

# ACADEMIC REGULATIONS

## COURSE STRUCTURE AND DETAILED SYLLABUS

### ELECTRICAL & ELECTRONICS ENGINEERING



For

## B. Tech. Four Year Degree Course

(Applicable for the batch admitted in 2013-14)

(MR-13 Regulations)

## MALLA REDDY ENGINEERING COLLEGE (Autonomous)

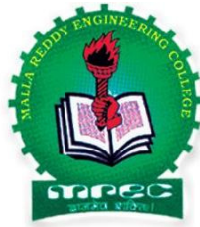
(Approved by AICTE & Affiliated to JNTUH)

Maisammaguda, Dhulapally (Post & Via Kompally), Secunderabad-500 100

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AND  
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ELECTRICAL & ELECTRONICS ENGINEERING  
For  
B. Tech Four Degree Course  
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# MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)

Maisammaguda, Dhulapally (Post via Kompally), Secunderabad - 500100

## Academic Regulations for B. Tech. (Regular)

### (MR13 Regulations)

(Effective for the students admitted into I year from the Academic year 2013-2014 onwards)

#### 1. Award of B. Tech. Degree

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

- 1.1 The candidate shall pursue a course of study for not less than four academic years and not more than eight academic years.
- 1.2 **After eight academic years of course of study, the candidate is permitted to write the Examinations for two more years.**
- 1.3 The candidate shall register for 224 credits and secure 216 credits with compulsory subjects as listed in Table-1.

Table 1: Compulsory Subjects

Serial Number	Subject Particulars
1	All practical subjects
2	Industry oriented mini project
3	Comprehensive Viva-Voce
4	Seminar
5	Project work

2. The students, who fail to fulfill all the academic requirements for the award of the degree within ten academic years from the year of their admission, shall forfeit their seats in B. Tech. course.

#### 3 Courses of study

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

<b>Branch Code</b>	<b>Branch</b>
1	Civil Engineering(CE)
2	Electrical and Electronics Engineering (EEE)
3	Mechanical Engineering(ME)
4	Electronics and Communication Engineering(ECE)
5	Computer Science and Engineering (CSE)
6	Information Technology(IT)
7	Mining Engineering(MNE)

#### **4 Credits**

	<b>I Year</b>		<b>Semester</b>	
	<b>Periods / Week</b>	<b>Credits</b>	<b>Periods / Week</b>	<b>Credits</b>
Theory	03	06	04	04
	02	04	--	--
Practical	03	04	03	02
Drawing	03	06	03	02
			06	04
Mini Project	--	--	--	02
Comprehensive Viva Voce	--	--	--	02
Seminar	--	--	06	02
Project	--	--	15	10

#### **5 Distribution and Weightage of Marks**

5.1 The performance of a student in each semester or I year shall be evaluated subject-wise for a maximum of 100 marks for a theory and 75 marks for a practical subject. In addition,

industry-oriented mini-project, seminar and project work shall be evaluated for 50, 50 and 200 marks, respectively.

5.2 For theory subjects the distribution shall be 25 marks for Internal Evaluation and 75 marks for the End- Examination.

5.3 For theory subjects, during a semester there shall be 2 mid-term examinations. Each mid-term examination consists of one objective paper, one essay paper and one assignment. The objective paper and the essay paper shall be for 10 marks each with a total duration of 1 hour 20 minutes (20 minutes for objective and 60 minutes for essay paper). The Objective paper is set with 20 bits of multiple choices, filling the blanks and matching type of questions for a total of 10 marks. The essay paper shall contain 4 full questions (one from each unit) out of which, the student has to answer 2 questions, each carrying 5 marks. While the first mid-term examination shall be conducted on 1 to 2 1/2 units of the syllabus, the second mid-term examination shall be conducted on 2 1/2 to 5 units. Five (5) marks are allocated for Assignments (as specified by the subject teacher concerned). Assignment should be submitted before the conduct of the first mid-examination, and the second Assignment should be submitted before the conduct of the second mid-examination. The total marks secured by the student in each mid-term examination are evaluated for 25 marks, and the average of the two mid-term examinations shall be taken as the final marks secured by each candidate. However, in the I year, there shall be 3 midterm examinations, each for 25 marks, along with 3 assignments in a similar pattern as above (1st mid shall be from Unit-I, 2nd mid shall be 2 & 3 Units and 3rd mid shall be 4 & 5 Units) and the average marks of the examinations secured (each evaluated for a total of 25 marks) in each subject shall be considered to be final marks for the internals/sessional. If any candidate is absent for any subject of a mid-term examination, a re-exam will be conducted in the deserving cases based on the recommendations of the College Academic Committee. The end examination will be conducted for 75 marks, which contains PART A and PART B. Part A for 25 marks contains 5 to 8 questions each two marks and remaining are one mark questions covering the entire syllabus. Part B is for maximum of 50 marks with 5 questions consisting of two parts each (a) and (b), out of which the student has to answer either (a) or (b), not both. Each question in Part B carries 10 marks.

- 5.4 For practical subjects there shall be a continuous evaluation during a semester for 25 sessional marks and 50 end semester examination marks. Out of the 25 marks for internal evaluation, day-to-day work in the laboratory shall be evaluated for 15 marks and internal practical examination shall be evaluated for 10 marks conducted by the laboratory teacher concerned. The end semester examination shall be conducted with an external examiner and internal examiner. The external examiner shall be appointed by the principal / Chief Controller of examinations
- 5.5 For the subject having design and/or drawing, (such as Engineering Graphics, Engineering Drawing, Machine Drawing) and Estimation, the distribution shall be 25 marks for internal evaluation (15 marks for day-to-day work and 10 marks for internal tests) and 75 marks for end semester examination. There shall be two internal tests in a Semester and the average of the two shall be considered for the award of marks for internal tests. However, in the I year class, there shall be three tests and the average will be taken into consideration.
- 5.6 There shall be an industry-oriented Mini-Project, in collaboration with an industry of their specialization, to be taken up during the vacation after III year II Semester examination. However, the mini-project and its report shall be evaluated along with the project work in IV year II Semester. The industry oriented mini-project shall be submitted in a report form and presented before the committee. It shall be evaluated for 50 marks. The committee consists of an external examiner, head of the department, and the supervisor of the mini-project and a senior faculty member of the department. There shall be no internal marks for industry-oriented mini-project.
- 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 of the topic, and submit it to the department. It shall be evaluated by the departmental committee consisting of head of the department, seminar supervisor and a senior faculty member. The seminar report shall be evaluated for 50 marks. There shall be no external examination for the seminar.
- 5.8 There shall be a Comprehensive Viva-Voce in IV year II semester. The Comprehensive Viva-Voce will be conducted by a Committee consisting of Head of the Department and two Senior Faculty members of the Department. The Comprehensive Viva-Voce is intended to assess the students understanding of the subjects he studied during the B. Tech. course of study. The Comprehensive Viva-Voce is evaluated for 100 marks by the Committee. There are no internal marks for the Comprehensive Viva-Voce.

5.9 Out of a total of 200 marks for the project work, 50 marks shall be allotted for Internal Evaluation and 150 marks for the End Semester Examination (Viva Voce). The End Semester Examination of the project work shall be conducted by the same committee as appointed for the industry-oriented mini-project. In addition, the project supervisor shall also be included in the committee. The topics for industry oriented mini project, seminar and project work shall be different from one another. The evaluation of project work shall be made at the end of the IV year. The Internal Evaluation shall be on the basis of two seminars given by each student on the topic of his project.

5.10 Laboratory marks and the sessional marks awarded by the concerned teacher are subjected to scrutiny and scaling by the Principal / Controller of examinations wherever necessary. In such cases, the sessional and laboratory marks awarded by the concerned teacher will be referred to a Committee headed by principal consisting of HOD, senior professor in that particular department. The Committee will arrive at a scaling factor and the marks will be scaled as per the scaling factor. The recommendations of the Committee are final and binding. The internal test papers including Lab end exam test papers shall be preserved in the exam branch for a minimum period of 6 years from the commencement of the batch, as per the University norms and shall be produced to the Committees as and when the same are asked for.

## **6 Attendance Requirements**

- 6.1 A student shall be eligible to appear for End examinations only if he acquires a minimum of 75% of attendance in aggregate of all the subjects.
- 6.2 **Shortage of Attendance below 65% in aggregate shall in NO case be condoned.**
- 6.3 Condonation of shortage of attendance in aggregate up to 10% (65% and above and below 75%) in each semester or I year may be granted by the College Academic Committee
- 6.4 A student will not be promoted to next semester unless he satisfies the attendance requirement of the present semester / first year as applicable
- 6.4 A student who is short of attendance in semester / I year may seek re-admission into that semester/I year as and when offered within 4 weeks from the date of the commencement of class work.

- 6.5 Students whose shortage of attendance is not condoned in any semester/I year are not eligible to write their end semester examination of that class and their registration Stands cancelled.
- 6.6 A stipulated fee shall be payable towards condonation of shortage of attendance.
- 6.7 A student will be promoted to the next semester if he satisfies the attendance requirement of the present semester/I year, as applicable, including the days of attendance in sports, games, NCC and NSS activities.
- 6.8 If any candidate fulfills the attendance requirement in the present semester or I year, he shall not be eligible for readmission into the same class.

## **7. Minimum Academic Requirements**

The following academic requirements have to be satisfied in addition to the attendance requirements mentioned in item no.6.

- 7.1 A student is deemed to have satisfied the minimum academic requirements if he has **earned the credits allotted to each theory/practical design/drawing subject/project and secures not less than 35% of marks in the end semester exam, and minimum 40% of marks in the sum total of the mid-term and end semester exams.**
- 7.2 A student shall be promoted from first year to second year if he fulfills the minimum attendance requirement.
- 7.3 A student shall be promoted from II to III year only if he fulfills the academic requirement of 34credits from
- a. One regular and one supplementary examinations of I year
  - b. One regular examination of II year I semester
- (or)
- 44credits from
- a. one regular and two supplementary examinations of I year,
  - b. one regular and one supplementary examination of II year I semester
  - c. one regular of II year II semester.
  - d. or as suggested by affiliating University from time to time.
- .
- 7.4 A student shall be **promoted from III year to IV year** only if he fulfills the academic requirements of **56 credits** from the following examinations,, whether or not the candidate



takes the examinations and secures prescribed minimum attendance in III year II semester.

- a. Two regular and two supplementary examinations of I year.
- b. Two regular and one supplementary examinations of II year I semester.
- c. One regular and one supplementary examinations of II year II semester.
- d. One regular examination of III year I semester

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7.5 A student shall register and put up minimum attendance in all 224 credits and earn 216 credits. **Marks obtained in the best 216 credits shall be considered for the calculation of percentage of marks.**

7.6 **Students who fail to earn 216 credits as indicated in the course structure within ten academic years (8 years of study + 2 years additionally for appearing for exams only) from the year of their admission, shall forfeit their seat in B.Tech. Course and their admission stands cancelled.**

## **8 Course pattern**

8.1 The entire course of study is for four academic years. I year shall be on yearly pattern and II, III and IV years on semester pattern.

8.2 **A student, eligible to appear for the end examination in a subject, but absent from it or has failed in the end semester examination, may write the exam in that subject during the period of supplementary exams.**

8.3 **When a student is detained for lack of credits/shortage of attendance, he may be re-admitted into the next semester/year. However, the academic regulations under which he was first admitted shall continue to be applicable to him.**

## **9 Award of Class**

After a 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:

<b>Class Awarded</b>	<b>% of marks to be secured</b>	
First Class with Distinction	70% and above	From the aggregate marks secured from 216 Credits.
First Class	Below 70 but not less than 60%	
Second Class	Below 60% but not less than 50%	
Pass Class	Below 50% but not less than 40%	

(The marks obtained in internal evaluation and end semester / I year examination shall be shown separately in the memorandum of marks.)

#### 10 **Minimum Instruction Days**

The minimum instruction days for each semester/I year shall be 90/180 days.

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

12 Transfer from other colleges will be permitted, as per the rules stipulated by the affiliating University and the State government.

#### 13 **WITHHOLDING OF RESULTS**

If the student has not paid the dues, if any, to the college or if any case of indiscipline is pending against him, the result of the student will be withheld and he will not be allowed into the next semester. His degree will be withheld in such cases.

#### 14. **TRANSITORY REGULATIONS**

14.1 Discontinued, detained, or failed candidates are eligible for readmission as and when next offered.

14.2 After the revision of the regulations, the students of the previous batches will be given two chances for passing in their failed subjects, one supplementary and the other regular. If the students cannot clear the subjects in the given two chances, they shall be given equivalent

subjects as per the revised regulations which they have to pass in order to obtain the required number of credits.

14.3 In case of transferred students from other Universities, the credits shall be transferred to MREC (A) as per the academic regulations and course structure of the MREC (A).

## **15. General**

15.1 Wherever the words he, him, his, occur in the regulations, they include she, her, hers.

15.2 The academic regulation should be read as a whole for the purpose of any interpretation.

15.3 In case of any doubt or ambiguity in the interpretation of the above rules, the decision of the College Academic Committee is final.

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

15.5. The students seeking transfer to MREC from various other Universities / Institutions have to pass the failed subjects which are equivalent to the subjects of MREC, and also pass the subjects of MREC which the candidates have not studied at the earlier Institution on their own without the right to sessional marks. Further, though the students have passed some of the subjects at the earlier institutions, if the same subjects are prescribed in different semesters of MREC, the candidates have to study those subjects in MREC in spite of the fact that those subjects are repeated.

**MALLA REDDY ENGINEERING COLLEGE  
(AUTONOMOUS)**

Maisammaguda, Dhulapally (Post via. Kompally), Secunderabad - 500100

**ACADEMIC REGULATIONS FOR B. TECH**

**(LATERAL ENTRY SCHEME)**

**(Effective for the students admitted into II year from the Academic year 2014-2015 onwards)**

**1 Eligibility for award of B. Tech. Degree (LES)**

I. The LES candidates shall pursue a course of study for not less than three academic years and not more than six academic years.

II. They shall be permitted to write the examinations for two more years after six academic years of course work.

2. The candidate shall register for 168 credits and secure 160 credits from II to IV year B.Tech. Program (LES) for the award of B.Tech. Degree with compulsory subjects as listed in Table-1.

<b>Serial Number</b>	<b>Subject Particulars</b>
<b>1</b>	All practical subjects
<b>2</b>	Industry oriented mini project
<b>3</b>	Comprehensive Viva-Voce
<b>4</b>	Seminar
<b>5</b>	Project work

Table 1: Compulsory Subjects

3. The students, who fail to fulfill the requirement for the award of the degree in 8 consecutive

academic years (6 years of study + 2 years additionally for appearing exams only) from the year of admission, shall forfeit their seats.

4. The attendance regulations of B. Tech. (Regular) shall be applicable to B.Tech. (LES).

### 5. **Promotion Rule**

A student shall be promoted from second year to third year if he fulfills the minimum attendance requirement.

A student shall be promoted from III year to IV year only if he fulfills the academic requirements of **34** credits from the following examinations, whether or not the candidate takes the examinations

- a. Two regular and one supplementary examinations of II year I semester.
- b. One regular and one supplementary examinations of II year II semester.
- c. One regular examination of III year I semester

### 6. **Award of Class**

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

<b>Class Awarded</b>	<b>% of marks to be secured</b>	
First Class with Distinction	70% and above	From the aggregate marks secured from 160 Credits from II Year to IV Year.
First Class	Below 70 but not less than 60%	
Second Class	Below 60% but not less than 50%	
Pass Class	Below 50% but not less than 40%	

(The marks obtained in the internal evaluation and the end semester examination shall be shown separately in the marks memorandum.)

7. All the other regulations as applicable to **B. Tech. 4-year degree course (Regular)** will hold good for **B. Tech. (Lateral Entry Scheme)**.

## MALPRACTICES RULES

### DISCIPLINARY ACTION FOR / IMPROPER CONDUCT IN EXAMINATIONS

	Nature of Malpractices/ Improper conduct	Punishment
	<i>If the candidate:</i>	
1. (a)	Possesses or keeps accessible in examination hall, any paper, note book, programmable calculators, Cell phones, pager, palm computers or any other form of material concerned with or related to the subject of the examination (theory or practical) in which he is appearing but has not made use of (material shall include any marks on the body of the candidate which can be used as an aid in the subject of the examination)	Expulsion from the examination hall and cancellation of the performance in that subject only.
(b)	Gives assistance or guidance or receives it from any other candidate orally or by any other body language methods or communicates through cell phones with any candidate or persons in or outside the exam hall in respect of any matter.	Expulsion from the examination hall and cancellation of the performance in that subject only of all the candidates involved. In case of an outsider, he will be handed over to the police and a case is registered against him.
2.	Has copied in the examination hall from any paper, book, programmable calculators, palm computers or any other form of material relevant to the subject of the examination (theory or practical) in which the candidate is appearing.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the subjects of that Semester/year.  The Hall Ticket of the candidate is to be cancelled.
3.	Impersonates any other candidate in connection with the examination.	The candidate who has impersonated shall be expelled from examination hall. The candidate is also debarred and forfeits the seat. The performance of the original candidate, who has been impersonated, shall be cancelled in all the subjects of the examination (including practical's and project work) already appeared and shall not be allowed to appear for examinations of the remaining subjects of that semester/year. The candidate is also debarred for two consecutive

		semesters from class work and all End examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. If the imposter is an outsider, he will be handed over to the police and a case is registered against him.
4.	Smuggles in the Answer book or additional sheet or takes out or arranges to send out the question paper during the examination or answer book or additional sheet, during or after the examination.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all End examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
5.	Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.	Cancellation of the performance in that subject.
6.	Refuses to obey the orders of the Principal/Controller of examinations any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walk out or instigates others to walk out, or threatens the officer-in charge or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs or by visible representation, assaults the officer-in-charge, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which result in damage to or destruction of property in the examination hall or any part of the College campus or engages in any other act	In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that subject and all other subjects the candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the subjects of that semester/year. The candidates also are debarred and forfeit their seats. In case of outsiders, they will be handed over to the police and a police case is registered against them.

	which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	
7.	Leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the examination hall.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all End examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
8.	Possess any lethal weapon or firearm in the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat.
9.	If student of the college, who is not a candidate for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to 8.	Student of the colleges expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat.  Person(s) who do not belong to the College will be handed over to police and, a police case will be registered against them.
10.	Comes in a drunken condition to the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already



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

**Malpractices identified by squad or special invigilators**

1. Punishments to the candidates as per the above guidelines.
2. Punishment for institutions : (if the squad reports that the college is also involved in encouraging malpractices)
  - (i) A show cause notice shall be issued to the college.
  - (ii) Impose a suitable fine on the college.
  - (iii)** Shifting the examination centre from the college to another college for a specific period of not less than one year.

**DEPARTMENT  
OF  
ELECTRICAL AND ELECTRONICS ENGINEERING**

**Programme Educational Objectives ( PEOs)**

**PEO 1.** To train students in core engineering knowledge with software skills, multi disciplinary approach, and make them capable to understand, analyze, design and control electrical machines, power systems and electronic products with solutions for real life applications.

**PEO 2.** To provide students an impressive academic environment for a successful career in industry/Technical profession and post graduate programmes, research and lifelong learning.

**PEO 3.** To instill in students professional and ethical attitude, team work skills, leadership qualities and improve oral and written communication skills.

**MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)**  
**B.Tech (ELECTRICAL AND ELECTRONICS ENGINEERING)**  
**COURSE STRUCTURE –MR13 Regulations**  
**I year Course Structure**

CODE	SUBJECT	L	T/P/D	Credits
30E01	English	2	-	4
30M01	Mathematics-I	3	-	6
30M02	Mathematical Methods	3	-	6
30P01	Engineering Physics	3	-	6
30C01	Engineering Chemistry	3	-	6
30501	Computer Programming	3	-	6
30302	Engineering Drawing	3	3	6
30502	Computer Programming Lab	-	3	4
30P02	Engineering Physics & Engineering Chemistry Lab	-	3	4
30E02	English Language Communication Skills Lab	-	3	4
30303	Engineering Workshop/IT Workshop	-	3	4
	<b>Total</b>	<b>20</b>	<b>15</b>	<b>56</b>

**II year – I Semester**                      **Course Structure**

Code	SUBJECT	L	T/P/D	Credits
30M08	Mathematics-III	4	-	4
30339	Fluid Mechanics and Hydraulic Machinery	4	-	4
30401	Electronic Devices and Circuits	4	-	4
30201	Electrical Circuits	4	-	4
30202	Electromagnetic Fields	4	-	4
30203	Electrical Machines-I	4	-	4
30340	Fluid Mechanics and Hydraulic Machinery Lab	-	3	2
30404	Electronic Devices & circuits Lab	-	3	2
	<b>Total</b>	<b>24</b>	<b>6</b>	<b>28</b>

**II year – II Semester**                      **Course Structure**

CODE	SUBJECT	L	T/P/D	Credits
30B01	Managerial Economics and Financial Analysis	4	-	4
30204	Power Systems-I	4	-	4
30432	Electronic Circuits	4	-	4
30403	Switching Theory and Logic Design	4	-	4
30205	Network Theory	4	-	4
30206	Electrical Machines-II	4	-	4
30207	Electrical Machines Lab – I	-	3	2
30208	Electrical Circuits and Simulation Lab	-	3	2
	<b>Total</b>	<b>24</b>	<b>6</b>	<b>28</b>

**B.Tech (ELECTRICAL AND ELECTRONICS ENGINEERING)****MR13 Regulations****III year – I Semester****Course Structure**

<b>CODE</b>	<b>SUBJECT</b>	<b>L</b>	<b>T/P/D</b>	<b>Credits</b>
30412	Linear & Digital IC Applications	4	-	4
30209	Electrical and Electronics Instrumentation	4	-	4
30210	Power Systems-II	4	-	4
30211	Control Systems	4	-	4
30212	Power Electronics	4	-	4
30213	Electrical Machines-III	4	-	4
30214	Electrical Machines Lab – II	-	3	2
30215	Control Systems and Simulation Lab	-	3	2
	<b>Total</b>	<b>24</b>	<b>6</b>	<b>28</b>

**III year –II Semester****Course Structure**

<b>CODE</b>	<b>SUBJECT</b>	<b>L</b>	<b>T/P/D</b>	<b>Credits</b>
30B02	Management Science	4	-	4
30216	Static Drives	4	-	4
30217	Computer Methods In Power Systems	4	-	4
30433	Microprocessors and Micro controllers	4	-	4
30109	Environmental studies	4	-	4
	<b>Open Elective</b>	4	-	4
302A1	Renewable Energy Sources			
30B05	Intellectual property rights			
30B04	Human values and Professional Ethics			
30218	Electrical & Electronics Measurements lab	-	3	2
30219	Power Electronics and Simulation Lab	-	3	2
	<b>Total</b>	<b>24</b>	<b>6</b>	<b>28</b>

**B.Tech (ELECTRICAL AND ELECTRONICS ENGINEERING)****IV year – I Semester****Course Structure**

<b>CODE</b>	<b>SUBJECT</b>	<b>L</b>	<b>T/P/D</b>	<b>Credits</b>
30220	Switch Gear and Protection	4	-	4
30221	Utilization of Electrical Energy	4	-	4
30418	Digital signal Processing	4	-	4
30222	Power System Operation and Control	4	-	4
	<b>Elective I</b>	4	-	4
302B1	High Voltage Engineering			
30424	VLSI Design			
302B2	Digital Control Systems			
30534	Data Structures			
	<b>Elective II</b>	4	-	4
30M12	Optimization Techniques			
302C1	Electrical Distribution Systems			
302C2	Electrical Estimation and Costing			
30435	Embedded Systems Design			
30434	Microprocessors and Interfacing Devices lab	-	3	2
30E07	Advanced Communications Skills Lab	-	3	2
	<b>Total</b>	<b>24</b>	<b>6</b>	<b>28</b>

**IV year – II Semester****Course Structure**

<b>CODE</b>	<b>SUBJECT</b>	<b>L</b>	<b>T/P/D</b>	<b>Credits</b>
30223	Fundamentals of HVDC and Fact Devices	4	-	4
	<b>Elective III</b>	4	-	4
302D1	Neural Networks and Fuzzy Logic			
301A1	Disaster Management			
302D2	Reliability Engineering and its applications to Power Systems			
302D3	Linear System Analysis			
	<b>Elective IV</b>	4	-	4
302E1	Advanced Control Systems			
302E2	EHV AC Transmission			
302E3	Introduction to Nanotechnology			
302E4	Electrical Power Quality			
30224	Industry Oriented Mini Project	0	0	2
30225	Seminar	0	6	2
30226	Project Work	0	15	10
30227	Comprehensive Viva	0	0	2
	<b>Total</b>	<b>12</b>	<b>21</b>	<b>28</b>

**MALLA REDDY ENGINEERING COLLEGE  
(AUTONOMOUS)**

I B.Tech EEE

**L T/P/D C**  
**2 -/-/ 4**

**ENGLISH**  
**(Common for ME, CE, Mining, EEE, ECE, CSE&IT)**

**1. INTRODUCTION:**

There is an increasing concern over the English language competency of Engineering students based on their academic and professional performance. The transformation and the mistreatment of language in the social networking over the last decade have greatly affected the language skills of the students. In keeping with the language skill deficiencies, the present syllabus is designed to hone not only the traditional LSRW skills but also their analytical skills that enable to think too in English. This effective approach to develop English Language competency among the Engineering students aims to kindle the thinking skills to communicate effectively. The classroom activities based on the textbook may be used to build confidence among the students as they become active participants and teachers taking the role of a facilitator.

