures, programming examples using contacts and coils. Drill press operation

UNIT VI

DIGITAL LOGIC GATES: Programming with logic gates, programming in the Boolean algebra system, conversion examples **PLC Functions:** Timer functions & Industrial applications, counters, counter function industrial applications, Arithmetic functions, Number comparison functions, number conversion functions

TEXT BOOKS:

1. Nagrath and Gopal,"Control systems Engineering", New Age International Publications.
2. B.C.Kuo, "Automatic Control Systems", Oxford.
3. K. Ogata , "Modern control Engineering", Pearson
4. Naresh - K.Sinha ,"Control Systems", New Age International Publishers.
5. B.S.Manke ,"Linear Control Systems".
6. John W. Webb & Ronald A. Reiss, "Programmable Logic Controllers- Principles and Applications", PHI

REFERENCE BOOKS:

1. Madan Gopal , "Control Systems", TMH
2. Porf, Bishop , "Modern Conrtol systems", Addison Wesley
3. (Shaum"s out line series) , "Feedback control systems", TMH
4. R.C.Shukla, "Control Systems", Dhanpat Rai.
5. Ashok Kumar, "Control Systems", TMH.
6. JR. Hackworth & F.D. Hackworth Jr., "Programmable Logic Controllers- Programming Method and Applications", Pearson.

IV-B.Tech, I-Sem (EEE)

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3+1*	3

(A0233157) PUBLIC SPEAKING

(Open Elective)

Public communication plays a role in almost everyone's life. We are asked to present our ideas to audiences in educational, work, social, and political settings. We listen to political and public addresses, class lectures, sermons, business presentations, and informal talks. *The public speaking course* is intended to help students to develop their understanding and skills as public communicators both as speakers and listeners. This course teaches nuts-and-bolts tips and techniques to become a more confident and competent public speaker. In this course, students are assessed on their abilities to apply the learning to specific presentations and coached to address areas of improvement.

OBJECTIVES:

- Captivate and engage an audience
- Use "Power Periods" and oral techniques to project competence
- Gesture, and position your body to convey strength
- Interact with displays, notes, and PowerPoint presentations
- Come up with customized ways to improve your own personal public speaking style

COURSE OUTCOMES:

1. To be able to present ideas to the audience in an educational and professional settings
2. Understand the structure and types of Public Speaking
3. To implement non verbal cues and assess audience demographics
4. To have a practical orientation via successful speech analysis
5. To carry out technicalities such as PPTs and Multi media

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	2	2	3	3	3	1	2	-	-	-
CO2	-	-	-	-	-	2	1	3	3	3	1	2	-	-	-
CO3	-	-	-	-	-	2	1	3	3	2	1	2	-	-	-
CO4	-	-	-	-	-	2	2	3	3	3	1	2	-	-	-
CO5	-	-	-	-	-	2	1	3	3	3	1	2	-	-	-

UNIT I

THE PUBLIC COMMUNICATOR: A PERSPECTIVE: The components of public communication - Perceptions and Attitudes

UNIT II

GETTING STARTED: Speaking to diverse audiences - Demographics – Psychographics – Rhetorographics

UNIT III

DEVELOPING THE SPEECH: Supporting Materials -Visual Aids - Photographs, pictures, Diagrams, Maps - Audio visual Aids

UNIT IV

STRUCTURING THE SPEECH: The Introduction -The Body -The Conclusion - Culture and Speaking Style -Listener Anxiety

UNIT V

TYPES OF SPEECHES: Informative Speech - Persuasive Speech - Ceremonial Speech

UNIT VI

Successful Speeches – Case Studies

REFERENCE BOOKS

1. Handbook of Public Comminication – Principles & Practice by AndrewD. Wolvin, Roy.M. Berko & Darlyin R.Wolvin. JAICO Books, 2007
2. Tips for Public Speaking: Selected from Carnegie's Original 1920 YMCA Course Books Paperback – 2007 by **Dale Carnegie** (Author), **Marie Carnegie Hill** (Editor)
3. Speak Like Yourself… No, Really! Follow Your Strengths and Skills to Great Public Speaking, by Jezra Kaye.
4. Executive Presence: The Missing Link Between Merit and Success, by Sylvia Ann Hewlett.

IV-B.Tech, I-Sem (EEE) T 3+1* C 3

(A0234157) TECHNICAL WRITING

(Open Elective)

Technical Writing is a unique and diverse field, which integrates itself in the field of all latest technologies on the face of the Earth. It is a creative and artistic field where one can expertise himself in all the cutting edge technologies and thus, having an edge over other professional career options. It communicates technical (specialized) information, generally in the form of user manuals, training materials, information guides and many. In today's customer-centric business model, an organization's user manuals and technical write-ups act as its public face and also reflect its level of professionalism.

OBJECTIVES:

- Composing skills needed to prepare a variety of documents required in common business and technical writing contexts.
- Practice the scrupulous attention to detail necessary in a business and technical writing environment.
- Aware of techniques for adapting their writing to the demands of a highly audience-driven, context-sensitive field.