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

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

**2. OBJECTIVES:**

- a. to facilitate for the improvement of the language proficiency of the students in English with emphasis on RW skills, grammar and vocabulary.
- b. To equip the students to study academic subjects more effectively using the theoretical and practical components of the English syllabus.
- c. To develop the study skills and communication skills in formal and informal situations.

**LEARNING OUTCOMES:**

1. Usage of English Language, written and spoken.
2. Enrichment of comprehension and fluency
3. Gaining confidence in using language for writing in real life situations.

**SYLLABUS:**

Reading Skills:

Objectives

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

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

*such as magazines/newspaper articles.*

Writing Skills :

Objectives

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

### **TEXTBOOKS PRESCRIBED:**

In order to improve the proficiency of the student in the acquisition of the four skills mentioned above, the following texts and course content, divided into Five Units, are prescribe.

**For Detailed study: First Textbook: “Skills Annexe -Functional English for Success”, Published by Orient**

**Black Swan, Hyderabad**

**For Non-detailed study**

**Second text book “Epitome of Wisdom”, Published by Maruthi Publications, Guntur**

**For Grammar practice**

### **3. A Work Book on English Grammar and Composition published by Tata Mac Graw –Hill , New Delhi 2012.**

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

I:

1. Chapter entitled ‘Wit and Humour’ from ‘Skills Annexe’ -Functional English for Success, Published by Orient Black Swan, Hyderabad
2. Chapter entitled ‘Mokshagundam Visvesvaraya’ from “Epitome of Wisdom”, Published by Maruthi Publications, Hyderabad.

G- articles, prepositions, tense and aspect, concord, voice, degrees of comparison, question tags. V- parts of speech, formation of words.

Unit –II

1. Chapter entitled “Cyber Age” from “Skills Annexe -Functional English for Success” Published by Orient Black Swan, Hyderabad.
- 2 Chapter entitled ‘Three Days To See’ from “Epitome of Wisdom”, Published by Maruthi Publications, Hyderabad.

G- types of sentences, transformation of sentences, speech. V- homonyms, homophones, synonyms and antonyms

### Unit –III

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

G – conditionals, common errors.

V – one word substitutions, words often confused, idioms and phrases and phrasal verbs, Unit –IV

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

R -Reading – introduction to reading skills, types of reading, reading for themes and gists.

W- characteristics of effective writing, writing paragraphs, Application writing with resume writing, and summarizing

### Unit –V

1. Chapter entitled 'Sports and Health' from "Skills Annexe -Functional English for Success" Published by Orient Black Swan, Hyderabad
2. Chapter entitled 'The Convocation Speech' by N.R. Narayanmurthy' from "Epitome of Wisdom", Published by Maruthi Publications, Hyderabad

R- reading for details, note-making, reading for specific purposes, critical reading W-report writing, types of reports, circular, notice and memo writing.

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

### REFERENCES :

1. Contemporary English Grammar Structures and Composition by David Green, MacMillan Publishers, New Delhi. 2010.
2. Innovate with English: A Course in English for Engineering Students, edited by T Samson, Foundation Books.
3. English Grammar Practice, Raj N Bakshi, Orient Longman.
4. Technical Communication by Daniel Riordan. 2011. Cengage Publications. New Delhi.
5. Effective English, edited by E Suresh Kumar, A RamaKrishna Rao, P Sreehari, Published by Pearson
6. Handbook of English Grammar & Usage, Mark Lester and Larry Beason, Tata Mc Graw –Hill.
7. Spoken English, R.K. Bansal & JB Harrison, Orient Longman.
8. Technical Communication, Meenakshi Raman, Oxford University Press
9. Objective English Edgar Thorpe & Showick Thorpe, Pearson Education
10. Grammar Games, Renuvolcuri Mario, Cambridge University Press.
11. Murphy's English Grammar with CD, Murphy, Cambridge University Press.
12. Everyday Dialogues in English, Robert J. Dixon, Prentice Hall India Pvt Ltd.,
13. ABC of Common Errors Nigel D Turton, Mac Millan Publishers.
14. Basic Vocabulary Edgar Thorpe & Showick Thorpe, Pearson Education
15. Effective Technical Communication, M Ashraf Rizvi, Tata Mc Graw –Hill.
16. An Interactive Grammar of Modern English, Shivendra K. Verma and Hemlatha Nagarajan , Frank Bros & CO
17. A Communicative Grammar of English, Geoffrey Leech, Jan Svartvik, Pearson Education
18. Enrich your English, Thakur K B P Sinha, Vijay Nicole Imprints Pvt Ltd.,
19. A Grammar Book for You And I, C. Edward Good, MacMillan Publishers



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**MALLA REDDY ENGINEERING COLLEGE  
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**I B.Tech EEE**

**L TP/D C**

**MATHEMATICS –I  
(Common for ME, CE, Mining, EEE, ECE, CSE&IT)**

**UNIT-I**

Theory of Matrices: Real matrices – Symmetric, skew – symmetric, orthogonal. Complex matrices: Hermitian, Skew- Hermitian and Unitary Matrices. Idempotent matrix,

Elementary row and column transformations- Elementary matrix, Finding rank of a matrix by reducing to Echelon and normal forms. Finding the inverse of a non-singular square matrix using row/ column transformations (Gauss-Jordan method). Consistency of system of linear equations (homogeneous and non- homogeneous) using the rank of a matrix. Solving  $m \times n$  and  $n \times n$  linear system of equations by Gauss elimination.

Cayley-Hamilton Theorem (without proof) – Verification. Finding inverse of a matrix and powers of a matrix by Cayley-Hamilton theorem, Linear dependence and Independence of Vectors. Linear Transformation – Orthogonal Transformation. Eigen values and eigen vectors of a matrix. Properties of eigen values and eigen vectors of real and complex matrices. Finding linearly independent eigen vectors of a matrix when the eigen values of the matrix are repeated.

Diagonalization of matrix – Quadratic forms up to three variables. Rank – Positive definite, negative definite, semi definite, index, signature of quadratic forms. Reduction of a quadratic form to canonical form.

**UNIT – II**

Differential calculus methods. Rolle's Mean value Theorem – Lagrange's Mean Value Theorem – Cauchy's mean value Theorem – (all theorems without proof but with geometrical interpretations), verification of the Theorems and testing the applicability of these theorem to the given function.

Functions of several variables: Functional dependence- Jacobian- Maxima and Minima of functions of two variables without constraints and with constraints-Method of Lagrange multipliers.

**UNIT – III**

Improper integrals, Multiple integrals & applications: Gamma and Beta Functions –Relation between them, their properties – evaluation of improper integrals using Gamma / Beta functions

Multiple integrals – double and triple integrals – change of order of integration- change of variables (polar, cylindrical and spherical) Finding the area of a region using double integrals and volume of a region using triple integrals.

**UNIT – IV**

Differential equations and applications Overview of differential equations- exact, linear and Bernoulli (NOT TO BE EXAMINED). Applications of first order differential equations – Newton's Law of cooling, Law of natural growth and decay, orthogonal trajectories. Linear differential equations of second and higher order with constant coefficients, Non-homogeneous term of the type  $f(X) = e^{ax}$ ,  $\sin ax$ ,  $\cos ax$ , and  $x^n$ ,  $e^{ax} V(x)$ ,  $xV(x)$ , method of variation of parameters. Applications to bending of beams, Electrical circuits and simple harmonic motion.

**UNIT – V**

Laplace transform and its applications to Ordinary differential equations Definition of Integral transform, Domain of the function and Kernel for the Laplace transforms. Existence of Laplace transform. Laplace transform of standard functions, first shifting Theorem, Laplace transform of functions when they are multiplied or divided by "t". Laplace transforms of derivatives and integrals of functions. – Unit step function – second shifting theorem – Dirac's delta function, Periodic function – Inverse Laplace transform by Partial fractions( Heaviside method) Inverse Laplace

transforms of functions when they are multiplied or divided by "s", Inverse Laplace Transforms of derivatives and integrals of functions, Convolution theorem -- Solving ordinary differential equations by Laplace transforms.

**TEXT BOOKS:**

1. Advanced engineering Mathematics by Kreyszig, John Wiley & Sons Publishers.
2. Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers.

**REFERENCES:**

1. Advanced Engineering Mathematics by R.K. Jain & S.R.K. Iyengar, 3rd edition, Narosa Publishing House, Delhi.
2. Engineering Mathematics – I by T.K. V. Iyengar, B. Krishna Gandhi & Others, S. Chand.
3. Engineering Mathematics – I by D. S. Chandrasekhar, Priso Books Pvt. Ltd.
4. Engineering Mathematics – I by G. Shanker Rao & Others I.K. International Publications.
5. Advanced Engineering Mathematics with MATLAB, Dean G. Duffy, 3rd Edi, CRC Press Taylor & Francis Group.
6. Mathematics for Engineers and Scientists, Alan Jeffrey, 6ht Edi, 2013, Chapman & Hall/ CRC
7. Advanced Engineering Mathematics, Michael Greenberg, Second Edition. Pearson Education.

**MALLA REDDY ENGINEERING COLLEGE  
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I B.Tech EEE

**L T/P/D C  
3 -/-/ 6**

**MATHEMATICAL METHODS  
(Common for EEE, ECE, CSE&IT)**

**UNIT – I: Interpolation and Curve fitting**

Interpolation: Introduction- Errors in Polynomial Interpolation – Finite differences- Forward Differences-Backward differences –Central differences – Symbolic relations and separation of symbols- Difference Equations – Differences of a polynomial-Newton’s formulae for interpolation – Central difference interpolation Formulae – Gauss Central Difference Formulae –Interpolation with unevenly spaced points-Lagrange’s Interpolation formula. B. Spline interpolation – Cubic spline.

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

**UNIT – II : Numerical techniques**

Solution of Algebraic and Transcendental Equations and Linear system of equations.

Introduction – Graphical interpretation of solution of equations .The Bisection Method – The Method of False Position – The Iteration Method – Newton-Raphson Method. Solving system of non-homogeneous equations by L-U Decomposition method(Crout’s Method)Jacobi’s and Gauss- Seidel Iteration method Numerical Differentiation, Integration, and Numerical solutions of First order differential equations: Numerical differentiation, Numerical integration - Trapezoidal rule, Simpson’s 1/3rd and 3/8 Rule , Generalized Quadrature.

Numerical solution of Ordinary Differential equations: Solution by Taylor’s series method –Picard’s

Method of successive Approximation- single step methods-Euler’s Method-Euler’s modified method, Runge-Kutta Methods,Predictor –corrector methods(Milne’s Method and Adams-Bashforth methods only).

**UNIT – III: Fourier series and Fourier Transforms**

Definition of periodic function. Fourier expansion of periodic functions in a given interval of length  $2\pi$

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. Fourier integral theorem - Fourier sine and cosine integrals. Fourier transforms – Fourier sine and cosine transforms– properties – inverse transforms – Finite Fourier transforms.

**UNIT-IV: Partial differential equations**

Introduction and Formation of partial differential equation by elimination of arbitrary constants and arbitrary functions, solutions of first order linear (Lagrange) equation and non-linear equations

(Charpit’s method), Method of separation of variables for second order equations –Applications of Partial differential equations-Two dimensional wave equation., Heat equation.

**UNIT – V Vector Calculus**

Vector Calculus: Scalar point function and vector point function, Gradient- Divergence- Curl and their related properties, - Laplacian operator, Line integral – work done – Surface integrals -Volume integral. Green’s Theorem, Stoke’s theorem and Gauss’s Divergence Theorems (Statement & theirVerification). Solenoidal and irrotational vectors, Finding Potential function.

**TEXT BOOKS:**

1. Advanced Engineering Mathematics by Kreyszig, John Wiley & Sons.
2. Higher Engineering Mathematics by Dr. B.S. Grewal, Khanna Publishers.

**REFERENCES:**

1. Mathematical Methods by T.K.V. Iyengar, B.Krishna Gandhi & Others, S. Chand.
2. Introductory Methods by Numerical Analysis by S.S. Sastry, PHI Learning Pvt. Ltd.
3. Mathematical Methods by G.Shankar Rao, I.K. International Publications, N.Delhi
4. Higher Engineering Mathematics by B.S. Grewal, Khanna Publications.
5. Mathematical Methods by V. Ravindranath, Etl, Himalaya Publications.
6. Advanced Engineering Mathematics with MATLAB, Dean G. Duffy, 3rd Edi, 2013, CRC Press Taylor & Francis Group.
7. Mathematics for Engineers and Scientists, Alan Jeffrey, 6ht Edi, 2013, Chapman & Hall/ CRC
8. Advanced Engineering Mathematics, Michael Greenberg, Second Edition. Pearson Education.

**MALLA REDDY ENGINEERING COLLEGE  
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I B.Tech EEE

**L T/P/D C  
3 -/-/ 6**

**ENGINEERING PHYSICS  
(Common for ME, CE, Mining, EEE, ECE, CSE&IT)**

**1. Crystallography and Crystal Structures:**

Classification of materials – Crystalline, Amorphous, Poly crystalline; Lattice point, Space Lattice, Basis, Crystal structure, Unit Cell, Crystallographic axes, Lattice Parameters; Crystal Systems – Bravais Lattices; Atomic Radius, Co-ordination Number and Packing Factor of SC, BCC, FCC and Diamond structures; Crystal Planes and Directions - Miller Indices; Inter Planar Spacing of Cubic System; Basic Principles of X – ray diffraction - Bragg's Law; Laue and Powder methods.

**2. Defects in Crystals:**

Defects and their classification; Point Defects - Vacancies, Substitutional, Interstitial defects; Qualitative discussion of Schottky and Frenkel defects; Qualitative treatment of line defects (Edge and Screw dislocations); Burger's Vector.

**3. Oscillations and Acoustics:**

Introduction; Differential equation for S.H.M. and its solution; velocity and acceleration; expression for period and frequency; graphs of displacement, velocity and acceleration; energy of the simple oscillator; Damped oscillations – under damping, critical damping and over damping; Qualitative treatment of Forced vibrations; sharpness of resonance, Qualitative treatment of electrical oscillator circuit containing inductor, capacitor and resistor.

Basic requirements of acoustically good Hall; Reverberation; Sabine's formula for Reverberation Time (Qualitative Treatment); Factors Affecting the Architectural Acoustics and their Remedies;

**Unit – II****4. Principles of Quantum Mechanics:**

Waves and Particles - de Broglie's concept of Matter Waves; Davisson and Germer's Experiment; Heisenberg's Uncertainty Principle; Schrödinger's Time Independent Wave Equation - Physical Significance of the Wave Function; Energy of a particle in a one dimensional infinite potential well.

**5. Band Theory of Solids:**

Electron in a periodic Potential (Bloch Theorem), Kronig-Penny Model (Qualitative Treatment), Origin of energy Band formation in solids, Classification of materials into Conductors, Semi Conductors & Insulators, Concept of effective mass of an electron.

**6. Semiconductor Physics:**

Charge carrier concentration in Intrinsic semiconductors; Qualitative treatment of charge carrier concentration in Extrinsic semiconductors; Qualitative treatment of Fermi Level in Intrinsic and Extrinsic Semiconductors; Direct & Indirect Band Gap Semiconductors; Hall Effect.

**UNIT-III****7. Dielectric Properties:**

Electric Dipole, Dipole Moment, Dielectric Constant, Polarizability, Electric Susceptibility, Displacement Vector; Electronic, Ionic and Orientation Polarizations; Calculation of electronic and ionic Polarizabilities; Qualitative treatment of Internal Field in dielectrics; Clausius - Mossotti Equation; Piezo-electricity and Ferro- electricity.

## **8. Nanotechnology:**

Origin of Nanotechnology; Nano Scale; Surface to Volume Ratio, Quantum Confinement; Bottom-up Fabrication: Sol-gel; Top-down Fabrication: Chemical Vapour Deposition; Characterization of nano materials by TEM.

## **UNIT-IV**

### **9. Magnetic Properties:**

Permeability, Field Intensity, Magnetic Field Induction, Magnetization, Magnetic Susceptibility, Origin of Magnetic Moment - Bohr Magneton; Classification of Dia, Para and Ferro magnetic materials on the basis of magnetic moment; Hysteresis Curve and its explanation based on Domain theory; Soft and Hard Ferro magnetic Materials; Properties of Anti-ferro and Ferri Magnetic Materials; Applications of Ferri magnetic materials;

Concept of Perfect Diamagnetism; Meissner effect - Magnetic levitation; Type I and II Superconductors; Applications of Superconductors.

### **10. LASER:**

Characteristics of LASER; Absorption, Spontaneous and Stimulated transitions; Einstein's Coefficients and Relations between them; Population Inversion; Pumping – Optical and Electrical; Meta-stable State; Three and Four level pumping schemes; Ruby LASER; Helium-Neon LASER; Semiconductor Diode LASER; Applications of LASER – Data storage, Medical, Scientific and industrial.

## **UNIT-V**

### **11. Fiber Optics:**

Principle of Optical Fiber; Acceptance angle and Acceptance cone, Numerical Aperture; Step and Graded index Optical Fibers and their Refractive Index profiles; Attenuation in Optical Fibers, Application of Optical Fibers – Medical, Level sensor and Communication system.

### **12. Optics:**

Interference: Introduction – Young's double slit experiment – Optical path difference and Fringe width – Interference in thin films (Reflected light) Cosine law – Newton's rings experiment (Condition for bright and dark rings – Determination of wavelength of light). Diffraction: Fraunhofer diffraction due to single slit (Qualitative treatment) – Theory of plane transmission diffraction grating.

Theory of Double refraction

## **TEXT BOOKS:**

1. Modern Engineering Physics by K. Vijaya Kumar, S. Chandralingam: S. Chand & Co.Ltd
2. Engineering Physics – P.K.Palanisamy - SciTech Publications Pvt. Ltd., 5th Print 2008.
3. Applied Physics – S.O. Pillai & Sivakami-New Age International (P) Ltd., 2nd Edition 2008.
4. A Text book of Optics by N Subrahmanyam, Brijlal and M N Avadhanulu, S Chand & Co,
5. Unified Physics Vol – I by S L Gupta and Sanjeev Gupta JNPN Publications.

## **REFERENCES:**

1. Solid State Physics – M. Armugam (Anuradha Publications).
2. A Text Book of Engg Physics – M. N. Avadhanulu & P. G. Khsirsagar– S. Chand & Co. (for acoustics).
3. Nanotechnology – M.Ratner & D. Ratner (Pearson Ed.).
4. Introduction to Solid State Physics – C. Kittel (Wiley Eastern).
5. Solid State Physics – A.J. Dekker (Macmillan).
6. Applied Physics – T. Bhima Shankaram & G. Prasad (B.S. Publications, Third Edition 2008).
7. A text book of Engineering Physics – S.P. Basvaraju – Subhas store
8. Electricity and magnetism by Edward Purcell – Berkeley series vol 2
9. Physics Vol 2 – Resnick, Halliday & Krane – Fifth edition, Wiley Student edition. 10.Physics – B.Sc. First Year by Dr B Sanjeeva Rao, et al, Telugu Akademi

2013-17

Code: 30C01

**MALLA REDDY ENGINEERING COLLEGE  
(AUTONOMOUS)**

**I B.Tech EEE**

**L T/P/D C  
3 -/- 6**

**ENGINEERING CHEMISTRY  
(Common for ME, CE, Mining, EEE, ECE, CSE&IT)**

**UNIT I:**

Electro Chemical Cells: EMF: Galvanic Cells, types of Electrodes – ( Calomel, Quinhydrone and glass electrodes); Nernst equation and its applications ; concept of concentration cells, electro chemical series, Potentiometric titrations, determination of  $p^H$  using glass electrode-Numerical problems.

Batteries: Primary cells ( dry cells) and secondary cells (lead-Acid cell, Ni-Cd cell ). Applications of batteries. Fuel cells – Hydrogen – Oxygen fuel cell; Advantages and Applications.

Corrosion and its control: Causes and effects of corrosion; Theories of corrosion – Chemical & Electrochemical corrosion; Types of corrosion ( Galvanic, Water line, Pitting and Inter granular); Factors affecting rate of corrosion – Nature of metal and Nature of Environment – Corrosion control methods – Cathodic protection (sacrificial anodic and impressed current). Surface coatings: Metallic coatings & methods of application of metallic coatings - hot dipping (galvanization & tinning), Cementation, cladding, electroplating ( copper plating ) Electro less plating ( Ni plating).

Organic coatings: Paints - constituents and their functions.

**UNIT II: Water and its Treatment:**

Hardness of Water: Causes of hardness, expression of hardness – units – types of hardness, estimation of temporary & permanent hardness of water by EDTA method - numerical problems. Boiler troubles – Scale & sludges, Priming and foaming, caustic embrittlement and boiler corrosion; Treatment of boiler feed water – Internal treatment ( Phosphate, Colloidal and calgon conditioning) – External treatment – Lime Soda process, Zeolite process and ion exchange process. Numerical Problems.

Potable Water- Its Specifications – Steps involved in treatment of potable water – Disinfection of water by chlorination and ozonisation. Reverse osmosis & its significance.

**UNIT III: Engineering Materials:**

Polymers:Types of Polymerization (Chain & Step growth).

Plastics: Thermoplastic & Thermo setting resins,Compounding & fabrication of plastics (Compression and injection moulding).Preparation, properties, engineering applications of PVC, Teflon and Bakelite.

Fibers- Characteristics of fibers – preparation, properties and uses of Nylon – 6,6 and Dacron – Fiber Reinforced Plastics (FRP) – applications.

Rubbers – Natural rubber and its vulcanization. Elastomers – Buna-s, Butyl rubber and Thiokol rubber.

Conducting polymers: Polyacetylene, Polyaniline, Mechanism of Conduction, doping; applications of Conducting polymers.

Bio-degradable Polymers- preparation and Applications of Poly vinyl acetate and Poly lactic acid

–

**Material Chemistry:**

Lubricants: Classification with examples- Characteristics of a good lubricant & mechanism of lubrication (thick film , thin film and extreme pressure) properties of lubricants: viscosity , Cloud point, flash and fire points.

Refractories: Classification, characteristics of a good refractory and applications. Nanomaterials: Introduction, preparation by sol-gel & chemical vapor deposition methods. Applications of nano materials.

**Unit – IV : Fuels & Combustion**

Fuels – Classification – solid fuels: coal – analysis of coal - proximate and ultimate analysis and their significance. Liquid fuels – petroleum and its refining – cracking – types – fixed bed catalytic cracking. Knocking – octane and

cetane rating, synthetic petrol, Bergius and Fischer-Tropsch's process: Gaseous fuels - constituents, characteristics and applications of natural gas, LPG and CNG. Analysis of flue gas by Orsat's apparatus – Numerical Problems. Combustion – Definition, Calorific value of fuel – HCV, LCV; Determination of calorific value by Junker's gas calorimeter – theoretical calculation of Calorific value by Dulong's formula – Numerical problems on combustion.

#### **UNIT V: Phase Rule & Surface Chemistry:**

Phase Rule: Definition of terms: Phase, component, degree of freedom, phase rule equation. Phase diagrams –one component system- water system. Two component system Lead- Silver System.

Alloys: Introduction, Classification and Properties. Surface chemistry:

Adsorption – Types of Adsorption, Isotherms – Freundlich and Langmuir adsorption isotherm, applications of adsorption;

Colloids: Classification of Colloids; Electrical & optical properties, micelles, applications of colloids in industry.

#### **TEXT BOOKS:**

1. Engineering Chemistry by R.P. Mani, K.N. Mishra, B. Rama Devi /CENGAGE learning.
2. Engineering Chemistry by P.C Jain & Monica Jain, Dhanpatrai Publishing Company (2008).

#### **REFERENCE BOOKS**

1. Engineering Chemistry by B. Siva Shankar Mc.Graw Hill Publishing Company Limited, New Delhi (2006)
2. Engineering Chemistry J.C. Kuriacase & J. Rajaram, Tata McGraw Hills Publishing Company Limited, New Delhi (2004).
3. Text Book of Engineering Chemistry by S.S. Dara & Mukkati S. Chand & Co Publishers, New Delhi(2006)
4. Chemistry of Engineering Materials by CV Agarwal, C.P Murthy, A.Naidu, BS Publications.



**MALLA REDDY ENGINEERING COLLEGE  
(AUTONOMOUS)**

I B.Tech EEE

**L T/P/D C  
3 -/- 6**

**COMPUTER PROGRAMMING  
(Common for ME, CE, Mining, EEE, ECE, CSE&IT)**

**Objectives:**

1. To understand the various steps in Program development.
2. To understand the basic concepts in C Programming Language.
3. To learn how to write modular and readable C Programs
4. To learn to write programs (using structured programming approach) in C to solve problems.
5. To introduce the students to basic data structures such as lists, stacks and queues.
6. To make the student understand simple sorting and searching methods.

**UNIT - I**

Introduction to Computers – Computer Systems, Computing Environments, Computer Languages, Creating and running programs, Program Development. Introduction to the C Language – Background, C Programs, Identifiers, Types, Variables, Constants, Input / Output, Operators(Arithmetic, relational, logical, bitwise etc.), Expressions, Precedence and Associativity, Expression Evaluation, Type conversions, Statements- Selection Statements(making decisions) – if and switch statements, Repetition statements ( loops)-while, for, do-while statements, Loop examples, other statements related to looping  
–break, continue, goto, Simple C Program examples.

**UNIT - II**

Functions-Designing Structured Programs, Functions, user defined functions, inter function communication, standardfunctions, Scope, Storage classes-auto, register, static, extern, scope rules, type qualifiers, recursion-recursive functions, Limitations of recursion, example C programs, Preprocessor commands. Arrays – Concepts, using arrays in C, inter function communication, array applications, two – dimensional arrays, multidimensional arrays, C program examples.

**UNIT - III**

Pointers – Introduction (Basic Concepts), Pointers for inter function communication, pointers to pointers, compatibility, Pointer Applications-Arrays and Pointers, Pointer Arithmetic and arrays, Passing an array to a function, memory allocation functions, array of pointers, programming applications, pointers to void, pointers to functions. Strings – Concepts, C Strings, String Input / Output functions, arrays of strings, string manipulation functions, string /data conversion, C program examples.

**UNIT – IV**

Enumerated, Structure ,and Union Types– The Type Definition(typedef), Enumerated types, Structures – Declaration, initialization, accessing structures, operations on structures, Complex structures, structures and functions, Passing structures through pointers, self-referential structures, unions, bit fields, C programming examples, command –linearguments,Input and Output – Concept of a file, streams, text files and binary files, Differences between text and binary files, State of a file, Opening and Closing files, file input / output functions (standard library input / output functions for files), file status functions (error handling),Positioning functions, C program examples.

## **UNIT – V**

Searching and Sorting – Sorting- selection sort, bubble sort, Searching-linear and binary search methods. Lists- Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list, Stacks- Push and Pop Operations, Queues- Enqueue and Dequeue operations.

### **TEXT BOOKS:**

1. Computer Science: A Structured Programming Approach Using C, B.A.Forouzan and R.F. Gilberg, ThirdEdition, Cengage Learning.
2. Programming in C. P. Dey and M Ghosh , Oxford University Press.

### **REFERENCE BOOKS:**

1. C& Data structures – P. Padmanabham, Third Edition, B.S. Publications.
2. C for All, S. Thamarai Selvi, R.Murugesan, Anuradha Publications.
3. Problem Solving and Program Design in C, J.R. Hanly and E.B. Koffman, 7th Edition, Pearson education.
4. Programming in C, Ajay Mittal, Pearson.
5. Programming with C, B.Gottfried, 3rd edition, Schaum’s outlines, TMH.
6. Problem solving with C, M.T.Somasekhara, PHI
7. Programming with C, R.S.Bickar, Universities Press.
8. Computer Programming & Data Structures, E.Balagurusamy, 4th edition, TMH.
9. Programming in C – Stephen G. Kochan, III Edition, Pearson Education.
10. The C Programming Language, B.W. Kernighan and Dennis M.Ritchie, PHI.
11. C Programming with problem solving, J.A. Jones & K. Harrow,Dreamtech Press.

2013-17

Code: 30302

**MALLA REDDY ENGINEERING COLLEGE  
(AUTONOMOUS)**

**I B.Tech EEE**

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3 -/3/- 6**

**ENGINEERING DRAWING  
(Common for ME, CE, Mining, EEE, ECE, CSE&IT)**

**UNIT – I**

**INTRODUCTION TO ENGINEERING DRAWING:** Principles of Engineering Drawing/Graphics – Various Drawing Instruments – Conventions in Drawing – Lettering practice – BIS Conventions.

Curves: Constructions of Curves used in Engineering Practice:

- a) Conic Sections including the Rectangular Hyperbola – General method only.
- b) Cycloid, Epicycloid and Hypocycloid
- c) Involute.

Scales: Construction of different types of Scales, Plain, Diagonal, Vernier scale.

**UNIT – II**

**ORTHOGRAPHIC PROJECTIONS IN FIRST ANGLE**

**PROJECTION:** Principles of Orthographic Projections – Conventions – First and Third Angle projections. Projections of Points. including Points in all four quadrants.

Projections of Lines - Parallel, perpendicular, inclined to one plan and inclined to both planes. True length and true angle of a line. Traces of a line.

**PROJECTIONS OF PLANES:** Plane parallel, perpendicular and inclined to one reference plane. Plane inclined to both the reference planes.

**UNIT – III**

**PROJECTIONS OF SOLIDS:** Projections of regular solids, cube, prisms, pyramids, tetrahedran, cylinder and cone, axis inclined to both planes.

**SECTIONS AND SECTIONAL VIEWS:** Right Regular Solids – Prism, Cylinder, Pyramid, Cone .

**UNIT – IV**

**DEVELOPMENT OF SURFACES:** Development of Surfaces of Right Regular Solids – Prisms, Cylinder, Pyramids, Cone and their parts. frustum of solids.

**INTERSECTION OF SOLIDS:-** Intersection of Cylinder Vs Cylinder, Cylinder Vs Prism, Cylinder Vs Cone.

**PERSPECTIVE PROJECTIONS:** Perspective View : Points, Lines, Plane and solids Figures.

**UNIT – V**

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

**TRANSFORMATION OF PROJECTIONS:** Conversion of Isometric Views to Orthographic Views. Conversion of orthographic views to isometric views – simple objects.

**TEXT BOOK:**

1. Engineering Drawing, N.D. Bhat / Charotar
2. Engineering Drawing - Basant Agrawal, TMH

**REFERENCES:**

1. Engineering drawing - P.J. Shah.S.Chand.
2. Engineering Drawing, Narayana and Kannaiah / Scitech publishers.
3. Engineering Drawing- Johle/Tata Macgraw Hill.
4. Computer Aided Engineering Drawing- Trymbaka Murthy- I.K. international.
5. Engineering Drawing - Grower.
6. Engineering Graphics for Degree - K.C. John. Engineering Drawing , Venugopal / New age.

**MALLA REDDY ENGINEERING COLLEGE  
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I B.Tech EEE

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**COMPUTER PROGRAMMING LAB**  
**(Common for ME, CE, Mining, EEE, ECE, CSE&IT)**

**Objectives:**

1. To write programs in C to solve the problems.
2. To implement linear data structures such as lists, stacks, queues.
3. To implement simple searching and sorting methods.

**Outcomes:**

1. Recommended Systems/Software Requirements:
2. Intel based desktop PC
3. ANSI C Compiler with Supporting Editors

**Week 1**

- a) Write a C program to find the sum of individual digits of a positive integer.
- b) 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.  
Write a C program to generate the first n terms of the sequence.
- c) Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.

**Week 2**

- a) Write a C program to calculate the following Sum:  $\text{Sum} = 1 - x^2/2! + x^4/4! - x^6/6! + x^8/8! - x^{10}/10!$
- b) Write a C program to find the roots of a quadratic equation.

**Week 3**

- a) The total distance travelled by vehicle in 't' seconds is given by distance =  $ut + 1/2at^2$  where 'u' and 'a' are the initial velocity (m/sec.) and acceleration (m/sec<sup>2</sup>). Write C program to find the distance travelled at regular intervals of time given the values of 'u' and 'a'. The program should provide the flexibility to the user to select his own time intervals and repeat the calculations for different values of 'u' and 'a'.
- b) Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +, -, \*, /, % and use Switch Statement)

**Week 4**

- a) 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.

**Week 5**

- a) Write a C program to find the largest integer in a list of integers.
- b) Write a C program that uses functions to perform the following:
  - i) Addition of Two Matrices
  - ii) Multiplication of Two Matrices

**Week 6**

- 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 a given 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.

### **Week 7**

- 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.

### **Week 8**

- a) Write a C program to generate Pascal's triangle.
- b) Write a C program to construct a pyramid of numbers.

### **Week 9**

Write a C program to read in two numbers, x and n, and then compute the sum of this geometric progression:  $1+x+x^2+x^3+\dots$  +for example: if n is 3 and x is 5, then the program computes  $1+5+25+125$ . Print x, n, the sum Perform error checking. For example, the formula does not make sense for negative exponents - if n is less than 0. Have your program print an error message if  $n < 0$ , then go back and read in the next pair of numbers of without computing the sum. Are any values of x also illegal? If so, test for them too.

### **Week 10**

- a) 2's complement of a number is obtained by scanning it from right to left and complementing all the bits after the first appearance of a 1. Thus 2's complement of 11100 is 00100. Write a C program to find the 2's complement of a binary number.
- b) Write a C program to convert a Roman numeral to its decimal equivalent.

### **Week 11**

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.)

### **Week 12**

- a) Write a C program which copies one file to another.
- b) Write a C program to reverse the first n characters in a file. (Note: The file name and n are specified on the command line.)

### **Week 13**

- a) Write a C program to display the contents of a file.
- b) Write a C program to merge two files into a third file (i.e., the contents of the first file followed by those of the second are put in the third file)

### **Week 14**

- a) Write a C program that uses non recursive function to search for a Key value in a given list of integers using Linear search.
- b) Write a C program that uses non recursive function to search for a Key value in a given sorted list of integers using Binary search.

### **Week 15**

- a) Write a C program that implements the Selection sort method to sort a given array of integers in ascending order.
- b) Write a C program that implements the Bubble sort method to sort a given list of names in ascending order.

**Week 16**

Write a C program that uses functions to perform the following operations:

- i) Create a singly linked list of integer elements.
- ii) Traverse the above list and display the elements.

**Week 17**

Write a C program that implements stack (its operations) using a singly linked list to display given list of integers in reverse order. Ex. input: 10 23 4 6 output: 6 4 23 10

**Week 18**

Write a C program that implements Queue (its operations) using a singly linked list to display given list of integers in the same order. Ex. input: 10 23 4 6 output: 10 23 4 6

**Week 19**

Write a C program to implement the linear regression algorithm.

**Week 20**

Write a C program to implement the polynomial regression algorithm.

**Week 21**

Write a C program to implement the Lagrange interpolation.

**Week 22**

Write C program to implement the Newton- Gregory forward interpolation.

**Week 23**

Write a C program to implement Trapezoidal method.

**Week 24**

Write a C program to implement Simpson method.

**TEXT BOOKS:**

1. C programming and Data Structures, P. Padmanabham, Third Edition, BS Publications
2. Computer Programming in C, V. Rajaraman, PHI Publishers.
3. C Programming, E.Balagurusamy, 3rd edition, TMH Publishers.
4. C Programming, M.V.S.S.N.Prasad, ACME Learning Pvt. Ltd.
5. C and Data Structures, N.B.Venkateswarlu and E.V.Prasad,S.Chand Publishers
6. Mastering C, K.R. Venugopal and S.R. Prasad, TMH Publishers.

2013-17

Code: 30P02

**MALLA REDDY ENGINEERING COLLEGE  
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**Engineering Physics / Engineering Chemistry Lab  
(Common for ME, CE, Mining, EEE, ECE, CSE&IT)**

**Engineering Physics Lab  
(Any Ten experiments compulsory)**

1. Dispersion of Light –Dispersive power of material of a given prism
2. Diffraction grating – Determination of the wavelength of a Sodium vapour lamp.
3. Newton's Rings – Radius of curvature of plano convex lens
4. Melde's Experiment – Longitudinal and Transverse modes
5. Study of RC time constant and RL circuit.
6. The series RLC circuit – determination of resonant frequency, bandwidth and quality factor.
7. Magnetic field along the axis of current carrying circular coil- Stewart and Gee's experiment.
8. LASER- Diffraction due to single slit.
9. Evaluation of Numerical aperture of the given fiber.
10. Energy band –gap of a material of a P-N junction diode.
11. Torsional Pendulum- Determination of Rigidity modulus of a given material of wire.
12. Sonometer- Frequency of A.C supply
13. LASER diode – I-V characteristics.

**Laboratory manual:**

Engineering Physics Practicals by Dr.B.Srinivasa Rao, KesavaVamsiKrishna.V, K.S.Rudramamba. (University Science Press)

**Engineering Chemistry Lab**

(Any 12 of the following)

**Titrimetry:**

1. Estimation of Hardness of water by EDTA method.
2. Estimation of ferrous iron by dichrometry.

**Mineral analysis:**

3. Determination of Percentage of copper in brass.
4. Estimation of manganese dioxide in pyrolusite.

**Instrumental Methods:**

**Colorimetry:**

5. Determination of ferrous iron in cement by colorimetric method.
6. Estimation of Copper by Colorimetric Method.

**Conductometry:**

7. Conductometric titration of strong acid vs strong base
8. Conductometric titration of mixture of acids vs strong base .



**Potentiometry:**

9. Titration of Strong acid vs strong base by potentiometry.
10. Titration of Weak acid vs strong base by potentiometry.

**Physical Properties:**

11. Determination of free chlorides in water.
12. Determination of viscosity of sample oil by redwood/Oswald's viscometer.

**Preparations:**

13. Preparation of Aspirin.

**Kinetics:**

14. To determine the rate constant of hydrolysis of methyl acetate catalyzed by an acid.

**REFERENCE BOOKS:**

1. Practical Engineering Chemistry by K. Mukkanti,etal, B.S. Publicatons, Hyderabad.
2. Inorganic quantitave analysis, Vogel.
3. Text Book of engineering chemistry by R.N.Goyal and Harrmendra Goel, Ane Books Private Ltd.,
4. A text book on experiments and calculation Engg. S.S.Dara.
5. Instrumental methods of chemical analysis, Chatwal, Ananad, Himalaya Publications.

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**ENGLISH LANGUAGE COMMUNICATION SKILLS LAB  
(Common for ME, CE, Mining, EEE, ECE, CSE&IT)**

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

**Objectives**

1. To sensitize the students to the intelligibility in their pronunciation of English, speech sounds, word accent, intonation and rhythm
2. To improve the fluency in spoken English and neutralize mother tongue influence
3. To facilitate honing of listening and speaking skills of students
4. To train students to understand nuances of both verbal and non verbal communication during all activities
5. To develop confidence to face the audience and participate in activities
6. To help the students shed inhibitions and communicate with clarity

**Learning Outcomes:**

1. Better Understanding of nuances of language through audio- visual experience and group activities
2. Neutralization of accent for intelligibility
3. Speaking with clarity and confidence thereby enhancing employability skills of the students
4. Good understanding of listening skills and speaking skills and their application in real life situations.
5. Good understanding of non-verbal communication and developing confidence to face audience, shed inhibitions.

**Listening Skills:****Objectives**

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

*Students should be given practice in listening to the sounds of the language to be able to recognise them, awareness regarding stress and recognise and use the right intonation in sentences.*

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

**Speaking Skills:****Objectives**

1. To make students aware of the role of speaking in English and its contribution to their success.
  2. To enable students to express themselves fluently and appropriately in social and professional contexts.
- Oral practice
  - Describing objects/situations/people
  - Just A Minute(JAM) Sessions.

**Syllabus: English Language Communication Skills Lab shall have two parts:****a. Computer Assisted Language Learning (CALL) Lab****b. Interactive Communication Skills (ICS) Lab**

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

## UNIT- I

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

**Lab:** Ice-Breaking activity and JAM session

Listening: listening for sounds in context, for ideas. Speaking: ideation and translation of ideas into sentences.

## UNIT – II

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

**ICS Lab:** Situational Dialogues – Role-Play- Expressions in Various Situations – Self-introduction and Introducing

Others – Greetings – Apologies – Requests – Social and Professional Etiquette - Telephone Etiquette.

Listening: listening for specific purposes, for details.

Speaking: speaking in the above situations with clarity, connectivity, maintaining voice characters.

## UNIT- III

**CALL Lab:** Word accent and Listening Comprehension.

**ICS Lab:** Descriptions- Narrations- Giving Directions and guidelines.

Listening: listening for intelligible English

Speaking: formal and informal conversations, register.

## UNIT – IV

**CALL Lab:** Intonation and Common errors in Pronunciation. **ICS**

**Lab:** Extempore- Public Speaking , Oral Presentation Skills

Listening: note taking and listening for speaker's tone/attitude

Speaking: organizing , connecting ideas and sentences, short forms in spoken English, errors in spoken English

## UNIT- V

**CALL Lab:** Neutralization of Mother Tongue Influence and Conversation Practice **ICS Lab:** Information Transfer, Debate

Minimum Requirement of infra structural facilities for ELCS Lab: 1.

Computer Assisted Language Learning (CALL) Lab:

The Computer aided Language Lab for 40 students with 40 systems, one master console, LAN facility and English language software for self- study by learners.

### **System Requirement (Hardware component):**

Computer network with Lan with minimum 60 multimedia systems with the following specifications:i) P – IV Processor

a) Speed – 2.8 GHZ

b) RAM – 512 MB Minimum

c) Hard Disk – 80 GB

ii) Headphones of High quality

### **2. Interactive Communication Skills (ICS) Lab :**

The Interactive Communication Skills Lab: A Spacious room with movable chairs and audio-visual aids with a Public Address System, a T. V., a digital stereo –audio & video system and camcorder etc.

### **Books Suggested for English Language Lab Library (to be located within the lab in addition to the CDs of the text book which are loaded on the systems):**

Prescribed Lab Manual: English Language Communication Skills laboratory Manual Published by Pearson, New Delhi 2012

1. Suresh Kumar, E. & Sreehari, P. 2009. A Handbook for English Language Laboratories. New Delhi: Foundation

2. Speaking English Effectively 2nd Edition by Krishna Mohan and N. P. Singh, 2011. Macmillan Publishers India Ltd. Delhi.

3. Sasi Kumar, V & Dhamija, P.V. How to Prepare for Group Discussion and Interviews. Tata McGraw Hill

4. Hancock, M. 2009. English Pronunciation in Use. Intermediate. Cambridge: CUP
5. Spoken English: A Manual of Speech and Phonetics by R. K. Bansal & J. B. Harrison. 2013. Orient Blackswan. Hyderabad.
6. Hewings, M. 2009. English Pronunciation in Use. Advanced. Cambridge: CUP
7. Marks, J. 2009. English Pronunciation in Use. Elementary. Cambridge: CUP
8. Nambiar, K.C. 2011. Speaking Accurately. A Course in International Communication. New Delhi : Foundation
9. Spoken English (CIEFL) in 3 volumes with 6 cassettes, OUP.
10. English Pronouncing Dictionary Daniel Jones Current Edition with CD.
11. A textbook of English Phonetics for Indian Students by T. Balasubramanian (Macmillan)

### **DISTRIBUTION AND WEIGHTAGE OF MARKS**

English Language Laboratory Practical Examination:

1. The practical examinations for the English Language Laboratory shall be conducted as per the college norms prescribed for the core engineering practical sessions.
2. For the Language lab sessions, there shall be a continuous evaluation during the year for 25 sessional marks and 50 year-end Examination marks. Of the 25 marks, 15 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The year- end Examination shall be conducted by the teacher concerned as an internal examiner and another member from examiners' list recommended by the BOS as an external examiner.

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MALLA REDDY ENGINEERING COLLEGE  
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**IT WORKSHOP / ENGINEERING WORKSHOP**  
(Common for ME, CE, Mining, EEE, ECE, CSE&IT)

**Objectives:**

The IT Workshop for engineers is a training lab course spread over 54 hours. The modules include training on PC Hardware, Internet & World Wide Web and Productivity tools including Word, Excel and Power Point.

**Outcomes:**

**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 working PC to disassemble and assemble to working condition and install Windows and Linux on the same PC. Students are suggested to work similar tasks in the Laptop scenario where everpossible.**

**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 netting 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 and power point presentations using the Microsoft suite of office tools and Latex. **(Recommended to use Microsoft office 2007 in place of MS Office 2003)**

**PC Hardware**

**Week 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.

**Week 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 would be given as part of the course content.

**Week 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.

**Week 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.

**Week 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.

**Week 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.

### **Internet & World Wide Web**

**Week 7 - 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.

**Week 8 - Task 2: Web Browsers, Surfing the Web:** Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers. Also, plug-ins like Macromedia Flash and JRE for applets.

**Week 9 - Task 3: Search Engines & Netiquette:** Students should know what search engines are and how to use the search engines. A few topics would be given to the students for which they need to search on Google. This should be demonstrated to the instructors by the student.

**Week 10 - Task 4: 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. Then they need to customize their browsers to block pop ups, block active x downloads to avoid viruses and/or worms.

**Week 11- Task 5:** Develop your home page using HTML Consisting of your photo, name, address and education details as a table and your skill set as a list.

### **Productivity tools**

#### **Latex and Word**

**Week 12 – Word Orientation:** The mentor needs to give an overview of Latex and Microsoft (MS) office 2007/equivalent (FOSS) tool word: Importance of Latex and MS office 2007/ equivalent (FOSS) tool Word as word Processors, Details of the three tasks and features that would be covered in each, using Latex and word –Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter.

**Task 1: Using Latex and 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 both Latex and Word.

**Week 13 - Task 2: Creating project abstract** Features to be covered:-Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

**Week 14 - Task 3 : Creating a Newsletter** : Features to be covered:- Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge inward.

#### **Excel**

**Week 15 - Excel Orientation:** The mentor needs to tell the importance of MS office 2007/ equivalent (FOSS) tool Excel as a Spreadsheet tool, give the details of the two tasks and features that would be covered in each. Using Excel – Accessing, overview of toolbars, saving excel files, Using help and resources.

**Task 1: Creating a Scheduler** - Features to be covered:- Gridlines, Format Cells, Summation, auto fill, Formatting Text

**Week 16 - Task 2 : Calculating GPA** - .Features to be covered:- Cell Referencing, Formulae in excel – average, td. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function, LOOKUP/VLOOKUP, Orting, Conditional formatting

#### **Latex and MS/equivalent (FOSS) tool Power Point**

**Week 17 - Task1:** Students will be working on basic power point utilities and tools which help them create basic power point presentation. Topic covered during this week includes :- PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in both Latex and Power point. Students will be given model power point presentation which needs to be replicated (exactly how it's asked).

**Week 18- Task 2:** Second week helps students in making their presentations interactive. Topic covered during this week includes: Hyperlinks, Inserting –Images, Clip Art, Audio, Video, Objects, Tables and Charts

**Week 19 - Task 3:** Concentrating on the in and out of Microsoft power point and presentations in Latex. Helps them learn best practices in designing and preparing power point presentation. Topic covered during this week includes: - Master Layouts (slide, template, and notes), Types of views (basic, presentation, slide slotter, notes etc), Inserting – Background, textures, Design Templates, Hidden slides.

**REFERENCE BOOKS:**

1. Introduction to Information Technology, IITL Education Solutions limited, Pearson Education.
2. LaTeX Companion – Leslie Lamport, PHI/Pearson.
3. Introduction to Computers, Peter Norton, 6/e Mc Graw Hill Publishers.
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 KenQuamme. – CISCO Press, Pearson Education.
7. PC Hardware and A Handbook – Kate J. Chase PHI (Microsoft)

**ENGINEERING WORKSHOP****1. TRADES FOR EXERCISES:**

At least two exercises from each trade:

1. Carpentry
2. Fitting
3. Tin-Smithy and Development of jobs carried out and soldering.
4. House-wiring.
5. Foundry.
6. Black smithy
7. Plumbing

**2. TRADES FOR DEMONSTRATION & EXPOSURE:**

1. Power Tools in construction, wood working, electrical engineering and mechanical engineering.
2. Welding.
3. Machine shop

**TEXT BOOK:**

1. Work Shop Manual – P. Kanniah/ K. L. Narayana, Scitech Publishers.
2. Work Shop Manual by Venkat Reddy
3. Work Shop Practice Manual by K. Venkat Reddy, B.S. Publishers.



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II Year B.Tech EEE-I Sem

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MATHEMATICS – III

**Learning Objectives:** To learn

1. Transforming the given variable coefficient equation (Cauchy's and Lagrange's) into the one with constant coefficients.
2. Identifying ordinary points, singular points and regular singular points for the given ODE.
3. Finding the series solution around a regular singular point.
4. Solve the given ODE with variable coefficients by Frobenius method and test the convergence of its series solution.
5. Series solutions for Legendre and Bessel differential equations, analyzing the properties of Legendre and Bessel polynomials.
6. Differentiation and Integration of complex valued functions.
7. Evaluation of integrals using Cauchy's integral formula.
8. Taylor's series, Maclaurin's series and Laurent's series expansions of complex functions
9. Evaluation of integrals using residue theorem.
10. Transform a given function from  $z$  - plane to  $w$  - plane.
11. Identify the transformations like translation, magnification, rotation and reflection and inversion.
12. Properties of bilinear transformations.

**Outcomes:** After going through this course the student will be able to:

1. Apply the Frobenius method to obtain a series solution for the given linear 2nd ODE.
2. Identify Bessel equation and Legendre equation and solve them under special conditions with the help of series solutions method. Also recurrence relations and orthogonality properties of Bessel and Legendre polynomials.
3. After going to through this course the student will be able to analyze
  - a. The complex functions with reference to their analyticity, Integration using Cauchy's integral theorem,
  - b. Find the Taylor's and Laurent series expansion of complex functions
  - c. The conformal transformations of complex functions can be dealt with ease.

**Syllabus**

UNIT – I:

Linear ODE with variable coefficients and series solutions(second order only):

Equations reducible to constant coefficients-Cauchy's and Lagrange's differential equations.

Motivation for series solutions, Ordinary point and Regular singular point of a differential equation, Transformation of non-zero singular point to zero

Singular point. Series solutions to differential equations around zero, Frobenius Method about zero.

Unit-II

Special Functions : Legendre's Differential equation, General solution of Legendre's equation, Legendre polynomials Properties: Rodrigue's formula – Recurrence relations, Generating function of Legendre's polynomials – Orthogonality. Bessel's Differential equation, Bessel functions properties: – Recurrence relations, Orthogonality, Generating function, Trigonometric expansions involving Bessel functions.