COURSE OUTCOMES:

1. To compose business and technical writing skills
2. Learning corresponding through digital, letter and email
3. To develop Projects reports and Technical Reports
4. Able to produce documentation technology
5. To aware the writing of research papers

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	2	1	2	2	2	1	2	-	-	-
CO2	-	-	-	-	1	2	1	2	2	3	1	2	-	-	-
CO3	-	-	-	-	1	2	1	2	1	3	-	3	-	-	-
CO4	-	-	-	-	-	1	1	2	1	3	1	3	-	-	-
CO5	-	-	-	-	-	1	1	2	1	3	1	3	-	-	-

UNIT I

INTRODUCTION TO TECHNICAL WRITING: Mechanics of Writing - Principles of Technical Writing- Pre –writing – Rewriting Documentation deliverables – Proof –reading - Avoiding Plagiarism - Understanding Audience/Readers

UNIT II

OFFICIAL CORRESPONDENCE: Letter, Memos, and Email - Formats of Written Correspondence – Digital Communication- Executive Chats – Instant Messaging – Dragon Fly - Effect

UNIT III

REPORTS: Document Development Process – Types - Technical Report - Feasibility Reports - Project Reports - Analytical Reports

UNIT IV

TECHNICAL PROPOSALS: Structure – Types – Characteristics - Style & Evaluation

UNIT V

TECHNICAL DESCRIPTIONS: Instructions – User Manuals - Checklists

UNIT VI

RESEARCH DOCUMENTATION: Abstract writing – Executive Summary – Synopsis - Research Papers - Dissertations and Thesis

REFERENCE BOOKS:

- The Elements of Style, Fourth Edition, by William Strunk Jr.
- Technical Communication, Principles and Practice, Second Edition, by Meenakshi Raman & Sangeeta Sharma.
- Successful Writing at Work: Concise Concise Edition 4th Edition, by Philip C. Kolin
- English and Soft Skills, Oriental Blackswan by S.P.Dhanavel

IV-B.Tech, I-Sem (EEE) T 3+1* C 3

(A0235157) INTERVIEW SKILLS

(Open Elective)

Technical Writing is a unique and diverse field, which integrates itself in the field of all latest technologies on the face of the Earth. It is a creative and artistic field where one can expertise himself in all the cutting edge technologies and thus, having an edge over other professional career options. It communicates technical (specialized) information, generally in the form of user manuals, training materials, information guides and many. In today's customer-centric business model, an organization's user manuals and technical write-ups act as its public face and also reflect its level of professionalism.

OBJECTIVES:

- Composing skills needed to prepare a variety of documents required in common business and technical writing contexts.
- Practice the scrupulous attention to detail necessary in a business and technical writing environment.
- Aware of techniques for adapting their writing to the demands of a highly audience-driven, context-sensitive field.

COURSE OUTCOMES:

1. Capable of writing a Resume
2. To adopt Pre Interview techniques such as Non Verbal cues and Mock Interviews
3. To be able to face different types of interviews – on line, Skype and telephone interviews
4. Analyze the behavior analysis and personality assessment in an interview
5. To gear up for a successful interview by analyzing the interview process

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	2	1	2	2	2	1	2	-	-	-
CO2	-	-	-	-	-	2	1	2	2	3	1	2	-	-	-
CO3	-	-	-	-	-	2	2	2	1	3	-	2	-	-	-
CO4	-	-	-	-	-	2	1	2	1	3	1	2	-	-	-
CO5	-	-	-	-	-	2	1	2	1	3	1	2	-	-	-

UNIT I

INTRODUCTION TO TECHNICAL WRITING: Mechanics of Writing - Principles of Technical Writing- Pre –writing – Rewriting Documentation deliverables – Proof – reading - Avoiding Plagiarism - Understanding Audience/Readers – Palmer Method of Business Writing.

UNIT II

OFFICIAL CORRESPONDENCE: Letter, Memos, and Email - Formats of Written Correspondence – Digital Communication- Executive Chats – Instant Messaging – Dragon Fly - Effect

UNIT III

REPORTS: Document Development Process – Types - Technical Report - Feasibility Reports - Project Reports - Analytical Reports

UNIT IV

TECHNICAL PROPOSALS: Structure – Types – Characteristics - Style & Evaluation

UNIT V

TECHNICAL DESCRIPTIONS: Instructions – User Manuals – Checklists – Sample Analysis

UNIT VI

RESEARCH DOCUMENTATION: Abstract writing – Executive Summary – Synopsis - Research Papers - Dissertations and Thesis Writing

REFERENCE BOOKS:

1. The Elements of Style, Fourth Edition, by William Strunk Jr.
2. Technical Communication, Principles and Practice, Second Edition, by Meenakshi Raman & Sangeeta Sharma.
3. Successful Writing at Work: Concise Concise Edition4th Edition, by Philip C. Kolin
4. English and Soft Skills, Oriental Blackswan by S.P.Dhanavel

IV-B.Tech, I-Sem (EEE)

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1+2*	1

(A0236157) GROUP DISCUSSION AND MOCK INTERVIEW

(Skill Development Course)

OBJECTIVES:

- To make the students aware of the GD session in selection process
- To learn the art of presentation and organising meetings
- To learn about the benefits of team work at the work place
- To learn the process of interviews an also extempore sessions
- To motivate the students with the help of popular motivational stories

COURSE OUTCOMES:

- The students can develop good leadership skills, communication skills, good interpersonal skill, analytical and lateral thinking
- To apply the principles of a good presentation and develop the art of presenting effectively
- The student can be a good team player by learning about the advantages of team building
- The student would be able to perform well in interviews and extempore sessions
- The student also learns the importance of developing self motivation by being influenced by successful stories

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1								2	2	3		3			
CO2										3		3			
CO3								2	3	3	2				
CO4						2				3					
CO5								2	2	3		3			

UNIT I

GROUP DISCUSSION: Introduction-Types of GD-D topics-Do's and Don'ts in GD -GD Tips-Difference between GD and Debate-Mock GD's and Debate - Role Play in a Group Discussion

UNIT II

PRESENTATION SKILLS: Presentation Evaluation-Just a minute speeches-Creating a power point presentation-Body language-Conclusions-Planning a meeting-Analyzing a meeting-Analyzing agendas-Round table discussions-Small group presentation-Shaking hands-Logging silences-Talent search-To speak or not to speak-relationships.

UNIT III

TEAM WORK SKILLS: Dimensions of team building-Components of team building-Purpose of teams-Building blocks for team-Types of team-Team leader skills

UNIT IV

INTERVIEW SKILLS: Introduction – concept – Types of Interviews – Characteristics of Interviewer – Characteristics of Interviewee – Recruitment interview – Appraisal interview – Research interview.

UNIT V

EXTEMPORE: Introduction to Extempore - Common Extempore Topics–SWOT Analysis

UNIT VI

MOTIVATIONAL THEMES: How to win Friends and influence people by Dale Carnegie, The Go-Giver: A little story about a powerful Business idea by Bob Burg and John David Mann, How to talk to anyone – 92 little tricks for big success in relationship by Leil Lowndes.

REFERENCE BOOKS:

1. How to win Friends and influence people by Dale Carnegie.
2. The Go-Giver: A little story about a powerful Business idea by Bob Burg and John David Mann
3. How to talk to anyone – 92 little tricks for big success in relationship by Leil Lowndes.

IV-B.Tech, I-Sem (EEE) P 3 C 2

(A0282157) POWER SYSTEMS LAB

OBJECTIVES:

- The knowledge of electrical fault condition is required to deploy proper different protective relays in different locations of electrical equipment.

COURSE OUTCOMES:

1. To analyze the experiment results according to relevant theory.
2. To Examine protection of Power System with various Protective relays.
3. To Review sequence impedances of 3 Phase Alternators and 3 Phase Transformers.
4. To understand the principle of Protective Schemes and Various faults in the power system scenario.
5. To understand the behavior and characteristics of different equipments.
6. Verification of theoretical concepts through experimentation.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	-	1	-	-	-	1	-	1	2	-	-	3
CO2	3	3	1	-	1	-	-	-	1	-	2	2	-	-	3
CO3	3	3	1	-	1	-	-	-	1	-	2	2	-	-	3
CO4	3	3	1	-	1	-	-	-	1	-	1	2	-	-	3
CO5	2	2	1	-		-	-	-	1	-	-	1	-	-	3
CO6	3	3	1	-	1	-	-	-	2	-	-	1	-	-	3

LIST OF EXPERIMENTS:

1. Determination of +ve, -ve and zero sequence impedances of three phase alternator.
2. Determination of +ve, -ve and zero sequence impedances of three phase transformer.
3. Equivalent circuit of a three phase three winding transformer.
4. Fault Analysis(LG, LLG) on a three phase unloaded alternator
5. Fault Analysis(LL, LLLG) on a three phase unloaded alternator
6. IDMT over current relay
7. Directional over current relay
8. Inverse over current relay
9. % Differential relay
10. Solid and Liquid Insulation Tests
11. Earth resistance measurement
12. Capacitance grading method

IV-B.Tech, I-Sem (EEE) P C
3 2

(A0283157) INSTRUMENTATION LAB

OBJECTIVES:

- Instrumentation has introduces the measurement of various physical quantities like strain, temperature, displacement, pressure, vibration and speed.
- Change of dielectric in terms of electrical quantities measuring quality factor for R,L,C circuits and measuring of R,L,C using different bridges.

COURSE OUTCOMES:

1. To acquire basic knowledge about transducers.
2. To improve measuring capabilities using LVDT and thermister.
3. To measure passive electrical parameter R, L, C and Quality factor using Q meter.
4. To convert the galvanometer into OHM meter and AC meter.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	-	2	-	3	-	-	-	2	-	2	-	3	-	-
CO2	2	-	2	-	3	-	-	-	2	-	2	-	3	-	-
CO3	2	-	2	-	3	-	-	-	2	-	2	-	3	-	-
CO	2	-	2	-	3	-	-	-	2	-	2	-	3	-	-

LIST OF EXPERIMENTS:

1. Measurement of strain using strain gauge. (Change in strain into resistance)
2. Measurement of temperature using RTD & Thermistor.
   (Change in temperature into Resistance)
3. Measurement of physical variable based on induced emf using Linear Variable Differential Transformer. (Change in displacement into Induced Voltage)
4. Measurement of pressure using bourdon tube. (Change in pressure into displacement)
5. Measurement of vibration using acceleration transducer.
6. Measurement of physical variables based on change in dielectric using Capacitive Pick-Up
7. Measurement of R, L, C and Quality factor using Q-meter
8. Measurement of speed using digital stroboscope
9. Conversion of D'Arsonal galvanometer into Ohm meter
10. Conversion of D'Arsonal galvanometer into AC meter (Current & Voltage)
11. pH measurement
12. Measurement of R, L, C using bridge circuits.