UNIT-III:

Complex Functions –Differentiation and Integration :

Complex functions and its representation on Argand plane, Concepts of limit Continuity, Differentiability, Analyticity, Cauchy-Riemann conditions, Harmonic functions– Milne – Thompson method. Line integral – Evaluation along a path and by indefinite integration – Cauchy's integral theorem – Cauchy's integral formula – Generalized integral formula.

#### UNIT-IV:

Power series expansions of complex functions and contour Integration: Radius of convergence -Expansion in Taylor's series, Maclaurin's series and Laurent series. Singular point –Isolated singular point – pole of order m – essential singularity. Residue – Evaluation of residue by formula and by Laurent series – Residue theorem. Evaluation of integrals of the type

(a) Improper real integrals  $\int_{-\infty}^{\infty} f(x) dx$

(b)  $\int_0^{2\pi} f(\cos \theta, \sin \theta) d\theta$

#### UNIT-V:

Conformal mapping: Transformation of z-plane to w-plane by a function, Conformal transformation. Standard transformations- Translation; Magnification and rotation; inversion and reflection, Transformations like  $ez$ ,  $\log z$ ,  $z^2$ , and Bilinear transformation. Properties of Bilinear transformation, determination of bilinear transformation when mappings of 3 points are given .

#### TEXT BOOKS:

1. Advanced Engineering Mathematics by Kreyszig, John Wiley & Sons.
2. Higher Engineering Mathematics by Dr. B.S. Grewal, Khanna Publishers.
3. Complex Variables & Applications by JW Brown & R V Churchill

#### REFERENCES:

- 1) Complex Variables Principles And Problem Sessions By A.K.Kapoor, World Scientific Publishers
- 2) Engineering Mathematics-3 By T.K.V.Iyengar and B.Krishna Gandhi Etc
- 3) A Text Book Of Engineering Mathematics By N P Bali, Manesh Goyal
- 4) Mathematics for Engineers and Scientists, Alan Jeffrey, 6th Edit. 2013, Chapman & Hall/CRC
- 5) Advanced Engineering Mathematics, Michael Greenberg, Second Edition. Person Education
- 6) Mathematics For Engineers By K.B.Datta And M.A S.Srinivas, Cengage Publication.

2013-17

CODE:30339

MALLA REDDY ENGINEERING COLLEGE  
(Autonomous)

II Year B.Tech EEE-I Sem

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FLUID MECHANICS AND HYDRAULIC MACHINERY

**Pre-requisite:** Engineering Physics

**Objective:** The objective of this subject is to provide the basic knowledge of fluids behavior at different conditions and their applications.

**Outcome:** The student shall be able to apply the knowledge to access the performance of hydraulic machines.

**Codes/Tables:** Nil

**UNIT I**

**Fluid Statics :** Dimensions and units: physical properties of fluids- specific gravity, viscosity surface tension-vapor pressure and their influence on fluid motion- atmospheric gauge and vacuum pressure -measurement of pressure- Piezometer, U-tube and differential manometers.

**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.

**UNIT II**

**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.

**Closed Conduit Flow:** Reynold's experiment- Darcy Weisbach equation- 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, Flow nozzle, Turbine flow meter.

**UNIT III**

**Basics of Turbo Machinery :** Hydrodynamic force of jets on stationary and moving flat, inclined, and curved vanes, jet striking centrally and at tip, velocity diagrams, work done and efficiency, flow over radial vanes.

**Hydroelectric Power Stations :** Elements of hydro electric power station-types-concept of pumped storage plants-storage requirements, mass curve (explanation only) estimation of power developed from a given catchment area; heads and efficiencies.

**UNIT IV**

**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. \*

**Performance of Hydraulic Turbines** : Geometric similarity, Unit and specific quantities, characteristic curves, governing of turbines, selection of type of turbine, cavitation, surge tank, water hammer.

## **UNIT V**

**Centrifugal Pumps** : Classification, working, work done - manometric head- losses and efficiencies specific speed- pumps in series and parallel-performance characteristic curves, NPSH.

**Reciprocating Pumps** : Working, Discharge, slip, indicator diagrams.

### **TEXT BOOKS:**

1. Hydraulics, fluid mechanics and Hydraulic machinery MODI and SETH.
2. Fluid Mechanics and Hydraulic Machines by Rajput.

### **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 ,JohnWiley & Sons Inc. 2004 (Chapter 12 - Fluid Flow Measurements).

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MALLA REDDY ENGINEERING COLLEGE  
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II Year B.Tech. ECE-I Sem

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**ELECTRONIC DEVICES AND CIRCUITS**

**Objective:** In real-time applications the most commonly used electronic devices are TV, radio, cell phone and etc. So to have a clear idea on semiconductor characteristics like diodes, transistors (FETs, BJTs and etc) the subject syllabus is framed accordingly to furnish full and clear knowledge on these basics.

**UNIT - I**

**CATHODE RAY OSCILLOSCOPE:** Motion of a charged particle in electric and magnetic fields, simple problems involving electric and magnetic fields only, electrostatic and magneto static deflection sensitivities, constituents of cathode ray oscilloscope, cathode ray tube, the electron gun, focusing, deflection system, uses of cathode ray oscilloscope.

**REVIEW OF TRANSPORT PHENOMENA IN SEMICINDUCTORS:** Electrons and holes in an Intrinsic semiconductor, conductivity of a semiconductor, carrier concentrations in an intrinsic semiconductor, donor and acceptor impurities, charge densities in a semiconductor, Fermi level in a semiconductor having impurities, diffusion, carrier lifetime, the continuity equation, the hall effect.

**UNIT - II**

**SEMICONDUCTOR DIODE CHARACTERISTICS:** Qualitative theory of the p-n Junction, the p-n junction as a diode, band structure of an open circuited p-n junction, the current components in a p-n diode, quantitative theory of the p-n diode currents, the volt ampere characteristics, the temperature dependence of V-I characteristics, diode resistance, ideal versus practical diodes, diode equivalent circuits, space charge or transition capacitance  $C_T$ , diffusion capacitance, breakdown mechanism in diode, Zener diode, V-I characteristics of Zener diode.

**UNIT - III**

**DIODE APPLICATIONS:** Introduction, load line analysis, series diode configurations, parallel and series-parallel configuration, half-wave rectification, full-wave rectification, general filter considerations, Inductive, Capacitive, LC and CLC filters, Zener diode as voltage regulator.

**SPECIAL SEMICONDUCTOR DEVICES:** Principle of operation, Characteristics and applications of Tunnel diode, Varactor diode, UJT, Photo Diode, LED, LCD, SCR.

**UNIT - IV**

**BIPOLAR JUNCTION TRANSISTORS:** Introduction, transistor construction, transistor operation, transistor current components, transistor as an amplifier, common base configuration, common emitter configuration, common collector configuration, limits of operation, transistor specifications.

**FIELD EFFECT TRANSISTORS:** Junction Field Effect Transistor (JFET) - Principle of operation, volt ampere characteristics, advantages of JFET over BJT. Introduction to MOSFETs - depletion and enhancement type MOSFETs, operation and volt-ampere characteristics.

**UNIT - V**

**BJT BIASING:** Need for biasing, Operating point, load line analysis, bias stabilization techniques: fixed bias, collector to base bias, self-bias, Stabilization against variations in  $I_{CO}$ ,  $V_{BE}$  and  $\beta$  for the self bias circuit, bias compensation techniques, thermal runaway and thermal stability.

**FET BIASING:** Biasing techniques: Fixed bias, Source self-bias, Voltage divider bias.

**TEXT BOOKS:**

1. Jacob Milliman, Christos C .Halkias, Satyabrata Jit (2011), *Electronic Devices and Circuits*, 3<sup>rd</sup> edition, Tata McGraw Hill, New Delhi.
2. S. Shalivahanan, N. Suresh Kumar, A. Vallavaraj (2007), *Electronic Devices and Circuits*, 3<sup>rd</sup> edition, McGraw Hill, New Delhi, India
3. Robert Boylestad, Lowis Nashelsky (1993), *Electronic Devices and Circuit Theory*, 5<sup>th</sup> edition, Prentice Hall of India, New Delhi, India.

**REFERENCE BOOKS:**

1. David. A. Bell (1986), *Electronic Devices and Circuits*, 4<sup>th</sup> edition, Prentice Hall of India, New Delhi.
2. G. K. Mittal (1999), *Electronic Devices and Circuits*, 22<sup>nd</sup> edition, Khanna Publications, New Delhi
3. Theodore. F. Bogart Jr, Jeffrey S. Beasley, Guillermo Rico (2004), *Electronic Devices and Circuits*, 6<sup>th</sup> edition Pearson Education, India.

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**MALLA REDDY ENGINEERING COLLEGE**  
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II Year B.Tech EEE-I Sem

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**ELECTRICAL CIRCUITS**

**Objective:** To start with understanding of any circuit the important and primary elements in electrical are R, L and C. So this subject has the scope of knowing better of basics of electrical elements, magnetic elements and their circuitry and also network topology and its theorems for reducing the complexity of the circuit.

**UNIT –I:**

**Introduction to Electrical Circuits:**

Circuit Concept, R-L-C Parameters, Voltage and Current Sources, Independent and Dependent Sources, Source Transformation, Voltage – Current relationship for Passive Elements (for different input signals –Square, Ramp, Saw tooth and Triangular). Kirchhoff's Laws, Network Reduction Techniques – Series, Parallel, Series Parallel, Star –to-Delta or Delta-to-Star Transformations, Nodal Analysis, Mesh Analysis, Super node and Super mesh for DC Excitations.

**UNIT –II:**

**Single Phase A.C. Circuits**

R.M.S. and Average values and form factor for 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.

**Resonance:** Resonance – Series, Parallel Circuits, Concept of Band width and Q factor.

**UNIT –III:**

**Magnetic Circuits:**

Magnetic Circuits, Faraday's law of Electromagnetic Induction, Concept of Self and Mutual Inductance, Dot convention, Coefficient of Coupling, Composite Magnetic Circuit, Analysis of Series and Parallel Magnetic Circuits.

**UNIT –IV:**

**Network Topology:**

Definitions, Graph, Tree, Basic cutset and Basic Tie set Matrices for Planar Networks, Loop and Nodal methods for analysis of Networks with Dependent & Independent Voltage and Current Sources, Duality & Dual Networks.

**UNIT –V:**

**Network Theorems (With A.C. & D.C):**

Tellegen's, Superposition, Reciprocity, Thevenin's, Norton's, Maximum Power Transfer, Milliman's and Compensation theorems for D.C excitations.

**TEXT BOOKS:**

1. Electric Circuits - A.Chakrabarhty, Dhanipat Rai & Sons.
2. Network analysis - N.C Jagan and C. Lakhminarayana, BS publications.
3. Basic circuit analysis by d.r. Cunningham & j.a. stuller, jaico

**REFERENCE BOOKS:**

1. Engineering Circuit Analysis - William Hayt ,Jack E. Kemmerly, S M Durbin, Mc Graw Hill Companies.
2. Electric Circuit Analysis - K.S.Suresh Kumar, Pearson Education.
3. Electrical Circuits - David A.Bell, Oxford University Press.
4. Network Analysis and Circuits - M.Arshad, Infinity Science Press.
5. Circuits - A.Bruce Carlson, Cengage Learning.
6. Electrical Circuits: An Introduction - KCA Smith & RE Alley, Cambridge University Press.



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II Year B.Tech EEE-I Sem

L T/P/D C  
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**ELECTROMAGNETIC FIELDS**

**Objective:** To expose the students to a variety of basic laws which drive all the electrical and electronics devices. The two categories of fields are studied in this subject i.e. electro static and dynamic, magneto static, dynamic or time varying with their mathematical formulations.

**UNIT – I: Electrostatics:**

Sources and effects of electromagnetic fields – Vector fields – Different co-ordinate systems

– Divergence theorem –Stoke’s theorem. Electrostatic Fields – Coulomb’s Law – Electric Field Intensity (EFI) – EFI due to a line and a surface charge – Work done in moving a point charge in an electrostatic field – Electric Potential– Properties of potential function – Potential gradient – Guass’s law – Application of Guass’s Law – Maxwell’s first law. Laplace’s and Poison’s equations – Solution of Laplace’s equation in one variable.

**UNIT – II: Conductors, Dielectric & Capacitance :**

Electric dipole – Dipole moment – potential and EFI due to an electric dipole and Torque – Behaviour of conductors in an electric field – Conductors and Insulators.

Electric field inside a dielectric material – polarization – Dielectric – Conductor and Dielectric – Dielectric boundary conditions, Capacitance – Capacitance of parallel plate and spherical and co-axial capacitors with composite dielectrics – Energy stored and energy density in a static electric field – Current density – conduction and Convection current densities – Ohm’s law in point form – Equation of continuity.

**UNIT – III: Magneto Statics, Ampere’s circuital law:**

Static magnetic fields – Biot-Savart’s law – Oesterd’s experiment - Magnetic field intensity (MFI) – MFI due to a straight current carrying filament – MFI due to circular, square and solenoid current – Carrying wire – Relation between magnetic flux, magnetic flux density and MFI – Maxwell’s second Equation. 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, Field due to a circular, rectangular and square loops.

**UNIT –IV: Force in Magnetic fields, Magnetic Potential:**

Magnetic force - Moving charges in a Magnetic field – Lorentz force equation – force on a current element in a magnetic field – Force on a straight and a long current carrying conductor in a magnetic field – Force between two straight long and parallel current carrying conductors – Magnetic dipole and dipole moment – a differential current loop as a magnetic dipole – Torque on a current loop placed in a magnetic field.

Scalar Magnetic potential and its limitations – vector magnetic potential and its properties – vector magnetic potential due to simple configurations – vector Poisson’s equations.

**UNIT – V: Inductance, Time Varying Fields :**

Self and Mutual inductance – Neumans’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. Introduction to permanent magnets, their characteristics and applications.

Time varying fields – Faraday’s laws of electromagnetic induction – Its integral and point forms – Maxwell’s fourth equation – Statically and Dynamically induced EMFs – Simple problems -Modification of Maxwell’s equations for time varying fields – Displacement current – Poynting Theorem and Poynting vector.

**TEXT BOOKS:**

1. Engineering Electromagnetics - *William H. Hayt & John. A. Buck* Mc. Graw-Hill Companies, 7<sup>th</sup> Edition, 2012.
2. Electromagnetic Fields - *Sadiku*, Oxford Publications, 7<sup>th</sup> edition, 2006.

**REFERENCE BOOKS:**

1. Introduction to Electro Dynamics - *D J Griffiths*, Prentice-Hall of India Pvt. Ltd, 2<sup>nd</sup> editon, 1989.
2. Electromagnetic - *J P Tewari*, Khanna Publishers, 2<sup>nd</sup> edition, 2005.
3. Electromagnetics - *J. D Kraus*, Mc Graw-Hill Inc, 4<sup>th</sup> edition 1992.
4. Electromagnetic fields - *S. Kamakshaiah*, Right Publishers, 2007.

2013-17

CODE:30203

MALLA REDDY ENGINEERING COLLEGE  
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II Year B.Tech EEE-I Sem

L T/P/D C  
4 -/- 4

**ELECTRICAL MACHINES-I**

**Objective:** Every Engineer will work on an electrical machine either in domestic or in industry. So, the basic idea of electro mechanical energy conversion and the two types of machines like DC motors and DC generators and its principle of operation, construction, types and etc are studied.

**UNIT – I: ELECTROMECHANICAL ENERGY CONVERSION**

Electromechanical Energy conversion – forces and torque in magnetic field systems – energy balance – energy and force in a singly excited magnetic field system, determination of magnetic force - co-energy – multi excited magnetic field systems.

**UNIT – II: D.C. GENERATORS – CONSTRUCTION & OPERATION**

D.C. Generators – Principle of operation – Action of commutator – constructional features – classification of DC generators – separately excited and self excited generators – armature windings – lap and wave windings – simplex and multiplex windings – use of laminated armature – E. M.F Equation – Problems – Armature reaction – cross magnetizing and demagnetizing AT/pole – compensating winding – commutation – reactance voltage – methods of improving commutation.

**UNIT –III: TYPES OF D.C 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 – 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 – V: 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. Electric Machinery- *P.S. Bimbra*, Khanna Publishers, 7<sup>th</sup> edition, 2010,
2. Theory and performance of Electrical machines – *J.B Gupta*, S.K Kataria & Sons publishers, 2009.

**REFERENCE BOOKS:**

1. Electrical Machines – *S.K. Bhatta Charya*, Tata Mc. Hill Publications, 2007.
2. Electrical Machines - *I.J. Nagrath & Kothari*, Tata Mc Graw-Hill Publishers, 3<sup>rd</sup> edition, 2004.
3. Electric Machines – *M.V. Deeshpande*, Wheeler Publishing, 1997.
4. Electrical machinery - *A.E. Fitzgerald C. Kingsley and S. Umans*, Mc Graw-Hill Companies, 5<sup>th</sup> edition, 2010.

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MALLA REDDY ENGINEERING COLLEGE  
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II Year B.Tech EEE-I Sem

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FLUID MECHANICS AND HYDRAULIC MACHINES LAB

1. Impact of jets on Vanes.
2. Performance Test on Pelton Wheel.
3. Performance Test on Francis Turbine.
4. Performance Test on Kaplan Turbine.
5. Performance Test on Single Stage Centrifugal Pump.
6. Performance Test on Multi Stage Centrifugal Pump.
7. Performance Test on Reciprocating Pump.
8. Calibration of Venturimeter.
9. Calibration of Orifice meter.
10. Determination of friction factor for a given pipe line.
11. Determination of loss of head due to sudden contraction in a pipeline.
12. Turbine flow meter.

**Note:** Any 10 of the above 12 experiments are to be conducted.

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MALLA REDDY ENGINEERING COLLEGE  
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II Year B.Tech EEE-I Sem

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ELECTRONIC DEVICES AND CIRCUITS LAB

**PART A: (Only for Viva-voce Examination)**

**Electronic Workshop Practice (In 3 Lab Sessions):**

1. Identification, Specifications, Testing of R, L, C Components (Color Codes), Potentiometers, Switches (SPDT, DPDT, and DIP), Coils, Gang Condensers, Relays, Bread Boards, PCB's
2. Identification, Specifications and Testing of Active Devices, Diodes, BJT's, Low power JFET's, MOSFET's, Power Transistors, LED's, LCD's, SCR, UJT.
3. Study and operation of
  - i. Multimeters (Analog and Digital)
  - ii. Function Generator
  - iii. Regulated Power Supplies
  - iv. CRO.

**PART B: (For Laboratory Examination – Minimum of 10 experiments)**

1. Forward & Reverse Bias Characteristics of PN Junction Diode.
2. Zener diode characteristics and Zener as voltage Regulator.
3. Input & Output Characteristics of Transistor in CB Configuration and h-parameter calculations.
4. Input & Output Characteristics of Transistor in CE Configuration and h-parameter calculations.
5. Half Wave Rectifier with & without filters.
6. Full Wave Rectifier with & without filters.
7. FET characteristics.
8. Design of Self-bias circuit.
9. Frequency Response of CC Amplifier.
10. Frequency Response of CE Amplifier.
11. Frequency Response of Common Source FET amplifier .
12. SCR characteristics.
13. UJT Characteristics

**PART C: Equipment required for Laboratories:**

1. Regulated Power supplies (RPS) -0-30 V
2. CRO's -0-20 MHz.
3. Function Generators -0-1 MHz.
4. Multimeters
5. Decade Resistance Boxes/Rheostats
6. Decade Capacitance Boxes
7. Ammeters (Analog or Digital) -0-20  $\mu$ A, 0-50 $\mu$ A, 0-100 $\mu$ A, 0-200 $\mu$ A, 0-10 mA.
8. Voltmeters (Analog or Digital) -0-50V, 0-100V, 0-250V
9. Electronic Components -Resistors, Capacitors, BJTs,  
LCDs, SCRs, UJTs, FETs,  
LEDs, MOSFETs, Diodes- Ge & Sitype,  
Transistors – NPN, PNP type

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MALLA REDDY ENGINEERING COLLEGE  
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II Year B.Tech EEE-II Sem

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MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

**Unit I :Introduction to Managerial Economics:** Definition, Nature and Scope of Managerial Economics–Demand Analysis: Demand Determinants, Law of Demand and its exceptions.

**Elasticity of Demand:**Definition, Types, Measurement and Significance of Elasticity of Demand. Demand Forecasting, Factors governing demand forecasting, methods of demand forecasting (survey methods, statistical methods, expert opinion method, test marketing, controlled experiments, judgmental approach to demand forecasting)

**Unit II :Theory of Production and Cost Analysis:**

Production Function – Isoquants and Isocosts, MRTS, Least Cost Combination of Inputs, Cobb-Douglas Production function, Laws of Returns, Internal and External Economies of Scale.

**Cost Analysis:** Cost concepts, Opportunity cost, fixed vs. Variable costs, explicit costs Vs. Implicit costs, Out of pocket costs vs. Imputed costs. Break-even Analysis (BEA)-Determination of Break-Even Point (simple problems)- Managerial Significance and limitations of BEA.

**Unit III :Introduction to Markets & Pricing Policies:**

**Market structures:** Types of competition, Features of Perfect competition, Monopoly and Monopolistic Competition. Price-Output Determination in case of Perfect Competition and Monopoly.

**Objectives and Policies of Pricing- Methods of Pricing:** Cost Plus Pricing, Marginal Cost Pricing, Sealed Bid Pricing, Going Rate Pricing, Limit Pricing, Market Skimming Pricing, Penetration Pricing, Two-Part Pricing, Block Pricing, Bundling Pricing, Peak Load Pricing, Cross Subsidization.

**Unit IV :Business & 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.

**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 proposals, Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR) and Net Present Value Method (simple problems)

**Unit V: Introduction to Financial Accounting:**Double-Entry Book Keeping, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments).

**Financial Analysis through ratios:**Computation, Analysis and Interpretation of Liquidity Ratios (Current Ratio 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 Ratio and EPS).

**TEXT BOOKS:**

1. Aryasri: Managerial Economics and Financial Analysis, 2/e, TMH, 2005.
2. Varshney & Maheswari: Managerial Economics, Sultan Chand, 2003.

**REFERENCE BOOKS:**

- a. Ambrish Gupta, Financial Accounting for Management, Pearson Education, New Delhi.
- b. H. Craig Peterson & W. Cris Lewis, Managerial Economics, PHI, 4<sup>th</sup> Ed.
- c. Suma Damodaran, Managerial Economics, Oxford University Press.
- d. Lipsey & Chrystel, Economics, Oxford University Press.
  
- e. S. A. Siddiqui & A. S. Siddiqui, Managerial Economics & Financial Analysis, New age International Space Publications.
  
- f. Domnick Salvatore: Managerial Economics In a Global Economy, 4th Edition, Thomson.
- g. Narayanaswamy: Financial Accounting—A Managerial Perspective, PHI.
  
- h. Raghunatha Reddy & Narasimhachary: Managerial Economics& Financial Analysis, Scitech.
- i. S.N.Maheswari & S.K. Maheswari, Financial Accounting, Vikas.
- j. Truet and Truet: Managerial Economics:Analysis, Problems and Cases, Wiley.
- k. Dwivedi:Managerial Economics, 6th Ed., Vikas.

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MALLA REDDY ENGINEERING COLLEGE  
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II Year B.Tech EEE-II Sem

L T/P/D C  
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POWER SYSTEMS-I

**Objective:** To expose knowledge on electrical power generating types and its functioning with their advantages & disadvantages and also general aspects of distribution systems and tariff methods, transmission line categories and their calculations of the parameters. This subject is mainly having applications in electrical and also civil.

**UNIT-I: Thermal and Nuclear Power Stations**

**Thermal Power Stations:** Line diagram of Thermal Power Station (TPS) showing paths of coal, steam, water, air, ash and flue gases.- Brief description of TPS components: Economizers, Boilers, Super heaters, Turbines, Condensers, Chimney and Cooling towers, numerical problems.

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

**UNIT- II: Gas Power Stations, Substations and Gas Insulated Substations (GIS).**

**Gas Power Stations:** Principle of Operation and Components (Block Diagram Approach Only)

Classification of substations: Air insulated substations - Indoor & Outdoor substations: Substations layout showing the location of all the substation equipment. Bus bar arrangements in the Sub-Stations: Simple arrangements like single bus bar, sectionalized single bus bar, main and transfer bus bar system with relevant diagrams.

**Gas insulated substations (GIS)** – Advantages of Gas insulated substations, single line diagram of gas insulated substations, bus bar, Installation and maintenance of GIS, Comparison of Air insulated substations and Gas insulated substations.

**UNIT- III: General Aspects of Distribution Systems and DC and AC Distribution Systems**

Classification of Distribution Systems - Comparison of DC vs AC and Under-Ground vs Over - Head Distribution Systems- Requirements and Design features of Distribution Systems.

**D.C. Distribution Systems:** Voltage Drop Calculations (Numerical Problems) in D.C Distributors for the following cases: Radial D.C Distributor fed one end and at the both the ends (equal/unequal Voltages) and Ring Main Distributor.

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

**UNIT- IV: Economic Aspects of Power Generation and Tariff Methods**

Load curve, load duration and integrated load duration curves-load, demand, diversity, capacity, utilization and plant use factors- Numerical Problems.

**UNIT-V: Tariff Methods:**

Costs of Generation and their division into Fixed, Semi-fixed and Running Costs. Desirable Characteristics of a Tariff Method.-Tariff Methods: Flat Rate, Block-Rate, two-part, three –part, and power factor tariff methods and Numerical Problems.