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous)

ELECTRICAL AND ELECTRONICS ENGINEERING

IV-B.Tech, II-Sem (EEE)

T	C
3+1*	3

(A0237158) UTILIZATION OF ELECTRICAL ENERGY

OBJECTIVES:

- This subject deals with the fundamentals of illumination and its classification and the electric heating and welding.
- It gives the detailed study of all varieties of Electric drives and their application to electrical traction systems

OUTCOME:

1. Distinguish the difference between AC &DC Motors, their usage & speed control techniques.
2. Learn fundamental of ILLUMINATION.
3. Study various electrical heating methods.
4. Study various electrical welding methods
5. Analyze the various concept of electrical traction.
6. Evaluate speed-time curve for traction motors.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	-	2	-	-	-	-	2	1	-	2	-	-	3
CO2	3	3	1	2	-	-	-	-	2	1	-	2	-	-	3
CO3	3	3	-	2	-	-	-	-	2	1	-	2	-	-	3
CO4	1	2	-	2	-	-	-	-	2	1	-	2	-	-	3
CO5	3	2	-	2	-	2	-	-	2	1	-	2	-	-	3
CO6	3	3	1	2	-	-	-	-	2	1	-	2	-	-	3

UNIT I

ILLUMINATION: Introduction, terms used in illumination, Laws of illumination, Polar curves, Calculation of illumination at a point Numerical Problems, electrical Lamps: Incandescent lamp-carbon arc lamp- Fluorescent lamp-Sodium vapour lamp-mercury vapour lamps-neon lamps and Compact florescent lamps (CFL), advantages of CFL, types of lighting schemes, Requirements of good lighting, Design of street lighting ,factory lighting and flood lighting schemes, Numerical Problems.

UNIT II

ELECTRICAL HEATING: Introduction, applications of electrical heating, Advantages with electrical heating, Methods of Electric heating ,Resistance heating , properties of good heating element ,design of heating element , arc heating, Induction heating and dielectric heating-applications.

UNIT III

ELECTRIC WELDING: Introduction, Methods of Electric welding, Resistance electric welding, electric arc welding, gas welding, Different welding electrodes-applications

UNIT IV

ELECTRIC TRACTION–I: Introduction, different systems of traction ,advantages of electric traction, Systems of track electrification, structure of the ac locomotive, Comparison between A. C and D. C Traction, special features of Traction Motors, electric traction power supply system, overhead equipment of electric traction, tramways, trolley bus,

UNIT V

ELECTRIC TRACTION–II: Types of railway services, Speed-time curves of different services, simplified speed time curves (trapezoidal and quadrilateral) – Numerical Problems.

UNIT VI

ELECTRIC TRACTION-III: Mechanism of train movement, Tractive effort, Calculations of tractive effort, output Power, energy output, determination of specific energy output, specific energy consumption, factors which effects specific energy consumption, Adhesive weight and coefficient of adhesion – Numerical Problems

TEXT BOOKS:

1. Utilization of Electric power and electric traction –by G.C.Garg, khanna Publishers
2. Utilization of Electrical Power – by R. K. Rajput, Laxmi Publications.

REFERENCE BOOKS:

1. Utilization of Electrical Power including Electric drives and Electric traction – by N.V.Suryanarayana, New Age International (P) Limited, Publishers.
2. Art & Science of Utilization of electrical Energy – by Partab, Dhanpat Rai & Co.

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous)

ELECTRICAL AND ELECTRONICS ENGINEERING

IV-B.Tech, II-Sem (EEE)

T	C
3+1*	3

(A0238158) PRINCIPLES OF POWER QUALITY

(Department Elective-V)

OBJECTIVES:

- This subject deals with the Voltage sags, Power interruptions, Harmonics and Devices used to reduce the harmonics

COURSE OUTCOMES:

1. To understand the basics in power quality such as sag, swell and interruptions, power quality, voltage quality etc.,
2. To analyze the power quality disturbances and determine the remedy in improving power quality.
3. To analyze the occurrence of harmonics in voltage and current because of non sinusoidal quantities during transients and faults.
4. To improve the ability in evaluating harmonic distortions
5. To understand the transient over voltages and its problems.
6. Ability to design basic filters to reduce harmonic distortion.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	1	-	-	-	-	-	-	2	-	1	-	-	3
CO2	2	2	2	2	-	-	-	-	-	-	-	1	-	-	3
CO3	3	1	1		-	-	-	-	1	2	-	-	-	-	3
CO4	2	3	1	2	-	-	-	-	1	1	-	1	-	-	3
CO5	2	2	-	-	-	-	-	-	-	-	-	1	-	-	3
CO6	2	2	2	1	2	-	-	-	1	-	2	-	-	-	3

UNIT I

INTRODUCTION: Power quality, Voltage quality, Concern, power quality Evaluation procedure, Transients, Long-duration- short duration-voltage variations, voltage imbalance, wave form distortion, voltage fluctuation, power frequency variations, power quality terms, CBEMA and ITI curves

UNIT II

VOLTAGE SAGS AND INTERRUPTIONS: Sources of sagas and interruptions, Estimating voltage sag performance, fundamental principles of protection, solutions at the end-user level, Motor-starting sags, and utility system fault-clearing issues.

UNIT III

TRANSIENT OVER VOLTAGES: Sources of over voltages, principles of over voltage protection, devices for over voltage protection, utility capacitor-switching transients, utility system lightning protection, switching transient problems with loads

UNIT IV

FUNDAMENTALS OF HARMONICS: Harmonic Distortion, voltage versus current distortion, harmonics versus transients, power system quantities under non sinusoidal conditions, Harmonic indices, Harmonic sources from commercial loads, Harmonic sources from Industrial loads, system response characteristics, effects of harmonic distortion

UNIT V

EVALUATION OF HARMONICS: Harmonic distortion evaluations, Principles of Controlling Harmonics, Harmonic studies, Devices for Controlling Harmonic Distortion

UNIT VI

LONG-DURATION VOLTAGE VARIATIONS: Principles of regulating the voltage, Devices for voltage regulation, utility voltage regulator Application, capacitors for voltage regulation flicker- power quality measuring equipment

TEXT BOOKS:

1. Electrical Power Systems Quality, Roger C. Dugan, Mark F. McGranaghan, Surya Santoso, H.Wayne Beaty, 2nd Edition, TMH Education Pvt. Ptd.
2. Power quality by C. Sankaran, CRC Press

REFERENCE BOOKS:

1. Electrical systems quality Assessment by J. Arrillaga, N.R. Watson, S. Chen, John Wiley & Sons
2. Understanding Power quality problems by Math H. J. Bollen IEEE Press
3. Power system harmonic analysis by J. Arrillaga, John Wiley & Sons
4. Power quality in electrical systems by Alexander Kusko, Marc T. Thompson

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING AND TECHNOLOGY

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ELECTRICAL AND ELECTRONICS ENGINEERING

IV-B.Tech, II-Sem (EEE) T C
3+1* 3

(A0239158) ELECTRICAL DISTRIBUTION SYSTEMS

(Department Elective-V)

OBJECTIVES:

- To realize the basic concepts of different types of feeders and substations.
- To understand the basic concepts of power factor improvement and voltage regulation and various protecting devices employed in distribution systems.

COURSE OUTCOMES:

1. To introduce the concepts and phenomenon of different Load modeling.
2. To give an idea about the fundamental concepts of electrical power distribution.
3. Ability to discuss functions of Substation.
4. Formulate distribution networks for necessary variable calculation.
5. Analyze the various concept Protective Devices
6. To understand the Power factor improvement and voltage control methods.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	1	1	-	-	-	-	-	-	-	-	-	-	3
CO2	2	2	1	-	-	-	-	-	-	-	-	-	-	-	3
CO3	3	2	2	1	1	-	-	-	-	-	-	1	-	-	3
CO4	2	2	2	1	1	-	-	-	-	-	-	1	-	-	3
CO5	3	1	2	2	1	-	-	-	-	-	-	2	-	-	3
CO6	2	1	1	3	1	-	-	-	-	-	-	3	-	-	3

UNIT I

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) and their characteristics

UNIT II

DISTRIBUTION FEEDERS: Design Considerations of Distribution Feeders: Radial and loop types of primary feeders, voltage levels, feeder loading; basic design practice of the secondary distribution system.

UNIT III

SUBSTATIONS: Location of Substations: Rating of distribution substation, service area within primary feeders. Benefits derived through optimal location of substations.

UNIT IV

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 V

PROTECTION: Objectives of distribution system protection, types of common faults and procedure for fault calculations - Protective Devices: Principle of operation of Fuses, Circuit Reclosures, line sectionalizes, and circuit breakers. **Coordination:** Coordination of Protective Devices: General coordination procedure.

UNIT VI

COMPENSATION FOR POWER FACTOR IMPROVEMENT: Capacitive compensation for power-factor control - Different types of power capacitors, shunt and series capacitors,

effect of shunt capacitors (Fixed and switched), Power factor correction, capacitor allocation - Economic justification - Procedure to determine the best capacitor location

VOLTAGE CONTROL: Voltage Control: Equipment for voltage control, effect of series capacitors, effect of AVB/AVR, line drop compensation

TEXT BOOKS:

1. Turan Gonen, *"Electric Power Distribution system, Engineering"*, Mc Graw-hill Book Company
2. A.S. Pabla ,*"Electric Power Distribution"*, Tata Mc Graw-hill Publishing company.

REFERENCE BOOKS:

1. S. Sivanagaraju, V.Sankar, *"Electrical Power Distribution and Automation"*, Dhanpat Rai & Co.
2. V. Kamaraju, *"Electrical Power Distribution Systems"*, Right Publishers.

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ELECTRICAL AND ELECTRONICS ENGINEERING

IV-B.Tech, II-Sem (EEE)

T	C
3+1*	3

(A0240158) SPECIAL MACHINES

(Department Elective-V)

OBJECTIVES:

- This subject deals with the construction, working and characteristics of special machines

COURSE OUTCOMES:

1. To know the Basics of various special machines
2. To understand the operation and working of machines
3. To study the characteristics of machines
4. To study the applications related to industries
5. To realize the machines in conjunction with Microcontrollers

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	1	1	-	-	-	-	-	-	1	-	3	-
CO2	2	3	2	2	1	-	-	-	-	-	1	1	-	3	-
CO3	2	2	3	2	2	-	-	-	-	-	1	2	-	3	-
CO4	3	2	2	2	2	-	-	-	-	-	1	2	-	3	-
CO5	2	2	3	2	2	-	-	-	-	-	2	1	-	3	-

UNIT I

SPECIAL TYPES OF D. C. MACHINES: Series booster–Shunt booster –Non –reversible booster –Reversible booster Armature excited machines–Rosenberg generator–Third-brush generator –Three–wire generator - Dynamometer.

UNIT II

STEPPER MOTORS: Introduction –Construction, Principle of Operation, Energisation with two phase at a time, Essential conditions for the satisfactory Operation of a 2–Phase Hybrid Stepper Motor–Control Circuits for Stepping Motors – An Open – Loop Controller for a 2-Phase Stepping Motor.