**TEXT BOOKS:**

1. A course in power systems - *J.B. Gupta, S. K. Kataria & Sons*, 2009.
2. Principles of Power Systems - *V.K Mehta and Rohit Mehta*, S.Chand& Company Ltd., New Delhi 2004.
3. Generation, distribution and utilization of Electrical energy- *C.L.Wadhawa*, New age International (P) Limited, Publishers 1997.

**REFERENCE BOOKS:**

1. A Text Book on Power System Engineering - *M.L.Soni, P.V.Gupta, U.S.Bhatnagar and A.Chakraborti*, Dhanpat Rai & Co. Pvt. Ltd., 1999.
2. Elements of Power Station design and practice - *M.V. Deshpande*, PHI, 2010.
3. Electrical Power Generation, Transmission and Distribution - *S.N.Singh.*, PHI 2003.
4. Gas turbine performance- *PP Wals, P.Fletcher*, Blackwell Publisher, 2004

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MALLA REDDY ENGINEERING COLLEGE  
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II Year B.Tech EEE-II Sem

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**ELECTRONIC CIRCUITS**

**Objective:** The scope of the subject is to have an idea on types of amplifiers like small signal and large signal with their types and circuitry, feedback amplifiers and oscillators which are mainly used in various applications for gain improving. To know the advantages of pulse and digital in applications the linear, nonlinear and multivibrators are also discussed.

**UNIT - I**

**SMALL SIGNAL SINGLE STAGE AMPLIFIERS:** Transistor as an amplifier, Classification of amplifiers, Transistor hybrid model, the h-parameters, analysis of a transistor amplifier circuit (CE, CB, CC) using h-parameters, simplified Common Emitter hybrid model, frequency response of amplifier. Small signal JFET model, common source amplifier, common drain amplifier, common gate amplifier.

**UNIT - II**

**LARGE SIGNAL AMPLIFIERS:** Introduction, class A large signal amplifier, harmonic distortion, transformer coupled audio power amplifier, collector dissipation and conversion efficiency, push-pull amplifier, class B power amplifier, class B push pull amplifier without output transformer, push pull amplifiers using transistors having complementary symmetry, class AB push pull amplifier, thermal stability, heat sink.

**UNIT - III**

**FEEDBACK AMPLIFIERS:** Feedback concept and types, transfer gain with feedback, general characteristics of negative feedback amplifiers, effect of negative feedback on input and output resistances, method of analysis of feedback amplifiers, voltage series, current series, current shunt, and voltage shunt feedback amplifiers.

**OSCILLATORS:** Constituents of an oscillator, Barkhausen criterion, classification of oscillators, sine wave feedback oscillators of LC type-general form of oscillator circuit, Hartley oscillator, Colpitts oscillator, sine wave feedback oscillator of RC type- RC phase shift oscillator, Wein bridge oscillator, Crystal oscillator, frequency stability.

**UNIT - IV**

**LINEAR WAVE SHAPING:** High pass, low pass RC circuits, their response for sinusoidal, step, pulse, square, ramp and exponential inputs, high pass RC circuit as differentiator and low pass RC circuit as integrator circuit.

**NON-LINEAR WAVE SHAPING:** Diode clippers, transistor clippers, clipping at two independent levels, clamping operation, clamping circuits using diode with different inputs, clamping circuit theorem, practical clamping circuits.

**UNIT - V**

**MULTIVIBRATORS:** The stable state of a Bistable multivibrator, design and analysis of fixed bias and self biased Bistable multivibrator, Schmitt trigger circuit using transistors, Monostable multivibrator, design and analysis of collector coupled and emitter coupled Monostable multivibrator, Astable multivibrator, design and analysis of collector coupled and emitter coupled Astable multivibrator.

**TEXT BOOKS:**

1. Jacob Millman, Christos C. Halkias, Chetan D. Parikh (2011), Integrated Electronics-Analog and Digital Circuits and Systems, 2nd edition, Tata McGraw Hill Education Private Limited, New Delhi.
2. Jacob Millman, Herbert Taub, Mothiki S. Prakash Rao (2008), Pulse, Digital and Switching Waveforms, 3rd edition, Tata McGraw Hill, New Delhi.

**REFERENCE BOOKS:**

1. Robert L. Boylestad, Louis Nashelsky (2006), Electronic Devices and Circuits Theory, 9th edition, Pearson/Prentice Hall, India.
2. Jacob Millman, Arvin Grabel (2003), Microelectronics, 2nd edition, Tata McGraw Hill, New Delhi.
3. A. Anand Kumar (2005), Pulse and Digital Circuits, Prentice Hall of India, India.
4. G. K. Mithall (1998), Electronic Devices and Circuits, Khanna Publishers, New Delhi.

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**MALLA REDDY ENGINEERING COLLEGE**  
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II Year B.Tech EEE-II Sem

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**SWITCHING THEORY AND LOGIC DESIGN**

**Objective:** To expose the students to a variety of number systems and its switching functions, design and minimization of sequential and combinational circuits with different applications. This data creates an interest in engineer for developing their own logic circuitry for their application.

**UNIT -I:**

**Number System and Boolean Algebra And Switching Functions:**

Number Systems, Base Conversion Methods, Complements of Numbers, Codes- Binary Codes, Binary Coded Decimal Code and its Properties, Unit Distance Codes, Alpha Numeric Codes, Error Detecting and Correcting Codes.

**Boolean Algebra:** Basic Theorems and Properties, Switching Functions, Canonical and Standard Form, Algebraic Simplification of Digital Logic Gates, Properties of XOR Gates, Universal Gates, Multilevel NAND/NOR realizations.

**UNIT -II:**

**Minimization and Design of Combinational Circuits:**

Introduction, The Minimization with theorem, The Karnaugh Map Method, Five and Six Variable Maps, Prime and Essential Implications, Don't Care Map Entries, Using the Maps for Simplifying, Tabular Method, Partially Specified Expressions, Multi-output Minimization, Minimization and Combinational Design, Arithmetic Circuits, Comparator, Multiplexers, Code Converters, Wired Logic, Tristate Bus System, Practical Aspects related to Combinational Logic Design, Hazards and Hazard Free Relations.

**UNIT -III:**

**Sequential Machines Fundamentals:**

Introduction, Basic Architectural Distinctions between Combinational and Sequential circuits, The Binary Cell, Fundamentals of Sequential Machine Operation, The Flip-Flop, The D-Latch Flip-Flop, The "Clocked T" Flip-Flop, The "Clocked J-K" Flip-Flop, Design of a Clocked Flip-Flop, Conversion from one type of Flip-Flop to another, Timing and Triggering Consideration, Clock Skew.

**UNIT -IV:**

**Sequential Circuit Design and Analysis:**

Introduction, State Diagram, Analysis of Synchronous Sequential Circuits, Approaches to the Design of Synchronous Sequential Finite State Machines, Design Aspects, State Reduction, Design Steps, Realization using Flip-Flops

Counters - Design of Single mode Counter, Ripple Counter, Ring Counter, Shift Register, Shift Register Sequences, Ring Counter Using Shift Register.

**UNIT -V:**

**Sequential Circuits:**

Finite state machine-capabilities and limitations, Mealy and Moore models-minimization of completely specified and incompletely specified sequential machines, Partition techniques and Merger chart methods-concept of minimal cover table.

**Algorithmic State Machines:** Salient features of the ASM chart-Simple examples-System design using data path and control subsystems-control implementations-examples of Weighing machine and Binary multiplier.

**TEXT BOOKS:**

1. Switching and Finite Automata Theory- Zvi Kohavi & Niraj K. Jha, 3<sup>rd</sup> Edition, Cambridge.
2. Digital Design- Morris Mano, PHI, 3<sup>rd</sup> Edition.

**REFERENCE BOOKS:**

1. Introduction to Switching Theory and Logic Design – Fredriac J. Hill, Gerald R. Peterson, 3<sup>rd</sup> Ed, John Wiley & Sons Inc.
2. Digital Fundamentals – A Systems Approach – Thomas L. Floyd, Pearson, 2013.
3. Digital Logic Design - Ye Brian and HoldsWorth, Elsevier
4. Fundamentals of Logic Design- Charles H. Roth, Cengage LEarning, 5<sup>th</sup>, Edition, 2004.
5. Digital Logic Applications and Design- John M. Yarbrough, Thomson Publications, 2006.
6. Digital Logic and State Machine Design – Comer, 3<sup>rd</sup>, Oxford, 2013.

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**NETWORK THEORY**

**Objective:** To highlight the difference between circuit and network and its analysis with DC and AC source. To make the engineer to use the mathematical functions for designing a network and testing with different filters for improving the efficiency.

**UNIT-I Three phase circuits**

Three phase circuits: Phase sequence- Star and delta connection-Relation between line and phase voltages and currents in balanced and unbalanced systems

Measurement of Active and Reactive power in balanced and unbalanced three phase systems.

**UNIT-II Transient Analysis**

**D.C Transient Analysis :** Transient response of R-L, R-C, R-L-C series, parallel circuits for D.C excitation-Initial conditions-solution using differential equation and Laplace transforms

**A.C Transient Analysis**

Transient response of R-L, R-C, R-L-C series, parallel circuits for sinusoidal excitations-Initial conditions-Solution using differential equations and Laplace transforms

**UNIT III Network Functions:** The concept of complex frequency, physical interpretation of complex frequency, transform impedance and transform circuit, series and parallel combination of element, terminal pairs or ports, network functions for one port and two port, poles and zeros of network functions, significance of poles and zeros, properties of driving point functions, properties of transfer functions, necessary condition for driving point function, necessary condition for transfer functions, time domain response from pole - zero plot.

**UNIT-IV Two Port Networks**

Two port network parameters – Z, Y, ABCD, hybrid and inverse hybrid parameters and their relations (Both Dependent and independent Sources).

Condition of Reciprocity and Symmetry

Cascaded networks Concept of transformed network – two port network parameters using transformed variables - Problems

**UNIT V Filters**

Low Pass, High Pass, Band Pass, Band Elimination – Numerical Problems

**Fourier analysis of A.C Circuits**

Fourier theorem- consideration of symmetry, exponential form of Fourier series – line spectra and phase angle spectra- Fourier Integrals and Fourier Transforms – properties of Fourier Transforms

**TEXT BOOKS :**

1. Network Analysis – ME Van Valkenburg, Prentice Hall of India, 3rd Edition, 2000.
2. Engineering Circuit Analysis by William Hayt and Jack E. Kemmerley, Mc Graw Hill Company, 6th edition

**REFERENCES :**

1. Network Analysis – N.C. Jagan and C. Lakshminarayana, B.S. Publications, 2006.
2. Electric Circuits – J. Edminister and M. Nahvi – Schaum's Outlines, TMH, 1999.
3. Electrical circuits by A. Chakraborthy, Dhanpath Rai & Co-6<sup>th</sup> edition-2010.

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CODE: 30206

MALLA REDDY ENGINEERING COLLEGE  
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**ELECTRICAL MACHINES-II**

**Objective:** To expose the students to a variety of static devices like transformers and its performance with different tests for both single-phase and three –phase. This subject also explains the different types of induction motors and its domestic and industrial applications.

To help the students cultivate the habit of practicing mathematics, thus providing them with the required facility to face any competitive exam.

**UNIT-I : 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.

**Performance of transformers :** 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 II: Three phase Transformers**

Poly-phase connections - Y/Y, Y/Δ, Δ/Y, Δ/Δ and open, Third harmonics in phase voltages-three winding transformers-tertiary windings. Determination of  $Z_p$ ,  $Z_s$  and  $Z_t$  transients in switching - off load and on load tap changing; Scott connection.

**UNIT III: Three Phase Induction Motors**

Construction details of cage and wound rotor machines-production of a rotating magnetic field - principle of operation – Slip- 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 - double cage and deep bar rotors - equivalent circuit - phasor diagram - crawling and cogging.

**UNIT IV: Performance of Three Phase Induction Motors**

Circle diagram-no load and blocked rotor tests-predetermination of performance. Methods of starting, starting current and torque calculation of Induction Motors.

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

**UNIT V: Single Phase Induction Motors:**

Single phase Induction motor – Constructional features- Double revolving field theory Equivalent circuit- split – Phase motors- Capacitor start Capacitor run motors.

**TEXT BOOKS:**

1. Electric Machinery- *P.S. Bimbra*, Khanna Publishers, 7<sup>th</sup> edition, 2010.
2. Theory and Performance of Electrical Machines - *JB Gupta*, SK Kataria & ISons,2009.



## REFERENCE BOOKS:

1. Performance and Design of AC Machines - *MG.Say*, BPB Publishers, 1968.
2. Theory of Alternating Current Machinery- *Langsdorf*, Tata McGraw-Hill Companies, 2<sup>nd</sup> edition, 2001.
3. Electromechanics-II (transformers and induction motors) - *S. Kamakshaiiah*, Hitech publishers.
4. Electric Machines – *I.J.Nagrath & D.P.Kothari*, Tata Mc Graw Hill, 7<sup>th</sup> Edition, 2005.
5. Electrical machinery - *A.E. Fitzgerald C. Kingsley and S. Umans*, Mc Graw-Hill Companies, 5<sup>th</sup> edition, 2010

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**ELECTRICAL MACHINES LAB – I**

**The following EIGHT experiments are to be compulsorily conducted:**

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

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

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

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**ELECTRICAL CIRCUITS AND SIMULATION LAB**

**PART-A: ELECTRICAL CIRCUITS** (Any Eight experiments are to be conducted)

- 1) Thevenin's, Norton's and Maximum Power Transfer Theorems
- 2) Superposition theorem and RMS value of complex wave
- 3) Verification of Compensation Theorem
- 4) Reciprocity, Millmann's Theorems
- 5) Locus Diagrams of RL and RC Series Circuits
- 6) Series and Parallel Resonance
- 7) Determination of Self, Mutual Inductances and Coefficient of coupling
- 8) Z and Y Parameters
- 9) Transmission and hybrid parameters
- 10) Measurement of Active Power for Star and Delta connected balanced loads
- 11) Measurement of Reactive Power for Star and Delta connected balanced loads
- 12) Measurement of 3-phase Power by two Wattmeter Method for unbalanced loads

**PART-B: PSPICE SIMULATION** (Any Two experiments are to be conducted)

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

**NOTE:**

PSPICE Software Package is necessary.

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MALLA REDDY ENGINEERING COLLEGE  
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LINEAR AND DIGITAL IC APPLICATIONS

**Objective:** To expose the students to a basic Integrated circuit and its origin and its linear, non-linear applications. This subject scope is the extension of the basics studied earlier (STLD, EC and etc). It also includes the most commonly used active filters, timers, PLLs, voltage regulator, A/D and D/A converters in every application.

UNIT - I

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

UNIT - II

**LINEAR APPLICATIONS OF OP-AMP:** Inverting and non-inverting amplifiers, adder, subtractor, Instrumentation amplifier, AC amplifier, V to I and I to V converters, Integrator and differentiator.

**NON-LINEAR APPLICATIONS OF OP-AMP:** Sample and Hold circuit, Log and Antilog amplifier, multiplier and divider, Comparators, Schmitt trigger, Multivibrators, Triangular and Square waveform generators, Oscillators.

UNIT - III

**ACTIVE FILTERS:** Introduction, Butterworth filters – 1st order, 2nd order low pass and high pass filters, band pass, band reject and allpass filters.

**TIMER AND PHASE LOCKED LOOPS:** Introduction to IC 555 timer, description of functional diagram, monostable and astable operations and applications, schmitt trigger, PLL - introduction, basic principle, phase detector/comparator, voltage controlled oscillator (IC 566), low pass filter, monolithic PLL and applications of PLL.

UNIT - IV

**VOLTAGE REGULATOR:** Introduction, Series Op-Amp regulator, IC Voltage Regulators, IC 723 general purpose regulators, Switching Regulator.

**D to A AND A to D CONVERTERS:** Introduction, basic DAC techniques - weighted resistor DAC, R-2R ladder DAC, inverted R-2R DAC, A to D converters - parallel comparator type ADC, counter type ADC, successive approximation ADC and dual slope ADC, DAC and ADC Specifications.

UNIT - V

**CMOS LOGIC:** CMOS logic levels, MOS transistors, Basic CMOS Inverter, NAND and NOR gates, CMOS AND-OR-INVERT and OR-AND-INVERT gates, implementation of any function using cmos logic.

**COMBINATIONAL CIRCUITS USING TTL 74XX ICS:** Study of logic gates using 74XX ICs, Four-bit parallel adder(IC 7483), Comparator(IC 7485), Decoder(IC 74138, IC 74154), BCD-to-7-segment decoder(IC 7447), Encoder(IC 74147), Multiplexer(IC 74151), Demultiplexer (IC 74154).

**SEQUENTIAL CIRCUITS USING TTL 74XX ICS:** Flip Flops (IC 7474, IC 7473), Shift Registers, Universal Shift Register(IC 74194), 4- bit asynchronous binary counter(IC 7493).

**TEXT BOOKS:**

1. D. Roy Choudhury, Shail B. Jain (2012), *Linear Integrated Circuit*, 4<sup>th</sup> edition, New Age International Pvt. Ltd., New Delhi, India.
2. Ramakant A. Gayakwad, (2012), *OP-AMP and Linear Integrated Circuits*, 4<sup>th</sup> edition, Prentice Hall / Pearson Education, New Delhi.
3. Floyd, Jain (2009), *Digital Fundamentals*, 8<sup>th</sup> edition, Pearson Education, New Delhi.

**REFERENCE BOOKS:**

1. Sergio Franco (1997), *Design with operational amplifiers and analog integrated circuits*, McGraw Hill, New Delhi.
2. Gray, Meyer (1995), *Analysis and Design of Analog Integrated Circuits*, Wiley International, New Delhi.
3. John F. Wakerly (2007), *Digital Design Principles and practices*, Prentice Hall / Pearson Education, New Delhi.

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CODE: 30209

**MALLA REDDY ENGINEERING COLLEGE**  
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III Year B.Tech EEE-I Sem

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**ELECTRICAL AND ELECTRONICS INSTRUMENTATION**

**Objective:** To expose students about measuring instruments like voltage, power, energy, current, resistance, inductance and capacitance. Instrument calibration and its extension of range

**UNIT-I BASICS OF MEASUREMENT SYSTEM**

Introduction: Measurement & Measurement system, Units of Electrical Quantities, Concept of Average, Root Mean Square etc., dB Scale, Methods of Measurements, Measurement Standards, Classification of instruments. Measurement Errors and Instrument Characteristics: Error, Types of Errors, Significant Figures, Static and Dynamic Characteristics of Measuring Instruments.

**UNIT-II MEASURING INSTRUMENTS**

Electromechanical Instruments: Permanent Magnet Moving Coil (PMMC), Galvanometer, DC Volt and Ammeter, Rectifier Volt and Ammeter, Series and Shunt Ohm Meter, VOM, Electro-dynamic Instrument, Electro dynamic Voltmeter and Ammeter.

Electronics Meters: Analog Electronics VOM, DC and AC Voltmeter circuits using active electronics components like transistor, FET, OPAMP, Electronics Ohm meter, Electronics Ammeter etc.

Digital Instruments, Display concepts, Analog to digital conversion principle, Digital voltmeter, types, construction, working, Digital Multi-meter, Digital frequency meter, Time measurement, frequency ratio measurement.

**UNIT-III INSTRUMENT TRANSFORMERS & MEASUREMENT OF POWER, ENERGY**

Instrument Transformer: Instrument Transformers, Types, Requirements, Difference between Current Transformer (CT) and Potential Transformer (PT), Construction, Burden, Error, Causes of error, reduction of error, Testing of Instrument Transformer, Effect of Secondary Open Circuit in CT, Permanent magnetization/ demagnetization of cores in CT. LVDT and its principle of operation

Measurement of Power and Energy:

Power and Energy concept, Power in DC and AC Circuits, Electro-dynamic and ferro-dynamic watt meter, low power factor wattmeter, thermo couple watt meter, Power measurement in 3-phase systems, Energy measurement, motor meters, Induction type meters, 1-phase and 3-phase energy measurement, Errors, Compensation for light load, over load, voltage, temperature etc.

**UNIT-IV BRIDGES**

Bridge Circuits:

DC Bridge Circuits, Measurement of Medium Resistance, Measurement of Low Resistance, Measurement of High Resistance. (Wheatston's, Kelvin's Double Bridge)

AC Bridge Circuits, Bridge Balancing, Equivalent circuits of Capacitance and Dissipation Factor, Equivalent Circuit of L and Q Factor, Capacitance Measurement (De-Sauty's, Schering) Inductance Measurement (Anderson, Maxwell's Bridge), Frequency measurement, Digital LCR meters.

**UNIT-V INSTRUMENT CALIBRATION**

Instrument Calibration and Extension of Range: Comparison methods, Digital Multimeter, Precision DC Voltage source, Potentiometer, calibration of various analog measurement instruments, Extension of range of instruments, Accessories for Measuring Instruments: Probes, Test leads, shielded cables, connectors, use of probes, low capacitance probes, High voltage probes, RF demodulator probes, probes for ICs, Current probes.

**TEXT BOOKS:**

1. Electronics Instrumentation & Measurements, David Bell
2. Electrical Measurements and measuring Instruments – by E.W. Golding and F.C. Widdis, fifth Edition, Wheeler Publishing.
3. Electrical & Electronic Measurement & Instruments by A.K.Sawhney Dhanpat Rai & Co

**REFERENCE BOOKS:**

1. Electrical Measurements – by Buckingham and Price, Prentice – Hall
2. Electrical Measurements by Harris.
3. Electrical Measurements: Fundamentals, Concepts, Applications – by Reissland, M.U, New Age International (P) Limited, Publishers

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**POWER SYSTEMS-II**

**Objective:** To expose the students to types of transmission lines and its propagation and its power system transients and various factors governing the performance of transmission lines. In this subject the comparison between underground and overhead transmission with their constructional features are also discussed.

**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-I Performance of Short, Medium and Long Length Transmission Lines**

Short, medium and long line and their model representations - Nominal-T, Nominal-  $\pi$  and A, B, C, D Constants for symmetrical & asymmetrical Networks, Numerical Problems. Mathematical Solutions to estimate regulation and efficiency of all types of lines - Numerical Problems.

**Performance of Long Transmission Lines**

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

**UNIT – III Power System Transients**

Types of System Transients - Travelling or Propagation of Surges - Attenuation, Distortion, Reflection and Refraction Coefficients - Termination of lines with different types of conditions - Open Circuited Line, Short Circuited Line, T-Junction, Lumped Reactive Junctions (Numerical Problems). Bewley's Lattice Diagrams (for all the cases mentioned with numerical examples).

**UNIT-IV Various Factors Governing the Performance of Transmission lines**

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

**Overhead Transmission Line Insulators**

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

**UNIT-V Sag and Tension Calculations**

Sag and Tension Calculations with equal and unequal heights of towers, Effect of Wind and Ice on weight of Conductor, Numerical Problems - Stringing chart and sag template and its applications.

**Underground Cables**

Types of Cables, Construction, Types of Insulating materials, Calculations of Insulation resistance and stress in insulation, Numerical Problems. Capacitance of Single and 3-Core belted cables, Numerical Problems. Grading of Cables - Capacitance grading, Numerical Problems, Description of Inter-sheath grading.



**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-6<sup>th</sup> edition-2003.
2. Electrical power systems - by C.L.Wadhwa, New Age International (P) Limited, Publishers,1998.
- 3.Power system Analysis-by John J Grainger William D Stevenson TMC Companies, 4th edition,1982.

**REFERENCE BOOKS:**

1. Power system Analysis-by John J Grainger William D Stevenson TMC Companies, 4th edition,1982.
2. Power System Analysis and Design by B.R.Gupta, Wheeler Publishing-3<sup>rd</sup> edition,1998.
3. Power System Analysis by Hadi Saadat – TMH Edition-2004.
4. Modern Power System Analysis by I.J.Nagaraj and D.P.Kothari, Tata McGraw Hill, 2<sup>nd</sup> Edition-2001.

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MALLA REDDY ENGINEERING COLLEGE  
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**CONTROL SYSTEMS**

**Objective:** To expose the students to basic definitions of control systems and mathematical modeling of an application in open and closed loop and its transient analysis either in time or frequency domain with stability methods. In this subject the idea of state space analysis for an application is explained and this is useful for fast computer computation.

**UNIT –I:**

**Introduction:**

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

**Transfer Function Representation:** Block diagram representation of systems considering electrical and mechanical systems as examples -Block diagram algebra – Representation by Signal flow graph - Reduction using Mason's gain formula.

**UNIT -II:**

**Time Response Analysis:**

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

**UNIT –III:**

**Stability Analysis in S-Domain:**

The concept of stability – Routh's stability criterion – qualitative stability and conditional stability – limitations of Routh's stability.

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

**UNIT –IV:**

**Frequency Response Analysis:**

Introduction, Frequency domain specifications-Bode diagrams-Determination of Frequency domain specifications and Phase margin and Gain margin-Stability Analysis from Bode Plots. Polar Plots-Nyquist Plots-Stability Analysis.Compensation techniques – Lag, Lead and Lead -Lag Controllers design in frequency Domain, P, I,D, PI, PD and PID Controllers.

**UNIT –V:**

**State Space Analysis of Continuous Systems:**

Concepts of state, state variables and state model, derivation of state models from block diagrams, Diagonalization-Solving the Time invariant state Equations- State Transition Matrix and it's Properties – Concepts of Controllability and Observability.