UNIT III

VARIABLE RELUCTANCE STEPPING MOTORS: Introduction-Construction, Operating Principle, Single–Stack VR step motors, Multiple-stack VR motors–Open Loop Control of 3-Phase VR Step Motor, Closed-Loop Control of Step Motor–Areas of Application of Stepping Motors–Torque developed in the Motor.

UNIT IV

SWITCHED RELUCTANCE MOTOR: Introduction – Principle of Operation of SRM, Some Distinctive Differences between SR and Conventional Reluctance Motors –Design of stator and Rotor and pole Arcs in SR Motor – Power Converter for SR Motor – Derivation of Torque Expression.

UNIT V

BRUSHLESS DC MOTOR: Types of Construction – Principle of Operation of BLDM – Sensing and Switching Logic Scheme–Theory of BLDM as Variable Speed Synchronous Motor (Assuming Sinusoidal Flux Distribution) – Methods of reducing Torque Pulsations, 180^0 Pole Arc and 120^0 current sheet.

UNIT VI

PERMANENT MAGNET MATERIALS AND MOTORS: Introduction – Stator Frames (Pole – and Yoke – Part) of Conventional PM dc Motors, Equivalent circuit of a PM – Development of Electronically Commutated DC Motor from Conventional DC Motor.

LINEAR INDUCTION MOTOR: Development of a Double sided LIM from Rotary type IM–A Schematic of LIM Drive for Electric Traction – Development of one sided LIM with back Iron.

TEXT BOOKS:

1. K. Venkataratnam, Special Electrical Machines, University Press.
2. R. K. Raj put, Electrical machines, Laxmi Publications.

REFERENCE BOOKS:

1. M. G. Say & E. O. Taylor, D. C. Machines, ELBS.
2. V. V. Athani, Stepper Motors: Fundamentals, Applications and Design, New Age International Pub.

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous)

ELECTRICAL AND ELECTRONICS ENGINEERING

IV-B.Tech, II-Sem (EEE) T C
3+1* 3

(A0503158) OBJECT ORIENTED PROGRAMMING THROUGH JAVA

(Common to EEE & ECE)
(Department Elective-VI / Massive Online Open Course-MOOC)

OBJECTIVES:

After taking this course, the student should be able to:

- Describe the Windows event-driven programming model
- Build simple JAVA applications according to the model

COURSE OUTCOMES:

1. Understand the syntax and concepts of JAVA
2. Write JAVA programs to implementing Object Oriented Concepts
3. Able to build directories and manage applications with interfaces
4. Write JAVA programs that use data from flat files and databases
5. Develop programs with error free and Multi tasking.
6. Program assignment utilizing Java GUI components, event listeners and event handlers.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	3	1	2	-	-	-	1	-	2	2	-	-	-
CO2	2	1	3	2	2	-	-	-	-	-	-	3	-	-	-
CO3	1	2	2	1	1	-	-	-	-	-	-	2	-	-	-
CO4	1	1	2	1	2	-	-	-	-	-	2	2	-	-	-
CO5	2	2	2	-	2	-	-	-	-	-	1	2	-	-	-
CO6	-	1	1	-	2	-	-	-	-	-	-	1	-	-	-

UNIT I

INTRODUCTION TO JAVA: Introduction to OOP, OOP Concepts, History of Java, Java buzzwords, How Java differs from C & C++, Structure of Java Program, data types, variables, constants, type conversion and casting, enumerated types, scope and life time of variables, operators, expressions , control flow- conditional statements, break and continue, simple java program, arrays, parameter passing, static fields and methods, access control, this, overloading methods and constructors, recursion, garbage collection.

UNIT II

INHERITANCE: Inheritance concept, Super and Sub classes, Member access rules, types of Inheritance, super uses, final classes and methods, casting, polymorphism- dynamic binding, method overriding, abstract classes and methods, the Object class and its methods.

UNIT III

INTERFACES: Interfaces Vs. Abstract classes, defining an interface, implementing interfaces, accessing implementations through interface references, extending interface.

Packages Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages

UNIT IV

FILES: Streams, text Input/output, binary input/output, random access file operations, File management using File class, Using java.io. **Strings:** Strings, string functions.

UNIT V

EXCEPTION HANDLING: benefits of exception handling, exception hierarchy, checked exceptions and unchecked exceptions, usage of try, catch, throw, throws and finally, rethrowing exceptions, built in exceptions, creating own exceptions.

MULTITHREADING: Differences between multiple processes and multiple threads, thread states, creating threads, interrupting threads, thread priorities, synchronizing threads, interthread communication, thread groups, daemon threads, thread deadlock.

UNIT VI

EVENT HANDLING: Events, Event sources, Event classes, Event Listeners, Relationship between Event sources and Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes

TEXT BOOKS:

1. Java; the complete reference, Herbert schildt, TMH.
2. Understanding OOP with Java, updated edition, T. Budd, pearson education.

REFERENCES BOOKS:

1. An Introduction to programming and OO design using Java, J.Nino and F.A. Hosch, John wiley & sons.
2. An Introduction to OOP, second edition, T. Budd, pearson education.
3. Introduction to Java programming, Y. Daniel Liang, pearson education.
4. An introduction to Java programming and object oriented application development, R.A. Johnson- Thomson.
5. Core Java 2, Fundamentals, Cay.S.Horstmann and Gary Cornell, seventh Edition, Pearson Education.
6. Core Java 2, Advanced Features, Cay.S.Horstmann and Gary Cornell, Seventh Edition, Pearson Education.