**TEXT BOOKS:**

1. Control System engineering by Nagrath and Gopal New Age International (P) Limited, Publishers.
2. Control Systems - N.C.Jagan, BS Publications.
3. Automatic control systems by B. C.Kuo

**REFERENCE BOOKS:**

1. Control systems - A.Ananad Kumar, PHI.
2. Control Systems Engineering - S.Palani, Tata-McGraw-Hill.
3. Control systems - Dhanesh N.Manik, Cengage Learning.

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III Year B.Tech EEE-I Sem

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**POWER ELECTRONICS**

**Objective:** To expose the students with types of power semiconductor devices with their characteristics, different conversion devices and circuits like AC-AC, DC-DC, DC-AC, and AC-AC converters and its principle of operation and mathematical modeling.

**UNIT – I POWER SEMI CONDUCTOR DEVICES**

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

**DEVICES AND COMMUTATION CIRCUITS**

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

**UNIT – II SINGLE PHASE HALF CONTROLLED CONVERTERS**

Phase control technique – Single phase Line commutated converters – Mid point and Bridge connections – Half controlled converters with Resistive, RL loads and RLE load– Derivation of average and rms values of load voltage and current -Active and Reactive power inputs to the converters without and with Free wheeling Diode – Numerical problems

**SINGLE PHASE FULLY CONTROLLED CONVERTERS**

Fully controlled converters, Mid point and Bridge connections with Resistive, RL loads and RLE load– Derivation of average and rms values of load voltage and current

– Line commutated inverters -Active and Reactive power inputs to the converters without and with Freewheeling Diode, Effect of source inductance – Derivation of load voltage and current – Numerical problems.

**UNIT – III THREE PHASE LINE COMMUTATED CONVERTERS**

Three phase converters – Three pulse and six pulse converters – Mid point and bridge connections -average and rms load voltage With R and RL loads – Effect of Source inductance–Dual converters (both single phase and three phase) - Waveforms – Numerical Problems.

**UNIT – IV AC VOLTAGE CONTROLLERS & CYCLO CONVERTERS**

AC voltage controllers – Single phase two SCR's in anti parallel – With R and RL loads – modes of operation of Triac – Triac with R and RL loads – Derivation of RMS load voltage, current and power factor wave forms – Firing circuits -Numerical problems -Cyclo converters – Single phase mid point cyclo converters with Resistive and inductive load (Principle of operation only) – Bridge configuration of single phase cyclo converter (Principle of operation only) – Waveforms

**UNIT – V CHOPPERS & INVERTERS**

Choppers – Time ratio control and Current limit control strategies – Step down choppers Derivation of load voltage and currents with R, RL and RLE loads- Step up Chopper – load voltage expression-Morgan's chopper – Jones chopper and Oscillation chopper (Principle of operation only) Waveforms — AC Chopper – Problems.

Inverters - Single phase inverters – Classification-Basic series inverter and basic parallel inverters, – single-phase half and full-bridge inverters with R and RL Loads, Three phase with 120 and 180 degrees phase angle – Waveforms.

**TEXT BOOKS :**

1. Power Electronics – by M. D. Singh & K. B. Kanchandhani, Tata Mc Graw – Hill Publishing company, 1998.
2. Power Electronics - by P.S. Bimbra

**REFERENCE BOOKS :**

1. Power Electronics – by Vedam Subramanyam, New Age International (P) Limited, Publishers -1997.
2. Power Electronics - by V.R.Murthy , 1<sup>st</sup> edition -2005, OXFORD University Press
3. Power Electronics-by P.C.Sen,Tata Mc Graw-Hill Publishing-1987.
4. Thyristorised Power Controllers – by G. K. Dubey, S. R. Doradra, A. Joshi and R. M. K. Sinha, New Age International (P) Limited Publishers, 1996.

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**ELECTRICAL MACHINES-III**

**Objective:** To expose the students with types of AC machines like induction and synchronous machines (motors and generators) and its principle of operation and constructional details with their power diagrams. This subject also gives an awareness of different special machines used and their applications.

**UNIT – I Construction and Principle of operation of Synchronous Generator**

Constructional Features of wound 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.

**UNIT-II Synchronous Generator Characteristics**

Harmonics in generated e.m.f. – suppression of harmonics – armature reaction - leakage reactance – synchronous reactance and impedance – experimental determination - phasor diagram – load characteristics.

**UNIT – III 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 – IV 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.

**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 Diagrams**

Introduction and Applications of power diagrams, Excitation and power diagrams – hunting and its suppression – Methods of starting – synchronous induction motor.

**Special Motors**

Principle & performance of A.C. Series motor-Universal motor – Principle of permanent magnet and reluctance motors.

**TEXT BOOKS**

1. Electric Machines – by I.J.Nagrath & D.P.Kothari, Tata Mc Graw-Hill Publishers, 7<sup>th</sup> Edition 2005.
2. Electrical Machines – by P.S. Bimbra, Khanna Publishers.

**REFERENCE BOOKS:**

1. The Performance and Design of A.C.Machines – by M.G.Say, ELBS and Pitman & Sons-3<sup>rd</sup> edition-1983.
  2. Electric Machinery – by A.E. Fitzgerald, C.Kingsley and S.Umans, Mc Graw-Hill Companies, 5<sup>th</sup> edition, 1990.
  3. Theory of Alternating Current Machinery by Langsdorf, Tata Mc Graw-Hill, 2<sup>nd</sup> edition-1999.
- Electromechanics-III (Synchronous and single phase machines), S.Kamakashiah, Right Publishers-3<sup>rd</sup> edition-2008.

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ELECTRICAL MACHINES LAB-II

**The following experiments are to be compulsorily conducted:**

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

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

9. Parallel operation of Single phase Transformers
10. Separation of core losses of a single phase transformer
11. Brake test on three phase Induction Motor
12. Regulation of three-phase alternator by Z.P.F. and A.S.A methods
13. Efficiency of a three-phase alternator
14. Heat run test on a bank of 3 Nos. of single phase Delta connected transformers
15. Measurement of sequence impedance of a three-phase alternator.
16. Performance characteristics of a Schrage motor



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**CONTROL SYSTEMS AND SIMULATION LAB**

**Any Eight of the following experiments are to be conducted:**

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

**Any two simulation experiments are to be conducted:-**

12. PSPICE simulation of Op-Amp based Integrator and Differentiator circuits.
13. Linear system analysis (Time domain analysis, Error analysis) using MATLAB.
14. Stability analysis (Bode, Root Locus, Nyquist) of Linear Time Invariant system using MATLAB
15. State space model for classical transfer function using MATLAB – Verification.

**REFERENCE BOOKS:**

1. Simulation of Electrical and electronics Circuits using PSPICE – by M.H.Rashid, M/s PHI Publications.
2. PSPICE A/D user's manual – Microsim, USA.
3. PSPICE reference guide – Microsim, USA.
4. MATLAB and its Tool Books user's manual and – Mathworks, USA.

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III Year B.Tech EEE-II Sem

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MANAGEMENT SCIENCE

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), Work Study -Basic procedure involved in Method Study and Work Measurement- Statistical Quality Control: chart, R chart, c chart, p chart, (simple Problems), Acceptance Sampling, Deming's contribution to quality.

- a) **Materials Management:** Objectives, Need for Inventory control, EOQ, ABC Analysis, Purchase Procedure, Stores Management and Stores Records.
- b) **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.

**Project Management (PERT/CPM) :** Network Analysis, Programme Evaluation and Review Technique (PERT), Critical Path Method (CPM), Identifying critical path, Probability of Completing the project within given time, Project Cost Analysis, Project Crashing. (Simple problems)

UNIT - V

**Strategic Management :** Mission, Goals, Objectives, Policy, Strategy, Programmes, Elements of Corporate Planning Process, Environmental Scanning, Value Chain Analysis, SWOT Analysis, Steps in Strategy Formulation and Implementation, Generic Strategy alternatives.

**Contemporary Management Practices :** Basic concepts of MIS, End User Computing, Materials Requirement Planning (MRP), Just-In-Time (JIT) System, Total Quality Management (TQM), Six sigma and Capability Maturity Model (CMM) Levels, Supply Chain Management, Enterprise Resource Planning (ERP), Performance Management, Business Process outsourcing (BPO), Business Process Re-engineering and Bench Marking, Balanced Score Card.

TEXT BOOKS:

1. Aryasri : *Management Science*, TMH, 2004.
2. Stoner, Freeman, Gilbert, *Management*, 6th Ed, Pearson Education, New Delhi, 2004.

## REFERENCE BOOKS:

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
6. Samuel C.Certo: *Modern Management*, 9/e, PHI, 2005
7. Schermerhorn, Capling, Poole & Wiesner: *Management*, Wiley, 2002.
8. Parnell: Strategic Management, Biztantra,2003.
9. Lawrence R Jauch, R.Gupta &William F.Glueck: Business Policy and Strategic Management, Frank Bros.2005.
10. L.S.Srinath: PERT/CPM,Affiliated East-West Press, 2005.

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**STATIC DRIVES**

**Objective:** To expose the students from the basic idea of electric drives and its characteristics with different loads, control of DC & AC motors with different methods.

**UNIT I: ELECTRIC DRIVES**

Type of electric drives, choice of motor, starting and running characteristics, speed control, temperature rise, particular applications of electric drives, types of industrial loads, continuous, intermittent and variable loads, load equalization.

**Control of DC motors by Single phase Converters**

Introduction to Thyristor controlled Drives, Single Phase Semi and Fully controlled converters connected to D.C separately excited and D.C series motors – continuous current operation – output voltage and current waveforms – Speed and Torque expressions – Speed – Torque Characteristics- Problems on Converter fed D.C motors.

**UNIT II: Control of DC motors by three phase Converters**

Three phase semi and fully controlled converters connected to D.C separately excited and D.C series motors – output voltage and current waveforms – Speed and Torque expressions – Speed – Torque characteristics – Problems.

**UNIT –III: Four Quadrant operations 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.

**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

**UNIT-IV: Control of Induction Motor through Stator voltage and Stator Frequency**

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

Variable frequency characteristics- control of induction motor by Voltage source inverter and current source inverter - cyclo converters- PWM control – Introduction to CSI and VSI – Comparison of VSI and CSI operations – Speed torque characteristics – numerical problems on induction motor drives

**UNIT –V: Control of Induction motor of Rotor side**

Static rotor resistance control – Slip power recovery – Static Scherbius drive – Static Kramer Drive – their performance and speed torque characteristics – advantages applications – problems

**Control of Synchronous Motors**

Separate control & self control of synchronous motors – Operation of self controlled synchronous motors by VSI.

**TEXT BOOKS:**

1. Fundamentals of Electric Drives – by G K Dubey Narosa Publications-5<sup>th</sup> edition-reprint,2005.
2. Modern Power Electronics and AC Drives by B.K.Bose, PHI-2002.

**REFERENCE BOOKS:**

1. Power Electronics – MD Singh and K B Khanchandani, Tata – McGraw-Hill Publishing company, 1998-12<sup>th</sup>
2. ThyRistor Control of Electric drives – Vedam Subramanyam Tata McGraw Hill Publications-1988, 1989, reprint 2001.
3. A First course on Electrical Drives – S K Pillai New Age International(P) Ltd. 2<sup>nd</sup> Edition-9<sup>th</sup> edition, reprint 2009.

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**COMPUTER METHODS IN POWER SYSTEMS**

**Objective:** To expose the students with applications of matrices in power systems which makes the easy computing in power flow studies, short circuit analysis, power system steady state and transient analysis.

**UNIT -I Power System Network Matrices-1**

Graph Theory: Definitions, Bus Incidence Matrix,  $Y_{bus}$  formation by Direct and Singular Transformation Methods, Numerical Problems.

Formation of  $Z_{Bus}$ : Partial network, Algorithm for the Modification of  $Z_{Bus}$  Matrix for addition element for the following cases: Addition of element from a new bus to reference, Addition of element from a new bus to an old bus, Addition of element between an old bus to reference and Addition of element between two old busses (Derivations and Numerical Problems).- Modification of  $Z_{Bus}$  for the changes in network ( Problems )

**UNIT –II Power flow Studies**

Necessity of Power Flow Studies – Data for Power Flow Studies – Derivation of Static load flow equations – Load flow solutions using Gauss Seidel Method: Acceleration Factor, Load flow solution with and without P-V buses, Algorithm and Flowchart. Numerical Load flow Solution for Simple Power Systems (Max. 3-Buses): Determination of Bus Voltages, Injected Active and Reactive Powers (Sample One Iteration only) and finding Line Flows/Losses for the given Bus Voltages.

Newton Raphson Method in Rectangular and Polar Co-Ordinates Form: Load Flow Solution with or without PV Busses- Derivation of Jacobian Elements, Algorithm and Flowchart.

Decoupled and Fast Decoupled Methods.- Comparison of Different Methods – DC load Flow

**UNIT – III Short Circuit Analysis**

Per-Unit System of Representation. Per-Unit equivalent reactance network of a three phase Power System, Numerical Problems.

Symmetrical fault Analysis: Short Circuit Current and MVA Calculations, Fault levels, Application of Series Reactors, Numerical Problems.

Symmetrical Component Theory: Symmetrical Component Transformation, Positive, Negative and Zero sequence components: Voltages, Currents and Impedances. Sequence Networks: Positive, Negative and Zero sequence Networks, Numerical Problems.

Unsymmetrical Fault Analysis: LG, LL, LLG faults with and without fault impedance, Numerical Problems.

**UNIT –IV Power System Steady State Stability Analysis**

Elementary concepts of Steady State, Dynamic and Transient Stabilities. Description of: Steady State Stability Power Limit, Transfer Reactance, Synchronizing Power Coefficient, Power Angle Curve and Determination of Steady State Stability and Methods to improve steady state stability.

**UNIT –V Power System Transient State Stability Analysis**

Derivation of Swing Equation. Determination of Transient Stability by Equal Area Criterion, Application of Equal Area Criterion, Critical Clearing Angle Calculation.-Solution of Swing Equation: Point-by-Point Method. Methods to improve Stability - Application of Auto Reclosing and Fast Operating Circuit Breakers.

**TEXT BOOKS:**

1. Computer Techniques in Power System Analysis by M.A.Pai, TMH Publications.
2. Modern Power system Analysis – by I.J.Nagrath & D.P.Kothari: Tata McGraw-Hill Publishing company, 2<sup>nd</sup> edition, 4<sup>th</sup> edition-reprint 2005.
3. Electrical Power Systems –by C.L. Wadhwa
4. Power System Analysis by Grainger and Stevenson, Tata McGraw Hill-2<sup>nd</sup> edition, reprint 2004.

**REFERENCE BOOKS:**

1. Power System Analysis – by A.R.Bergen, Prentice Hall, Inc-3<sup>rd</sup> edition- reprint 2004.
2. Power System Analysis by Hadi Saadat – TMH Edition-5<sup>th</sup> edition-reprint 2004.
3. Power System Analysis by B.R.Gupta, Wheeler Publications-reprint 2004.
4. Computer methods in power systems by William stagg.

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MALLA REDDY ENGINEERING COLLEGE  
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**MICROPROCESSORS AND MICROCONTROLLERS**

**Objective:** To expose the students with basics of microprocessors and controllers, their types, pin diagram and other features. The utilization of MPMC by writing Assembly Language Programming for real-time applications by making programming easy than using C programming or etc.

**UNIT -I:**

**8086 Architecture:** 8086 Architecture-Functional diagram, Register Organization, Memory Segmentation, Programming Model, Memory addresses, Physical Memory Organization, Architecture of 8086, Signal descriptions of 8086- Common Function Signals, Timing diagrams, Interrupts of 8086.

**UNIT -II:**

**Instruction Set and Assembly Language Programming of 8086:** Instruction formats, Addressing modes, Instruction Set, Assembler Directives, Macros, Simple Programs involving Logical, Branch and Call Instructions, Sorting, Evaluating Arithmetic Expressions, String Manipulations.

**UNIT -III:**

**I/O Interface:** 8255 PPI, Various Modes of Operation and Interfacing to 8086, Interfacing Keyboard, Display, D/A and A/D Converter.

**Communication Interface:** Serial Communication Standards, Serial Data Transfer Schemes, 8251 USART Architecture and Interfacing.

**Interfacing with advanced devices:** Memory Interfacing to 8086, Interrupt Structure of 8086, Vector Interrupt Table, Interrupt Service Routine.

**UNIT -IV:**

**Introduction to Microcontrollers:** Overview of 8051 Microcontroller, Architecture, I/O Ports, Memory Organization, Addressing Modes and Instruction set of 8051, Simple Programs

**UNIT -V:**

**8051 Real Time Control:** Programming Timer Interrupts, Programming External Hardware Interrupts, Programming the Serial Communication Interrupts, Programming 8051 Timers and Counters

**TEXT BOOKS:**

1. D. V. Hall, Microprocessors and Interfacing, TMGH, 2<sup>nd</sup> Edition 2006.
2. Kenneth. J. Ayala, The 8051 Microcontroller , 3<sup>rd</sup> Ed., Cengage Learning.

**REFERENCE BOOKS:**

1. Advanced Microprocessors and Peripherals – A. K. Ray and K.M. Bhurchandani, TMH, 2<sup>nd</sup> Edition 2006.
2. The 8051Microcontrollers, Architecture and Programming and Applications -K.Uma Rao, Andhe Pallavi, Pearson, 2009.
3. Micro Computer System 8086/8088 Family Architecture, Programming and Design - Liu and GA Gibson, PHI, 2<sup>nd</sup> Ed.
4. Microcontrollers and Application - Ajay. V. Deshmukh, TMGH, 2005.
5. The 8085 Microprocessor: Architecture, programming and Interfacing – K.Uday Kumar, B.S.Umashankar, 2008, Pearson



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III Year B.Tech EEE-II Sem

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**ENVIRONMENTAL STUDIES**

**Course Objectives**

- An interdisciplinary approach to complex environmental problems using basic tools of the natural and social sciences including geosystems, biology, chemistry, economics, political science and international processes.
- The ability to work effectively as a member of an interdisciplinary team on complex problems involving multiple competing stakeholders and agendas.
- The ability to apply quantitative reasoning skills to environmental problems including basic calculations related to energy, water, and air issues and the use of statistical methods in data analysis and argumentation.

**UNIT-I**

**ECOSYSTEMS:** Definition, Scope and Importance of ecosystem, Concept of ecosystem, Classification of ecosystems, Structure and Structural Components of an ecosystem, Functions of ecosystem, Food chains, food webs and ecological pyramids. Flow of energy, Biogeochemical cycles, Homeostasis / Cybernetics, Food chain concentration, Biomagnification, ecosystems value, services and carrying capacity.

**UNIT-II**

**NATURAL RESOURCES:** Classification of Resources: Living and Non-Living resources, Renewable and non-renewable resources. Water resources: use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. Mineral resources: use and exploitation, environmental effects of extracting and using mineral resources – case studies. Energy resources: growing energy needs, renewable and non renewable energy sources, use of alternate energy sources – case studies. Land resources: land as a resource, land degradation, man induced landslides and land use / land cover mapping.

**BIODIVERSITY AND BIOTIC RESOURCES:** Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and intrinsic values. Hot spots of biodiversity. Threats to biodiversity: habitat loss, poaching of wildlife, man- wildlife conflicts, conservation of biodiversity: In-Situ and Ex-situ conservation. Food and fodder resources, Timber and non-timber forest products.

**UNIT-III**

**ENVIRONMENTAL POLLUTION AND CONTROL:** Classification of pollution and pollutants, causes, effects and control technologies. Air Pollution: Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. Water pollution: Point and non-point sources of pollution, Major pollutant of water and their sources, drinking water quality standards, Waste water treatment methods: effluent treatment plants (ETP), Sewage treatment plants (STP), common and combined effluent treatment plants (CETP). Soil Pollution: Soil as sink for pollutants, Impact of modern agriculture on soil, degradation of soil. Marine Pollution: Misuse of International water for dumping of hazardous waste, coastal pollution due to sewage and marine disposal of industrial effluents. Noise Pollution: Sources, Industrial Noise- Occupational Health hazards, standards, Methods of control of Noise. Thermal Pollution: Thermal Comforts, Heat Island effect, Radiation effects. Nuclear Pollution: Nuclear power plants, nuclear radiation, disasters and impacts, genetical disorders. Solid waste: types, Collection processing and disposal of industrial and municipal solid wastes composition and characteristics of e-Waste and its management.

#### **UNIT-IV**

**GLOBAL ENVIRONMENTAL PROBLEMS AND GLOBAL EFFORTS :** Green house effect, Green House Gases (GHG), Global Warming, Sea level rise, climate change and their impacts on human environment. Ozone depletion and Ozone depleting substances (ODS).Deforestation and desertification. International conventions / Protocols: Earth summit, Kyoto protocol and Montréal Protocol,

#### **ENVIRONMENTAL IMPACT ASSESSMENT (EIA) AND ENVIRONMENTAL MANAGEMENT PLAN:**

Definition of Impact: classification of impacts, Positive and Negative, methods of baseline data acquisition. Impacts on different environmental components. Prediction of impacts and impact assessment methodologies. Environmental Impact Statement (EIS). Environmental Management Plan (EMP): Technological Solutions, preventive methods, Control technologies, treatment technologies: green-belt- development, rain water harvesting, Remote sensing and GIS methods.

#### **UNIT-V**

**ENVIRONMENTAL POLICY, LEGISLATION, RULES AND REGULATIONS:** National Environmental Policy, Environmental Protection act, Legal aspects Air (Prevention and Control of pollution ) Act- 1981, Water( Prevention and Control of pollution ) Act-1974, Water pollution Cess Act-1977, Forest Conservation Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules .

#### **TOWARDS SUSTAINABLE FUTURE**

Concept of Sustainable Development, Threats to Sustainability, Population and its explosion, Crazy Consumerism, Over-exploitation of resources, Strategies for Achieving Sustainable development, Environmental Education, Conservation of Resources, Urban Sprawl, Sustainable Cities and Sustainable Communities, Human health, Role of IT in Environment, Environmental Ethics, Environmental Economics, Concept of Green Building, Clean Development Mechanism (CDM).

#### **Course Outcomes**

- To enable the students to realise the importance of the sustainable use of natural resources
- To make the students aware of the impacts of human actions on environment and measures to minimize and mitigate them
- To enable the students to become aware of the current issues and problems pertaining to the environment

#### **TEXT BOOKS:**

1. Environmental studies , From crisis to cure by R.Rajagopalan, 2005
2. Environmental studies by Erach Bharucha 2005, University Grants Commission, University Press.

#### **REFERENCE BOOKS:**

1. Text book of Environmental Science and Technology by M.Anji Reddy 2007
2. Environmental Science: towards a sustainable future by Richard T.Wright. 2008 PHL Learning Private Ltd. New Delhi
3. Environmental Engineering and science by Gilbert M.Masters and Wendell P. Ela .2008 PHI Learning Pvt. Ltd.

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**MALLA REDDY ENGINEERING COLLEGE**  
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III Year B.Tech EEE-II Sem

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**RENEWABLE ENERGY SOURCES**  
(OPEN ELECTIVE)

**Objective:** To expose the students with two types of sources like renewable and non-renewable sources and their differences, how renewable sources are used and their environmental impacts. The subject enlightens renewable sources which are the future and evergreen sources.

**UNIT I: PRINCIPLES OF SOLAR RADIATION:**

Role and potential of new and renewable source, the solar energy option, Environmental impact of solar power, physics of the sun, the solar constant, extraterrestrial and terrestrial solar radiation, solar radiation on tilted surface, instruments for measuring solar radiation and sun shine, solar radiation data.

**UNIT II: SOLAR ENERGY COLLECTION:**

Flat plate and concentrating collectors, classification of concentrating collectors, orientation and thermal analysis, advanced collectors.

Different methods, Sensible, latent heat and stratified storage, solar ponds. Solar Applications- solar heating/cooling technique, solar distillation and drying, photovoltaic energy conversion.

**UNIT III: WIND ENERGY AND BIO-MASS:**

Sources and potentials, horizontal and vertical axis windmills, performance characteristics, Betz criteria

Principles of Bio-Conversion, Anaerobic/aerobic digestion, types of Bio-gas digesters, gas yield, combustion characteristics of bio-gas, utilization for cooking.

**UNIT IV: GEOTHERMAL ENERGY:**

Resources, types of wells, methods of harnessing the energy, potential in India.

**OCEAN ENERGY:**

OTEC, Principles utilization, setting of OTEC plants, thermodynamic cycles. Tidal and wave energy: Potential and conversion techniques, mini-hydel power plants, and their economics.

**UNIT V: DIRECT ENERGY CONVERSION:**

Need for DEC, Carnot cycle, limitations, principles of DEC.

**TEXT BOOKS:**

1. Renewable Energy Resources — Twidell & Wier, CRC Press( Taylor & Francis)
2. Renewable energy sources and emerging technologies by D.P.Kothari,K.C.Singhal, P.H.I.

**REFERENCE BOOKS:**

1. Renewable energy resources/ Tiwari and Ghosal/ Narosa.
2. Renewable Energy Technologies /Ramesh & Kumar /Narosa
3. Non-Conventional Energy Systems / K Mittal /Wheeler
4. Non-Conventional Energy Sources /G.D. Rai, Khanna Publishers-5<sup>th</sup> edition 2012.