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING AND TECHNOLOGY

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ELECTRICAL AND ELECTRONICS ENGINEERING

IV-B.Tech, II-Sem (EEE)

T	C
3+1*	3

(A0504158) COMPUTER ORGANISATION

(Department Elective-VI/ Massive Online Open Course-MOOC)

OBJECTIVES:

- To understand the structure, function, characteristics and performance issues of computer systems.
- To understand the design of the various functional Units of digital computers

COURSE OUTCOMES:

1. Explain the organization of basic computer, its design & the design of control unit and trade offs between hardware and software.
2. Students will formulate and solve problems, understand the performance requirement of the systems and the operations & languages of the register transfer, micro operations and input output organization.
3. Students can understand how computer stores positive and negative numbers.
4. Understand the organization of memory and memory management hardware.
5. Elaborate advanced concepts of computer architecture, Parallel Processing, interprocessor communication and synchronization.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	1	3	-	-	-	-	-	2	-	-	-	-	-	-
CO2	-	-	2	3	1	-	-	-	-	-	-	-	-	-	-
CO3	3	2	1	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	3	2	-	-	-	-	-	-	-	1	-	-	-
CO5	-	-	-	-	3	-	-	-	-	-	2	1	-	-	-

UNIT I

BASIC STRUCTURE OF COMPUTERS: Computer Types, Functional Unit, Basic operational concepts, Bus structures, Software, Performance, multiprocessors and multi computers

DATA REPRESENTATION: Fixed Point Representation, Floating Point Representation - Error Detection codes

UNIT II

REGISTER TRANSFER LANGUAGE AND MICROOPERATIONS: Register transfer language, Register Transfer, Bus and memory transfers, Arithmetic Micro operations, logic micro operations, shift micro operations

BASIC COMPUTER ORGANIZATION AND DESIGN: Instruction codes, Computer Registers, Computer instructions, Instruction cycle, Memory- reference instructions, Input – Output and Interrupt

UNIT III

CENTRAL PROCESSING UNIT: Stack organization, Instruction formats,Addressing modes, Data transferand manipulation, Program control

COMPUTER ARITHMETIC: Fixed point operations - Addition and subtraction, multiplication, Division Algorithms

UNIT IV

THE MEMORY SYSTEM: Basic concepts, semiconductor RAM memories, Read-only memories, Cache memories, performance considerations, Virtual memories, secondary storage, Introduction to RAID.

UNIT V

PIPELINE AND VECTOR PROCESSING: Parallel processing, Arithmetic pipeline, Instruction Pipeline, RISC Pipeline, Vector processing, Array Processors

UNIT VI

MULTI PROCESSORS: Characteristics of Multi Processors, Inter Connection Structures, Inter Processor Arbitration; Inter Processor Communication & Synchronization, Cache Coherence

TEXT BOOKS:

1. Computer Systems Architecture – M. Moris Mano, Pearson/PHI

REFERENCES:

1. Computer Organization – Carl Hamacher, ZvonksVranesic, SafeaZaky, McGraw Hill

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(Autonomous)

ELECTRICAL AND ELECTRONICS ENGINEERING

IV-B.Tech, II-Sem (EEE)

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3+1*	3

(A0505158) WEB PROGRAMMING

(Department Elective-VI / Massive Online Open Course-MOOC)

OBJECTIVES:

- This course demonstrates an in-depth understanding of the tools and Web technologies necessary for business application design and development. The course covers client side scripting like HTML, JavaScript and server side scripting like servlets, JSPs. And also XML and web servers and database interfacing.

COURSE OUTCOMES:

The main learning outcomes are:

1. Student can able to demonstrate the HTML important tags and for desigining static web pages and separate design from content using CSS.
2. Able to design a webpage with more user interactivity usingJavascript.
3. Students can able to understand the need of XML in the developing of Web applications.
4. Students able to understand the need of Server side scripting using Servlets and JSP.
5. Able to develop the web applications with MVC architecture design using Struts.
6. Students can able to apply the java programming to develop interactive of databases and develop the scalable web applications.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	-	3	1	2	2	1	-	2	-	-	2	-	-	-
CO2	1	-	1	-	2	1	-	1	2	-	-	2	-	-	-
CO3	1	-	-	-	2	1	-	-	1	-	-	2	-	-	-
CO4	1	2	1	1	2	2	-	-	2	1	-	2	-	-	-
CO5	1	1	1	2	3	-	-	-	2	-	-	-	-	-	-
CO6	1	1	1	-	2	-	-	-	2	-	-	1	-	-	-

UNIT I

INTRODUCTION TO HTML: HTML common tags, HTML program structure, Attributes, List, Tables, images, image maps, forms, Frames; Cascading Style sheets

UNIT II

JAVASCRIPT: Introduction to Java Scripts, Objects in Java Script, Dynamic HTML with Java Script, Data Validation using Java Script.

UNIT III

XML: Document type definition, XML Schemas, Document Object model, Presenting XML, Using XML Processors: DOM and SAX

UNIT IV

MORE ON SERVLETS: Reading Initialization parameters, the javax.servlet HTTP package, Handling Http Request & Responses, Using Cookies-Session Tracking

JSP Application Development

Generating Dynamic Content, Using Scripting Elements Implicit JSP Objects, Conditional Processing – Displaying Values Using an Expression to Set an Attribute, Declaring Variables and Methods Sharing Data Between JSP pages, Sharing Session and Application Data.