2013-17

CODE: 30B05

**MALLA REDDY ENGINEERING COLLEGE**  
(Autonomous)

III Year B.Tech EEE-II Sem

L T/P/D C  
4 -/- 4

**INTELLECTUAL PROPERTY RIGHTS**  
(OPEN ELECTIVE)

**Objective:**

1. To make students familiar with Intellectual Property Rights.
2. To understand innovations in engineering and other domains.
3. To be familiar with patents, copyrights and various acts related to innovations.

**UNIT I**

Introduction – Invention and Creativity – Intellectual Property (IP) – Importance – Protection of IPR – Basic types of property i. Movable Property ii. Immovable Property and iii. Intellectual Property.

**UNIT II**

IP – Patents – Copyrights and related rights – Trade Marks and rights arising from Trademark registration – Definitions – Industrial Designs and Integrated circuits – Protection of Geographical Indications at national and International levels – Application Procedures..

**UNIT III**

International convention relating to Intellectual Property – Establishment of WIPO – Mission and Activities – History – General Agreement on Trade and Tariff (GATT).

**UNIT IV**

Indian Position Vs WTO and Strategies – Indian IPR legislations – commitments to WTO-Patent Ordinance and the Bill – Draft of a national Intellectual Property Policy – Present against unfair competition.

**UNIT V**

Case Studies on – Patents (Basumati rice, turmeric, Neem, etc.) – Copyright and related rights – Trade Marks – Industrial design and Integrated circuits – Geographic indications – Protection against unfair competition.

**TEXT BOOKS**

1. Subbaram N.R. “Handbook of Indian Patent Law and Practice “, S. Viswanathan Printers and Publishers Pvt. Ltd., 1998.

**REFERENCES**

1. P. Narayanan; Law of Copyright and Industrial Designs; Eastern law House, Delhi, 2010
2. Prabhuddha Ganguli: ‘ Intellectual Property Rights’ Tata Mc-Graw –Hill, New Delhi
3. M.Ashok Kumar and Mohd.Iqbal Ali: “Intellectual Property Right” Serials Pub.

2013-17

CODE: 30B04

**MALLA REDDY ENGINEERING COLLEGE**  
(Autonomous)

III Year B.Tech EEE-II Sem

**L T/P/D C**  
**4 -/-/ 4**

**HUMAN VALUES & PROFESSIONAL ETHICS**

**Course Objectives**

1. To make students familiar with Human value with professional ethics.
2. To understand values which can enhance human well-being of the society
3. To be trustworthy and honest with more professional responsibilities

**UNIT-I**

**HUMAN VALUES**

Morals, Values and Ethics – Integrity – Work Ethic – Service Learning – Civic Virtue – Respect for Others – Living Peacefully – caring – Sharing – Honesty – Courage – Time management-Valuing Time – Cooperation – Commitment – Empathy – Self-Confidence – Character. Corporate Social responsibility, Social responsibility as a citizen of this great country.

**UNIT-II**

**SELF MANAGEMENT,**

SELF Concept Learning Enhancement Facilitation Centre, University of Weston Sydney, Australia. A New Idea of Self Constructs, Self discipline, understanding self, Self Exploration, need and purpose. Assessment procedures and types, importance of Self assessment/appraisal systems. Gardeners multiple intelligence concept. Key to success and road map to success. Untrained/Trained Memory.

**UNIT-III**

**ENGINEERING ETHICS**

Code of ethics for engineers, ASCE, ASME Codes of ethical conduct of engineers, Personal ethics, Professional ethics, Senses of 'Engineering Ethics' - variety of moral issued - types of inquiry – moral dilemmas - moral autonomy - Kohlberg's theory - Gilligan's theory –uses of ethical theories– Models of Professional Roles - theories about right action - Self-interest - customs and religion professional rights - employee rights - Intellectual Property Rights (IPR), Trade marks, Patents, copy rights. Some interesting case studies.

**UNIT-IV**

**VALUE EDUCATION**

Concept of Value education, its intensions, the need for value education in today's context, basic guidelines for value education, the contents of value education and the process of value education. Universal Brotherhood, spirituality, Basic human aspirations, harmony: self, family and society.

**UNIT-V**

**STRESS MANAGEMENT**

Types of Stress, Positive Stress (Eustress) and rewarding experiences, Negative Stress (Distress) and its influence on human health, Methods of Stress Management for better living. Meditation, Laughter is the best medicine, Anger management. Personality development. Study & Learning skills, need to develop a positive attitudes, brain & behaviour, respect for authority, responsibility, accountability, confidentiality etc..

**Course Outcomes:**

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

1. To define various terms related to Human value with professional ethics..
2. To understand the professional responsibilities.
3. To analyse the soft ware engineering ethics and practices..

## **TEXTBOOK**

1. Govindarajan M, Natarajan S, Senthil Kumar V. S, "Engineering Ethics", Prentice Hall of India, New Delhi,
2. S.B.Gogate,"Human Values & Professional Ethics",Vikas Publishing House Pvt., Ltd., First edition-2011

## **REFERENCES**

1. Charles D. Fleddermann, "Engineering Ethics", Pearson Education / Prentice Hall,
2. Charles E Harris, Michael S. Protchard and Michael J Rabins, "Engineering Ethics – Concepts and Cases",
3. Wadsworth Thompson Learning, United States, 2000 (Indian Reprint now available) 2003.
4. C.G.Krishnadas Nair, "Engineering Ethics", Harishree Publishing Company, Bangalore.
5. R.K.Shukla, Anuranjan Mishra,"Human Values and Professional Ethics" Published by A.B.Publication.

2013-17

CODE: 30218

MALLA REDDY ENGINEERING COLLEGE  
(Autonomous)

III Year B.Tech EEE-II Sem

L T/P/D C  
- -/3/- 2

ELECTRICAL AND ELECTRONICS MEASUREMENTS LAB

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

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

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

9. Calibration LPF wattmeter – by Phantom testing
10. Measurement of 3 phase power with single watt meter and 2 No's of C.T.
11. C.T. testing using mutual Inductor – Measurement of % ratio error and phase angle of given C.T. by Null method.
12. P.T. testing by comparison – V.G. as Null detector – Measurement of % ratio error and phase angle of the given P.T.
13. LVDT and capacitance pickup – characteristics and Calibration
14. Resistance strain gauge – strain measurements and Calibration
15. Transformer turns ratio measurement using a.c. bridge.
16. Measurement of 1% ratio error and phase angle of given C.T. by comparison.



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**MALLA REDDY ENGINEERING COLLEGE**  
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**III Year B.Tech EEE-II Sem**

**L T/P/D C**  
**- /3/- 2**

**POWER ELECTRONICS AND SIMULATION LAB**

**LIST OF EXPERIMENTS:**

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

**ANY TWO OF SIMULATION EXPERIMENTS WITH PSPICE/PSIM**

14. PSPICE simulation of single-phase full converter using RLE loads and single-phase AC voltage controller using RLE loads
15. PSPICE simulation of resonant pulse commutation circuit and Buck chopper.
16. PSPICE simulation of single phase Inverter with PWM control.

**Reference Books:**

1. Simulation of Electric and Electronic circuits using PSPICE –by M.H. Rashid, M/s PHI Publications.
2. PSPICE A/D user's manual-Microsim, USA.
3. PSPICE reference guide-Microsim, USA.
4. Spice for power electronics and electric power by Rashid, CRC Press

2013-17

CODE:30220

MALLA REDDY ENGINEERING COLLEGE  
(Autonomous)

IV Year B.Tech EEE I-Sem

L T/P/D C  
4 -/- 4

SWITCH GEAR AND PROTECTION

**Objective :**

This course introduces all varieties of Circuit Breakers and Relays for protection of Generators, Transformers and feeder bus bars from over voltages and other hazards. It emphasis on Neutral grounding for overall protection.

**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 and Static Relays**

Principle of Operation and Construction of Attracted armature, Balanced Beam, induction Disc and Induction Cup relays. Relays Classification: Instantaneous, DMT and IDMT types.

Application of relays: Over current/ under voltage relays, Direction relays, Differential Relays and Percentage Differential Relays.

Universal torque equation, Distance relays: Impedance, Reactance and Mho and Off-Set Mho relays, Characteristics of Distance Relays and Comparison.

Static Relays: Static Relays verses Electromagnetic Relays.

**UNIT – III      System 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.

Protection of Lines: Over Current, Carrier Current and Three-zone distance relay protection using Impedance relays. Translay Relay.

Protection of Bus bars – Differential protection.

**UNIT – IV      Protection against over voltages**

Grounded and Ungrounded Neutral Systems- Effects of Ungrounded Neutral on system performance. Methods of Neutral Grounding: Solid, Resistance, Reactance - Arcing Grounds and Grounding Practices.

**UNIT – V      Over voltages in Power Systems**

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

**TEXT BOOKS:**

1. Switchgear and Protection – by Sunil S Rao, Khanna Publlishers
2. Power System Protection and Switchgear by Badari Ram , D.N Viswakarma, TMH Publications
3. The Transmission and Distribution of Electricalenergy- H.Cotton and Barber, ELBS

**REFERENCE BOOKS:**

1. Fundamentals of Power System Protection by Paithankar and S.R.Bhide.,PHI, 2003.
2. Art & Science of Protective Relaying – by C R Mason, Wiley Eastern Ltd.
3. Electrical Power Systems – by C.L.Wadhwa, New Age international (P) Limited, Publishers, 3<sup>nd</sup> editon
4. A Text book on Power System Engineering by B.L.Soni, Gupta, Bhatnagar, Chakrabarthy, Dhanpat Rai & Co.

2013-17

CODE:30221

MALLA REDDY ENGINEERING COLLEGE  
(Autonomous)

IV Year B.Tech EEE I-Sem

L T/P/D C  
4 -/-/ 4

UTILIZATION OF ELECTRICAL ENERGY

**Objective :**

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.

**UNIT – I ELECTRIC DRIVES**

Type of electric drives, choice of motor, starting and running characteristics, speed control, temperature rise, particular applications of electric drives, types of industrial loads, continuous, intermittent and variable loads, load equalization.

**UNIT – II ELECTRIC HEATING**

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

Electric welding, resistance and arc welding, electric welding equipment, comparison between A.C. and D.C. Welding.

**UNIT – III ILLUMINATION**

Introduction, terms used in illumination, laws of illumination, polar curves, photometry, integrating sphere, sources of light.

Discharge lamps, MV and SV lamps – comparison between tungsten filament lamps and fluorescent tubes, Basic principles of light control, Types and design of lighting and flood lighting.

**UNIT – IV ELECTRIC TRACTION – I**

System of electric traction and track electrification. Review of existing electric traction systems in India. Special features of traction motor, methods of electric braking-plugging rheostatic braking and regenerative braking.

**UNIT – V ELECTRIC TRACTION-II**

Mechanics of train movement. Speed-time curves for different services – trapezoidal and quadrilateral speed time curves.

Calculations of tractive effort, power, specific energy consumption for given run, effect of varying acceleration and braking retardation, adhesive weight and braking retardation adhesive weight and coefficient of adhesion.

**TEXT BOOK:**

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

**REFERENCE BOOKS:**

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

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MALLA REDDY ENGINEERING COLLEGE  
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CODE:30418

IV Year B.Tech EEE I-Sem

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DIGITAL SIGNAL PROCESSING

**Objectives:**

This course is an essential course that provides design techniques for processing all type of signals in various fields. The main objectives are:

- To provide background and fundamental material for the analysis and processing of digital signals.
- To familiarize the relationships between continuous-time and discrete-time signals and systems.
- To study fundamentals of time, frequency and Z-plane analysis and to discuss the inter-relationships of these analytic method.
- To study the designs and structures of digital (IIR and FIR) filters from analysis to synthesis for a given specifications.
- The impetus is to introduce a few real-world signal processing applications.
- To acquaint in FFT algorithms, Multi-rate signal processing techniques and finite word length effects.

**UNIT -I:**

**Introduction:** Introduction to Digital Signal Processing: Discrete Time Signals & Sequences, Linear Shift Invariant Systems, Stability, and Causality, Linear Constant Coefficient Difference Equations, Frequency Domain Representation of Discrete Time Signals and Systems

**Realization of Digital Filters:** Applications of Z – Transforms, Solution of Difference Equations of Digital Filters, System Function, Stability Criterion, Frequency Response of Stable Systems, Realization of Digital Filters – Direct, Canonic, Cascade and Parallel Forms.

**UNIT -II:**

**Discrete Fourier series & Discrete Fourier Transform:** DFS Representation of Periodic Sequences, Properties of Discrete Fourier Series, Discrete Fourier Transforms: Properties of DFT, Linear Convolution of Sequences using DFT, Computation of DFT: Over-Lap Add Method, Over-Lap Save Method, Relation between DTFT, DFS, DFT and Z-Transform.

**Fast Fourier Transforms:** Fast Fourier Transforms (FFT) - Radix-2 Decimation-in-Time and Decimation-in-Frequency FFT Algorithms, Inverse FFT, and FFT with General Radix-N.

**UNIT-III:**

**IIR Digital Filters:** Analog filter approximations – Butterworth and Chebyshev, Design of IIR Digital Filters from Analog Filters, Step and Impulse Invariant Techniques, Bilinear Transformation Method, Spectral Transformations.

**UNIT-IV:**

**FIR Digital Filters:** Characteristics of FIR Digital Filters, Frequency Response, Design of FIR Filters: Fourier Method, Digital Filters using Window Techniques, Frequency Sampling Technique, Comparison of IIR & FIR filters.

**UNIT-V:**

**Multirate Digital Signal Processing:** Introduction, Down Sampling, Decimation, Upsampling, Interpolation, Sampling Rate Conversion.

**Finite Word Length Effects:** Limit cycles, Overflow Oscillations, Round-off Noise in IIR Digital Filters, Computational Output Round Off Noise, Methods to Prevent Overflow, Trade Off Between Round Off and Overflow Noise, Dead Band Effects.

**TEXT BOOKS:**

1. Digital Signal Processing, Principles, Algorithms, and Applications: John G. Proakis, Dimitris G. Manolakis, Pearson Education / PHI, 2007.
2. Discrete Time Signal Processing – A. V. Oppenheim and R.W. Schaffer, PHI, 2009
3. Fundamentals of Digital Signal Processing – Loney Ludeman, John Wiley, 2009

**REFERENCE BOOKS:**

1. Digital Signal Processing – Fundamentals and Applications – Li Tan, Elsevier, 2008
2. Fundamentals of Digital Signal Processing using MATLAB – Robert J. Schilling, Sandra L. Harris, Thomson, 2007
3. Digital Signal Processing – S.Salivahanan, A.Vallavaraj and C.Gnanapriya, TMH, 2009
4. Discrete Systems and Digital Signal Processing with MATLAB – Taan S. ElAli, CRC press, 2009.
5. *Digital Signal Processing - A Practical approach*, Emmanuel C. Ifeakor and Barrie W. Jervis, 2<sup>nd</sup> Edition, Pearson Education, 2009.
6. Digital Signal Processing - Nagoor Khani, TMG, 2012

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MALLA REDDY ENGINEERING COLLEGE  
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CODE:30222

IV Year B.Tech EEE I-Sem

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4 -/-/ 4

POWER SYSTEM OPERATION AND CONTROL

**Objective :**

This subject deals with Economic operation of Power Systems, Hydrothermal scheduling and modeling of turbines, generators and automatic controllers. It emphasizes on single area and two area load frequency control and reactive power control.

**UNIT – I Economic Operation of Power Systems**

Optimal operation of Generators in Thermal Power Stations, - heat rate Curve – Cost Curve – Incremental fuel and Production costs, input-output characteristics, Optimum generation allocation with line losses neglected.

Optimum generation allocation including the effect of transmission line losses – Loss Coefficients, General transmission line loss formula.

**UNIT – II Hydrothermal Scheduling & Optimal Power Flow Solution**

Optimal scheduling of Hydrothermal System: Hydroelectric power plant models, Scheduling problems-Short term Hydrothermal scheduling problem.

Optimal power flow solution L: Elementary treatment of OPF without and with inequality constraints

**UNIT – III 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.

Proportional plus Integral control of single area and its block diagram representation, steady state response – Load Frequency Control and Economic dispatch control.

**UNIT – IV Load Frequency Control - II**

Load frequency control of 2-area system – uncontrolled case and controlled case, tie-line bias control

Optimal two area LF control – steady state representation – performance index and optimal parameter adjustment.

**UNIT – V Reactive Power Control**

Overview of Reactive Power control – Reactive Power compensation in transmission systems – advantages and disadvantages of different types of compensating equipment for transmission systems; load compensation – Specifications of load compensator, Uncompensated and compensated transmission lines: shunt and Series Compensation (qualitative treatment).

**TEXT BOOKS:**

1. Electrical Power Systems by C.L.Wadhwa, Newage International-3<sup>rd</sup> Edition
2. *Modern Power System Analysis* – by I.J.Nagrath & D.P.Kothari Tata M Graw – Hill Publishing Company Ltd, 2<sup>nd</sup> edition.
3. Reactive power control in electric systems – T.J.E. Miller, John wiley & sons

***REFERENCE BOOKS:***

1. Power System Analysis and Design by J.Duncan Glover and M.S.Sarma., THOMPSON, 3<sup>rd</sup> Edition.
2. Electric Energy systems Theory – by O.I.Elgerd, Tata Mc Graw-hill Publishing Company Ltd., Second edition.
3. Power System Analysis by Grainger and Stevenson, Tata McGraw Hill.
4. Power System Analysis by Hadi Saadat – TMH Edition.

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MALLA REDDY ENGINEERING COLLEGE  
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CODE:302B1

IV Year B.Tech EEE I-Sem

L	T/P/D	C
4	-/-/-	4

HIGH VOLTAGE ENGINEERING  
(Elective-I)

**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.

**UNIT I INTRODUCTION TO HIGH VOLTAGE TECHNOLOGY AND APPLICATIONS**

Electric Field Stresses, Gas / Vacuum as Insulator, Liquid Dielectrics, Solids and Composites, Estimation and Control of Electric Stress, Numerical methods for electric field computation, Surge voltages, their distribution and control, Applications of insulating materials in transformers, rotating machines, circuit breakers, cable power capacitors and bushings.

**UNIT II BREAK DOWN IN GASEOUS, LIQUID AND SOLID DIELECTRICS**

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. Intrinsic breakdown, electromechanical breakdown, thermal breakdown, breakdown of solid dielectrics in practice, Breakdown in composite dielectrics, solid dielectrics used in practice.

**UNIT III GENERATION AND 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-DSTRUCTIVE TESTING OF MATERIAL AND ELECTRICAL APPARATUS & HIGH VOLTAGE TESTING**

Measurement of D.C Resistivity, Measurement of Dielectric Constant and loss factor, Partial discharge measurements.

Testing of Insulators and bushings, Testing of Isolators and circuit breakers, Testing of cables, Testing of Transformers, Testing of Surge Arresters, Radio Interference measurements.



**TEXT BOOKS:**

1. High Voltage Engineering by M.S.Naidu and V. Kamaraju – TMH Publications, 3<sup>rd</sup> Edition
2. High Voltage Engineering: Fundamentals by E.Kuffel, W.S.Zaengl, J.Kuffel by Elsevier, 2<sup>nd</sup> Edition.

**REFERENCE BOOKS:**

1. High Voltage Engineering by C.L.Wadhwa, New Age Internationals (P) Limited, 1997.
2. High Voltage Insulation Engineering by Ravindra Arora, Wolfgang Mosch, New Age International (P) Limited, 1995.

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MALLA REDDY ENGINEERING COLLEGE  
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IV Year B.Tech EEE I-Sem

L	T/P/D	C
4	-/-/-	4

VLSI DESIGN

(Elective – I)

**Objective ;**

This subject deals with the detailed introduction to IC technology and its electrical properties, VLSI design processes, gate level design. Information about data path subsystems. In addition the Programmable Logic Devices and CMOS testing are also discussed.

**UNIT –I:**

**Introduction:** Introduction to IC Technology – MOS, PMOS, NMOS, CMOS & BiCMOS

**Basic Electrical Properties:** Basic Electrical Properties of MOS and BiCMOS Circuits:  $I_{ds}$ - $V_{ds}$  relationships, MOS transistor threshold Voltage,  $g_m$ ,  $g_{ds}$ , Figure of merit  $\omega_0$ ; Pass transistor, NMOS Inverter, Various pull ups, CMOS Inverter analysis and design, Bi-CMOS Inverters.

**UNIT -II:**

**VLSI Circuit Design Processes:** VLSI Design Flow, MOS Layers, Stick Diagrams, Design Rules and Layout, 2  $\mu$ m CMOS Design rules for wires, Contacts and Transistors Layout Diagrams for NMOS and CMOS Inverters and Gates, Scaling of MOS circuits.

**UNIT –III:**

**Gate Level Design:** Logic Gates and Other complex gates, Switch logic, Alternate gate circuits, Time delays, Driving large capacitive loads, Wiring capacitance, Fan – in, Fan – out, Choice of layers.

**UNIT -IV:**

**Data Path Subsystems:** Subsystem Design, Shifters, Adders, ALUs, Multipliers, Parity generators, Comparators, Zero/One Detectors, Counters.

**Array Subsystems:** SRAM, DRAM, ROM, Serial Access Memories.

## **UNIT -V:**

**Programmable Logic Devices:** PLAs, FPGAs, CPLDs, Standard Cells, Programmable Array Logic, Design Approach, Parameters influencing low power design.

**CMOS Testing:** CMOS Testing, Need for testing, Test Principles, Design Strategies for test, Chip level Test Techniques.

## **TEXT BOOKS:**

1. Essentials of VLSI circuits and systems – Kamran Eshraghian, Eshraghian Douglas and A. Pucknell, PHI, 2005 Edition
2. CMOS VLSI Design – A Circuits and Systems Perspective, Neil H. E Weste, David Harris, Ayan Banerjee, 3<sup>rd</sup> Ed, Pearson, 2009.
3. VLSI Design – M. Michael Vai, 2001, CRC Press.

## **REFERENCE BOOKS:**

1. Introduction to VLSI Systems: A Logic, Circuit and System Perspective – Ming-BO Lin, CRC Press, 2011
2. CMOS logic circuit Design - John .P. Uyemura, Springer, 2007.
3. Modern VLSI Design - Wayne Wolf, Pearson Education, 3rd Edition, 1997.
4. VLSI Design- K .Lal Kishore, V. S. V. Prabhakar, I.K International, 2009.
5. Introduction to VLSI – Mead & Convey, BS Publications, 2010.

2013-17

CODE:302B2

MALLA REDDY ENGINEERING COLLEGE  
(Autonomous)

IV Year B.Tech EEE I-Sem

L	T/P/D	C
4	-/-/-	4

DIGITAL CONTROL SYSTEMS

(Elective-I)

**Objective ;**

This subject deals with the detailed introduction to sampling and reconstruction, transform analysis of sampled data systems with time domain analysis. In addition the transform of digital control and state space analysis are also discussed.

**UNIT – I          SAMPLING AND RECONSTRUCTION**

Introduction, Examples of Data control systems – Digital to Analog conversion and Analog to Digital conversion, sample and hold operations.

**UNIT-II          Transform analysis of Sampled Data Systems**

Introduction, Linear difference equations, pulse response, Z – transforms, Theorems of Z – Transforms, the inverse Z – transforms, Modified Z- Transforms

Z-Transform method for solving difference equations; Pulse transforms function, block diagram analysis of sampled – data systems, mapping between s-plane and z-plane.

**UNIT – III Time domain analysis**

Comparison of Time response of continuous data and sampled data systems, correlation between time response and rootlocus in splance and Zplane, Effect of Pole zero configuration on the Zplane upon maximum overshoot and peak time of transient response – root locus of digital control systems – steady state error analysis of DCS , Nyquist plot, Bode plot, gain margin and phase margin for digital control systems

**UNIT – IV          Transform Design of Digital Controls:**

Design of state feedback controller through pole placement – Necessary and sufficient conditions, Ackerman's formula.State Observers – Full order and Reduced order observers.  
Transient and steady – State response Analysis – Design based on the frequency response method – Bilinear Transformation and Design procedure in the w-plane, Lead, Lag and Lead-Lag compensators and digital PID controllers.

**UNIT –V          STATE SPACE ANALYSIS**

State Space Representation of discrete time systems, Pulse Transfer Function Matrix solving discrete time state space equations, State transition matrix and it's Properties, Methods for Computation of State Transition Matrix, Discretization of continuous time state – space equations  
Concepts of Controllability and Observability, Tests for controllability and Observability. Controllability and Observability conditions for Pulse Transfer Function

**TEXT BOOKS:**

1. Discrete-Time Control systems - K. Ogata, Pearson Education/PHI, 2<sup>nd</sup> Edition

**REFERENCE BOOKS:**

1. Digital Control Systems, Kuo, Oxford University Press, 2<sup>nd</sup> Edition, 2003.
2. Digital Control and State Variable Methods by M.Gopal, TMH

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MALLA REDDY ENGINEERING COLLEGE  
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Code:30534

IV Year B.Tech EEE-I Sem

L T/P/D C  
4 -/ - 4

DATA STRUCTURES  
(Elective-I)

**Course Objectives:**

1. To understand the basic concepts such as Abstract Data Types, Linear and Non Linear Data structures.
2. To understand the notations used to analyze the Performance of algorithms.
3. To understand the behavior of data structures such as stacks, queues, trees, hash tables, search trees, Graphs and their representations.
4. To choose the appropriate data structure for a specified application.
5. To understand and analyze various searching and sorting algorithms.
6. To write programs in C to solve problems using data structures such as arrays, linked lists, stacks, queues, trees, graphs, hash tables, search trees.