UNIT V

STRUTS: Tomcat &Struts Installation, Struts Request life cycle, Struts Configuration file, Form Validation with Struts, Simple Struts application.

UNIT VI

DATABASE ACCESS: Database Programming using JDBC, Types of JDBC Drivers, Studying Javax.sql.* package, Accessing a Database from a JSP Page, Application – Specific Database Actions

AJAX: Introduction, Background, How AJAX works, Common steps AJAX will follow.

TEXT BOOKS:

1. HTML Black Book – Steve Holzner.
2. Web Programming, building internet applications, Chris Bates, WILEYDreamtech
3. The complete Reference Java 2 by Patrick Naughton and Herbert Schildt. TMH
4. Java Server Pages –Hans Bergsten, SPD O'Reilly

REFERENCE BOOKS:

1. Programming world wide web-Sebesta, Pearson.
2. Core SERVLETS AND JAVA SERVER PAGES VOLUME 1: CORE TECHNOLOGIES by Marty Hall and Larry Brown Pearson.
3. Internet and World Wide Web – How to program by Dietel and Nieto PHI/Pearson Education Asia.
4. Jakarta Struts Cookbook , Bill Siggelkow, S P D O'Reilly
5. Murach's beginning JAVA JDK 5, Murach, SPD.
6. An Introduction to web Design and Programming –Wang-Thomson.

IV-B.Tech, II-Sem (EEE) T C
1+2* 1

(A0204158) ELECTRICAL SYSTEMS SIMULATION-IV
(HOMER)
(Skill Development Course)

OBJECTIVES OF HOMER:

The HOMER energy modeling software is a powerful tool for designing and analyzing hybrid power systems, which contain a mix of conventional generators, cogeneration, wind turbines, solar photovoltaics, hydropower, batteries, fuel cells, hydropower, biomass and other inputs. It is currently used all over the world by tens of thousands of people.

For either grid-tied or off-grid environments, HOMER helps determine how variable resources such as wind and solar can be optimally integrated into hybrid systems.
Engineers and non-professionals use HOMER to run simulations of different energy systems compare the results and get a realistic projection of their capital and operating expenses. HOMER determines the economic feasibility of a hybrid energy system optimizes the system design and allows users to really understand how hybrid renewable systems work.

As distributed generation and renewable power projects continue to be the fastest growing segment of the energy industry, HOMER can serve utilities, telecoms, systems integrators, and many other types of project developers - to mitigate the financial risk of their hybrid power projects.

COURSE OUTCOMES:

1. To obtain the knowledge of renewable energy sources.
2. To model and simulate the solar photovoltaic system.
3. To model and simulate the fuel cells.
4. To understand the concepts of wind energy conversion.
5. To enhance simulation skills of Micro power system modeling with HOMER.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	-	-	-	2	-	3	2	-	-	-	-	-	-	2
CO2	2	-	2	-	2	-	3	2	-	-	-	-	-	-	2
CO3	2	-	2	-	2	-	3	2	-	-	-	-	-	-	2
CO4	2	-	2	-	2	-	3	2	-	-	-	-	-	-	2
CO5	2	-	2	-	2	-	3	2	-	-	-	-	-	-	2

UNIT I

INTRODUCTION: Renewable Energy Sources – Energy parameters – cogeneration-energy efficiency and conservation – atmospheric pollution-hydro carbons – particulates- thermal pollution

UNIT II

SOLAR PHOTOVOLTAIC SYSTEM: Solar constant – spectral distribution of extraterrestrial radiation-photo voltaic effect-PV cell equivalent circuit-characteristics

UNIT III

FUEL CELLS: Principle of operation of fuel cell-types- dynamic model of fuel cell – characteristics –hydrogen as fuel

UNIT IV

WIND ENERGY CONVERSION: Classification of WT's – HAWT-VAWT – Thrust principle-Aerodynamic principle –characteristics

UNIT V

HOMER: Micro power system modeling with HOMER-simulation - Optimization - Sensitive Analysis- dealing with uncertainty – sensitive analyses on hourly data sets - Physical Modeling – Loads- primary loads – deferrable load – thermal load - Resources—solar -wind-hydro – biomass- fuel cell - Components- PV Array- wind turbine – hydro turbine-generators-battery bank—grid –boiler- converter- electrolyzer-hydrogen tank

UNIT VI

HOMER: System dispatch –operating reserve-control of dispatchable system components-dispatch strategy-load priority-economic modeling

THE FOLLOWING QUERIES CAN BE IMPLEMENTED USING HOMER

- Is it cost-effective to add a wind turbine to the diesel generator in my system?
- How much will the cost of diesel fuel need to increase to make photovoltaics cost effective?
- Will my design meet a growing electric demand?
- Is it cost-effective to install a micro turbine to produce electricity and heat for my grid-connected facility?

TEXT BOOKS:

1. Renewable Energy Sources and Emerging Technologies-D.P. Kothari, K.C. Singal, Rakesh Ranjan, Prentice hall India.
2. Integration of Alternative Sources Of Energy-by Felix A. Farret, M. Godoy Simoes, IEEE press, John Wiley & Sons, Inc., Publications

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3. PV*SOL, http://www.valentin.de, accessed February 2, 2005.
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8. J. F. Manwell and J. G. McGowan, Lead acid battery storage model for hybrid energy systems, Solar Energy, Vol. 50, pp. 399–405, 1993.
9. C. D. Barley and C. B.Winn, Optimal dispatch strategy in remote hybrid power systems, Solar Energy, Vol. 58, pp. 165–179, 1996.