**UNIT- I**

**Basic concepts-** Algorithm Specification-Introduction, Recursive algorithms, Data Abstraction Performance analysis- time complexity and space complexity, Asymptotic Notation-Big O, Omega and Theta notations, Introduction to Linear and Non Linear data structures

**Linked lists:** Singly Linked Lists-Operations-Insertion, Deletion, Concatenating singly linked lists, Circularly linked lists- Operations for Circularly linked lists, Doubly Linked Lists- Operations- Insertion, Deletion. Representation of single, two dimensional arrays, sparse matrices-array and linked representations.

**UNIT- II**

**Stacks:** Stack ADT, definition, operations, array and linked implementations in C, Applications-infix to postfix conversion, Postfix expression evaluation, recursion implementation.

**Queue ADT,** definition and operations ,array and linked Implementations in C, Circular queues-Insertion and deletion operations, Deque (Double ended queue)ADT,array and linked implementations in C.

**UNIT- III**

**Trees –** Terminology, Representation of Trees, Binary tree ADT, Properties of Binary Trees, Binary Tree Representations-array and linked representations, Binary Tree traversals, Threaded binary trees, Max PriorityQueue ADT-implementation-Max Heap-Definition, Insertion into a Max Heap, Deletion from a Max Heap.

**Graphs –** Introduction, Definition, Terminology, Graph ADT, Graph Representations- Adjacency matrix,Adjacency lists, Graph traversals- DFS and BFS.

**UNIT- IV**

**Searching-** Linear Search, Binary Search, Static Hashing-Introduction, hash tables, hash functions, Overflow Handling.

**Sorting-**Insertion Sort, Selection Sort, Radix Sort, Quick sort, Heap Sort, Comparison of Sorting methods.

**UNIT- V**

**Search Trees-**Binary Search Trees, Definition, Operations- Searching, Insertion and Deletion, AVL Trees- Definition and Examples, Insertion into an AVL Tree ,B-Trees, Definition, B-Tree of order m, operations-Insertion and Searching, Introduction to Red-Black and Splay Trees (Elementary treatment-only Definitions and Examples), Comparison of Search Trees.

**Pattern matching algorithm-** The Knuth-Morris-Pratt algorithm, Tries (examples only).

**Course Outcomes:**

1. Learn how to use data structure concepts for realistic problems.
2. Ability to identify appropriate data structure for solving computing problems in respective language.
3. Ability to solve problems independently and think critically.

**TEXT BOOKS:**

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

**REFERENCE BOOKS:**

1. Data structures: A Pseudocode Approach with C, 2nd edition, R.F.Gilberg And B.A.Forouzan, Cengage Learning.
2. Data structures and Algorithm Analysis in C, 2nd edition, M.A.Weiss, Pearson.
3. Data Structures using C, A.M.Tanenbaum,Y. Langsam, M.J.Augenstein, Pearson.
4. Data structures and Program Design in C, 2nd edition, R.Kruse, C.L.Tondo and B.Leung,Pearson.
5. Data Structures and Algorithms made easy in JAVA, 2nd Edition, Narsimha Karumanchi, CareerMonk Publications.
6. Data Structures using C, R.Thareja, Oxford University Press.
7. Data Structures, S.Lipscutz,Schaum's Outlines, TMH.
8. Data structures using C, A.K.Sharma, 2nd edition, Pearson..
9. Data Structures using C &C++, R.Shukla, Wiley India.
10. Classic Data Structures, D.Samanta, 2nd edition, PHI.
11. Advanced Data structures, Peter Brass, Cambridge.

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CODE:30M12

MALLA REDDY ENGINEERING COLLEGE  
(Autonomous)

IV Year B.Tech EEE I-Sem

L	T/P/D	C
4	-/-/-	4

OPTIMIZATION TECHNIQUES  
(ELECTIVE-III)

**UNIT – I: Introduction and Classical Optimization Techniques:**

Statement of an Optimization problem – design vector – design constraints – constraint surface – objective function – objective function surfaces – classification of Optimization problems.

**Linear Programming:** Standard form of a linear programming problem – geometry of linear programming problems – definitions and theorems – solution of a system of linear simultaneous equations – pivotal reduction of a general system of equations – motivation to the simplex method – simplex algorithm.

**Transportation Problem:** Finding initial basic feasible solution by north – west corner rule, least cost method and Vogel’s approximation method – testing for optimality of balanced transportation problems.

**UNIT – II: Classical Optimization Techniques/Introduction to NLPP:** Single variable Optimization – multi variable Optimization without constraints – necessary and sufficient conditions for minimum/maximum – multivariable Optimization with equality constraints. Solution by method of Lagrange multipliers – multivariable Optimization with inequality constraints – Kuhn – Tucker conditions.

**UNIT – III: Constrained & Nonlinear Programming:** Characteristics of a constrained problem, Classification, Basic approach of Penalty Function method; Basic approaches of Interior and Exterior penalty function methods. Introduction to convex Programming Problem. Wolfe and Beal’s methods

**Unconstrained Nonlinear Programming:** One – dimensional minimization methods: Classification, Fibonacci method and Quadratic interpolation method

**UNIT – IV: Unconstrained Optimization Technique:** Univariate method, Powell’s method and steepest descent method.

**UNIT – V: Dynamic Programming:**

Dynamic programming multistage decision processes – types – concept of sub optimization and the principle of optimality – computational procedure in dynamic programming – examples illustrating the calculus method of solution - examples illustrating the tabular method of solution.

**TEXT BOOKS:**

1. “Engineering optimization: Theory and practice”-by S. S.Rao, New Age International (P) Limited, 3<sup>rd</sup> edition, 1998.
2. “Introductory Operations Research” by H.S. Kasene & K.D. Kumar, Springer (India), Pvt .Ltd.

**REFERENCE BOOKS:**

1. “Optimization Methods in Operations Research and systems Analysis” – by K.V. Mital and C. Mohan, New Age International (P) Limited, Publishers, 3<sup>rd</sup> edition, 1996.
2. Operations Research – by Dr. S.D.Sharma.
3. “Operations Research: An Introduction” – by H.A. Taha, PHI Pvt. Ltd., 6<sup>th</sup> edition
4. Linear Programming – by G. Hadley
5. Convex Optimization -by Stephen Boyd, PHI



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CODE: 302C1

MALLA REDDY ENGINEERING COLLEGE  
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IV Year B.Tech EEE I-Sem

L	T/P/D	C
4	-/-	4

ELECTRICAL DISTRIBUTION SYSTEMS  
(Elective-II)

**Objective;**

This subject deals general concepts of distribution systems and its modeling and characteristics, design of feeders and its system analysis, protection of relays and its co-ordination and various compensation of power factor and voltage control.

**UNIT – 1 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 AND SUBSTATIONS**

Design Considerations of Distribution Feeders: Radial and loop types of primary feeders, voltage levels, feeder loading; basic design practice of the secondary distribution system.

Location of Substations: Rating of distribution substation, service area within primary feeders. Benefits derived through optimal location of substations.

**UNIT – III SYSTEM ANALYSIS**

Voltage drop and power-loss calculations: Derivation for voltage drop and power loss in lines, manual methods of solution for radial networks, three phase balanced primary lines.

**UNIT – IV PROTECTIVE DEVICES AND COORDINATION**

Objectives of distribution system protection, types of common faults and procedure for fault calculations. Protective Devices: Principle of operation of Fuses, Circuit Reclosures, line sectionalizers, and circuit breakers-Coordination of Protective Devices: General coordination procedure.

**UNIT – V COMPENSATION FOR POWER FACTOR IMPROVEMENT AND VOLTAGE CONTROL**

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: Equipment for voltage control, effect of series capacitors, effect of AVB/AVR, line drop compensation.

**TEXT BOOK:**

1. "Electric Power Distribution system, Engineering" – by Turan Gonen, Mc Graw-hill Book Company.
2. Electric Power Distribution – by A.S. Pabla, Tata Mc Graw-hill Publishing company, 4<sup>th</sup> edition, 1997.

**REFERENCE BOOK:**

1. Electrical Power Distribution and Automation by S.Sivanagaraju, V.Sankar, Dhanpat Rai & Co, 2006
2. Electrical Power Distribution Systems by V.Kamaraju, Right Publishers.

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CODE: 302C2

MALLA REDDY ENGINEERING COLLEGE  
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IV Year B.Tech EEE I-Sem

L	T/P/D	C
4	-/-	4

ELECTRICAL ESTIMATION AND COSTING  
(Elective-II)

**Objective:** To expose the subject highlights on elements of estimation and costing, budgeting of service connections and also about contracting, maintenance.

**UNIT-1 ELEMENTS OF ESTIMATING & COSTING OF DOMESTIC AND INDUSTRIAL WIRING**

Definition of "Estimation", Types of estimation and estimation tools, Overhead and service charges, Purchase procedure.

Layout and wiring diagram for residential building and industrial wiring, Selection of number of circuit for project as per IE rules, Estimation for residential wiring and industrial wiring, I.E. rules observed for above wiring.

**UNIT-2 ESTIMATING & COSTING OF SERVICE CONNECTIONS**

Survey work for domestic and industrial service connection, Lay out/ wiring diagram of service connection (given project work), List of materials and accessories along with specifications required for given project work, Estimation of service connection for domestic and industrial (1phase and 3phase) service connections, I.E. rules pertaining to above wiring.

**UNIT-3 ESTIMATION OF OVER HEAD AND UNDERGROUND DISTRIBUTION LINE**

Survey work for estimation of overhead and underground distribution system, Planning and layout of project, List of materials and accessories required for the given project, Procedure for preparing estimate for 440 V, 3 phase, 4 wire or 3 wire overhead and underground distribution system, Necessary drawing/ sketches of overhead and underground service connection, I.E. rules pertaining to above project.

**UNIT-4 ESTIMATING & COSTING OF ELECTRICAL PRODUCT**

Market survey for cost of given product like D.O.L. starter, small motor, monoblock pump, automatic electric iron, table/ceiling fan, ICDP/ICTP switch etc, Preparation of detailed drawing work of the product, Preparation of material quantity sheet for the product, Market survey for availability of required materials, their cost and other requirements, Preparation of cost schedule of product, Find out cost of product considering material cost, labour cost and overhead charges, Validation of cost schedule, Financial arrangement for the product.

**UNIT-5 ESTIMATING & COSTING OF REPAIR & MAINTENANCE OF ELECTRICAL DEVICES AND EQUIPMENT & CONTRACTING**

Location of fault, Materials required and their cost for remedial measure of fault, Estimation of repairing cost. Estimation of maintenance, servicing and testing cost including labour cost(service charge), Tools used for repairs & maintenance work, Detailed estimation and preparation of cost schedule for repair and maintenance of electric fan, automatic electric iron, single phase transformer, mixy, D.O.L.starter etc.

Principles of contracting :Terms, conditions, and types of contract system,Tender,tendering procedure and preparation of simple tender, Terms and conditions of tender, procedure for inviting and scrutinizing of tender, Importance of Earnest Money Deposit, Security Deposit and S.O.R

**TEXT BOOKS:**

- (1) S.L. Uppal- Khanna Publisher Electrical wiring, estimating and costing.
- (2) S.K. Bhattacharya - TTTI, Chandigarh

**REFERENCE BOOKS:**

- (3) M.N. Bajpai- Saroj publication. Electrical estimating and costing.
- (4) S.O.Rs of P.W.D. Govt. departments.
- (5) I.E. rules gadget.
- (6) Electrical costing, estimating and contracting

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IV Year B.Tech EEE I-Sem

L	T/P/D	C
4	-/-/-	4

EMBEDDED SYSTEMS DESIGN  
(Elective-II)

**Course Objectives:**

For embedded systems, the course will enable the students to:

- Understand the basics of an embedded system
- Program an embedded system
- To learn the method of designing an Embedded System for any type of applications.
- To understand operating systems concepts, types and choosing RTOS.
- Design, implement and test an embedded system.

**UNIT -I:**

**Introduction to Embedded Systems**

Definition of Embedded System, Embedded Systems Vs General Computing Systems, History of Embedded Systems, Classification, Major Application Areas, Purpose of Embedded Systems, Characteristics and Quality Attributes of Embedded Systems.

**UNIT -II: Typical Embedded System:**

Core of the Embedded System: General Purpose and Domain Specific Processors, ASICs, PLDs, Commercial Off-The-Shelf Components (COTS), Memory: ROM, RAM, Memory according to the type of Interface, Memory Shadowing, Memory selection for Embedded Systems, Sensors and Actuators, Communication Interface: Onboard and External Communication Interfaces.

**UNIT -III: Embedded Firmware:**

Reset Circuit, Brown-out Protection Circuit, Oscillator Unit, Real Time Clock, Watchdog Timer, Embedded Firmware Design Approaches and Development Languages.

**UNIT -IV: RTOS Based Embedded System Design:**

Operating System Basics, Types of Operating Systems, Tasks, Process and Threads, Multiprocessing and Multitasking, Task Scheduling.

**UNIT -V: Task Communication:**

Shared Memory, Message Passing, Remote Procedure Call and Sockets, Task Synchronization: Task Communication/Synchronization Issues, Task Synchronization Techniques, Device Drivers, How to Choose an RTOS.

**TEXT BOOKS:**

1. Introduction to Embedded Systems - Shibu K.V, Mc Graw Hill.

**REFERENCE BOOKS:**

1. Embedded Systems - Raj Kamal, TMH.
2. Embedded System Design - Frank Vahid, Tony Givargis, John Wiley.
3. Embedded Systems – Lyla, Pearson, 2013
4. An Embedded Software Primer - David E. Simon, Pearson Education.

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CODE:30434

MALLA REDDY ENGINEERING COLLEGE  
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IV Year B.Tech EEE I-Sem

L T/P/D C  
- -/3/- 2

**MICROPROCESSORS AND MICROCONTROLLERS LAB**

The following programs are to be written for assembler and execute the same with 8086 and 8051 kits

1. Programs for 16 bit arithmetic operations for 8086 ( using various addressing modes)
2. Program for sorting an array for 8086.
3. Program for searching for a number or character in a string for 8086.
4. Program for string manipulations for 8086.
5. Program for digital clock design using 8086.
6. Interfacing ADC and DAC to 8086.
7. Parallel communication between two microprocessor kits using 8255.
8. Serial communication between two microprocessor kits using 8251.
9. Interfacing to 8086 and programming to control stepper motor.
10. Programming using arithmetic, logical and bit manipulation instructions of 8051.
11. Program and verify timer/counter in 8051.
12. Program and verify interrupt handling in 8051.
13. UART operation in 8051.
14. Communication between 8051 kit and PC.
15. Interfacing LCD to 8051.
16. Interfacing Matrix/keyboard to 8051..
17. Data Transfer from peripheral to memory through DMA controller 8237/8257.

Note: Minimum of 12 experiments to be conducted.

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MALLA REDDY ENGINEERING COLLEGE  
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IV Year B.Tech EEE I-Sem

L T/P/D C  
- -/3/- 2

### Advanced English Communication Skills Laboratory

#### Introduction:

Effective Communication binds any progressive organization. At the B Tech third year level, the Advanced English Communication skills laboratory is introduced to help students succeed in attaining a challenging and a professional career. Each unit aims to reinforce learning and helps the learners perform well before and after they enter the world of work. The course is designed to be practical, stimulating and challenging providing opportunities to the learners to go beyond the classrooms and get empowered in language skills. The course also enables the students understand the employers' expectations that are varied from company to company while giving them insight into the acceptable norms of attitude, behavior and etiquette.

#### Objectives:

- To help the students understand the requisites to successfully deliver as professionals and the challenges they need to encounter
- To help them make a smooth transition from the academic world to the professional world
- To refine the style of individual communication
- To broaden and raise awareness about the dynamics of communication in the work environment
- To integrate the learning experience with the functional areas of communication
- Helping the students to become industry ready

#### Outcomes

- Since the communication skills cannot be taught but be developed through practice the student will be competent communicators through application and the use of the concepts and activities in different units.
- Students are competent to take a smooth transition from the academic world to the professional world
- Students are industry ready

#### Methodology:

Facilitator's role: Since classroom learning augments thinking process, helping them to develop written, spoken and non verbal communication, the facilitator / Faculty would briefly discuss the topics with the students and later on guide them while the students involve in activities, writing work and while making presentations. The facilitator is required to design a lot of practical/industry oriented project works for the students

\*Students are required to participate, perform, write and submit the work in the form of written documents or Power Point Presentations to hone their spoken written and non verbal communication skills . Students are to take up field work and submit the project work.

#### Unit I

**Industry awareness-** Introduction to the world of work- Collection of information about various sectors, companies, enterprises, organizations and conglomerates; field visit to the industry they wish to work for

Instruction: Here the students are required to work in teams- Team players-participating and responding, team leader -delegates, plans and involves all the team members, Challenges the team faces -the report presented in the written form and making presentation

#### Unit II

##### **Job hunt process**

- SWOT analysis, correspondence and browsing the internet , job application-cover letter drafting, drafting a winning resume', types of resume's -electronic, video and printed resume's

- Instruction: Students are required to prepare their video resume which will be assessed by the faculty member.

#### Unit III

**Group Discussion-** Initiators- Contributor-Informer-Team Leader-Motivator-Creative Contributor , Importance of , Non verbal communication -eye contact, voice characters, posture, gestures, do's and don'ts, Role play and Simulation- Learners assuming the roles of characters and participating in Group discussion, analysis, or prediction with strictly defined goals.

#### Unit IV

**Interview skills-** Preparing for the interview, types of interviews, interview session, importance of non verbal communication during the interview, do's and don'ts of interview, follow up and thanking letter. FAQ's.

#### Unit V

**Office etiquette-** Formal Conversation, elevator etiquette, table manners, office attire- do's and don'ts, gossips and rumors, greetings and meetings, speaking to seniors and handshakes , offering and taking visiting cards.

#### Unit VI

##### **E- Correspondence and Email etiquette**

Common web mail services, yahoo, gmail etc, fields to pay attention- To:, Cc:, Bcc:, Reply All, Subject, Salutation, Body, Signature, Font, Caps Lock , Highlight, The 'KISS' strategy( Keep It Simple and Short,)Points to remember while signing off, Introduction to Technical Vocabulary

- This unit is purely for internal assessment/evaluation

#### Unit VII

**Report writing-** types of report, project report writing, technical reports, importance of pictorial presentation- graphs , diagrams etc

Instruction: The students are required to work on a project. Field work and collection of information , prepare a project report, present the project in the form of Power Point Presentation and written document. This report will be given weightage during the external examination

### **Outcome**

Since the communication skills cannot be taught but be developed through practice the student will be competent communicator through application and the use of the concepts and activities in different units.

### **Reference Books**

- Handbook of practical Communication Skills by Chrissie Wright
- How to win friends and influence people by Dale I.Carnegie
- Skills with people by Les Giblin
- Bringing out the best in people by Aubrey Daniels
- The definitive book on body Language by Barbara and Allan Pease
- Just Listen :Discover the Secret to getting through to absolutely anything by Mark Goulstone
- Ten Much by A G Krishna Murthy
- Communication skills for Professionals by Cambridge Publishers
- Good practice Student's book on Communication skills by Cambridge Publishers
- Word Power Made Easy by Norman Lewis
- Effective Technical Communication by Ashraf Rizbi
- Resume Magic: Trade Secrets of a Professional Resume by Susan Britton Whitcomb

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**MALLA REDDY ENGINEERING COLLEGE  
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IV Year B.Tech EEE II-Sem

L	T/P/D	C
4	-/-/-	4

**FUNDAMENTALS OF H.V.D.C. TRANSMISSION AND FACTS DEVICES**

**Objective;**

This subject deals with the basic concepts of HVDC and its applications, analysis of HVDC converters with their control circuitry. This subject also includes reactive power control, power flow with compensation devices or controllers including voltage source converter also.

**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.

**CONVERTER & HVDC SYSTEM CONTROL**

Principle 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-III 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.

**POWER FLOW ANALYSIS IN AC/DC SYSTEMS**

Modeling of DC Links-DC Network-DC Converter-Controller Equations-Solution of DC load flow – P.U. System for d.c. quantities-solution of AC-DC Power flow-Simultaneous method-Sequential method.

**Unit IV : POWER FLOW AND DYNAMIC STABILITY**

Transmission interconnections, power flow in an AC System, loading capability limits, Power flow and Dynamic stability considerations, importance of controllable parameters.

Opportunities for FACTS, basic types of FACTS controllers, benefits from FACTS controllers, Requirements and Characteristics of High Power devices – Voltage and Current rating, losses and speed of switching, parameter trade-off of devices.



## **Unit V : VOLTAGE SOURCE CONVERTERS:**

Basic concept of Voltage source converter, Single phase full wave bridge converter, Single phase-leg (pole) operation, Square-wave voltage harmonics for a single phase Bridge, 3 Phase full wave bridge converter.

### **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.
3. “Understanding FACTS ” N.G.Hingorani and L.Guygi, IEEE Press. Indian Edition is available:--Standard Publications, 2001.

### **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.
4. “Flexible a c transmission system (FACTS)” Edited by YONG HUE SONG and ALLAN T JOHNS, Institution of Electrical Engineers, London.

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CODE:302D1

MALLA REDDY ENGINEERING COLLEGE  
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IV Year B.Tech EEE II-Sem

L	T/P/D	C
4	-/-/-	4

NEURAL NETWORKS AND FUZZY LOGIC  
(Elective-III)

**Objective :**

This course introduces the basics of Neural Networks and essentials of Artificial Neural Networks with Single Layer and Multilayer Feed Forward Networks. Also deals with Associate Memories and introduces Fuzzy sets and Fuzzy Logic system components. The Neural Network and Fuzzy Network system application to Electrical Engineering is also presented. This subject is very important and useful for doing Project Work.

**Unit – I: Introduction to Neural Networks**

Introduction, Humans and Computers, Organization of the Brain, Biological Neuron, Biological and Artificial Neuron Models, Hodgkin-Huxley Neuron Model, Integrate-and-Fire Neuron Model, Spiking Neuron Model, Characteristics of ANN, McCulloch-Pitts Model, Historical Developments, Potential 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, Neural Dynamics (Activation and Synaptic), Learning Strategy (Supervised, Unsupervised, Reinforcement), Learning Rules, Types of Application

**Unit–III: Feed Forward Neural Networks**

Introduction, Perceptron Models: Discrete, Continuous and Multi-Category, Training Algorithms: Discrete and Continuous Perceptron Networks, Perceptron Convergence theorem, Limitations of the Perceptron Model, Applications.

Credit Assignment Problem, Generalized Delta Rule, Derivation of Backpropagation (BP) Training, Summary of Backpropagation Algorithm, Kolmogorov Theorem, Learning Difficulties and Improvements.

**Unit IV:Associative Memories & Architecture**

Paradigms of Associative Memory, Pattern Mathematics, Hebbian Learning, General Concepts of Associative Memory (Associative Matrix, Association Rules, Hamming Distance, The Linear Associator, Matrix Memories, Content Addressable Memory),

**Bidirectional Associative Memory (BAM) Architecture, BAM Training Algorithms:** Storage and Recall Algorithm, BAM Energy Function, Proof of BAM Stability Theorem

**Architecture of Hopfield Network:** Discrete and Continuous versions, Storage and Recall Algorithm, Stability Analysis, Capacity of the Hopfield Network

Summary and Discussion of Instance/Memory Based Learning Algorithms, Applications.

**Unit – V: Classical & Fuzzy Sets & Fuzzy systems**

Introduction to classical sets - properties, Operations and relations; Fuzzy sets, Membership, Uncertainty, Operations, properties, fuzzy relations, cardinalities, membership functions.

**Fuzzy Logic System Components**

Fuzzification, Membership value assignment, development of rule base and decision making system, Defuzzification to crisp sets, Defuzzification methods.

***TEXT BOOK:***

1. Neural Networks, Fuzzy logic, Genetic algorithms: synthesis and applications by Rajasekharan and Rai – PHI Publication.
2. Introduction to Neural Networks using MATLAB 6.0 - S.N.Sivanandam, S.Sumathi, S.N.Deepa, TMH, 2006

***REFERENCE BOOKS:***

1. Neural Networks – James A Freeman and Davis Skapura, Pearson Education, 2002.
2. Neural Networks – Simon Hakens , Pearson Education
3. Neural Engineering by C.Eliasmith and CH.Anderson, PHI
4. Neural Networks and Fuzzy Logic System by Bart Kosko, PHI Publications.

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MALLA REDDY ENGINEERING COLLEGE  
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IV Year B.Tech EEE II-Sem

L	T/P/D	C
4	-/-	4

DISASTER MANAGEMENT  
(Open Elective)

### Course Objectives

- To increase the knowledge and understanding of the disaster phenomenon, its different contextual aspects, impacts and public health consequences.
- To increase the knowledge and understanding of the International Strategy for Disaster Reduction and to increase skills and abilities for implementing the Disaster Risk Reduction (DRR) Strategy.
- To ensure skills and abilities to analyse potential effects of disasters and of the strategies and methods to deliver public health response to avert these effects.
- To ensure skills and ability to design, implement and evaluate research on disasters

### UNIT-I

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

**TYPES OF ENVIRONMENTAL HAZARDS & DISASTERS:** Natural hazards and Disasters – Man induced hazards & Disasters - Natural Hazards- Planetary Hazards/ Disasters - Extra Planetary Hazards/ disasters - Planetary Hazards- Endogenous Hazards - Exogenous Hazards

### UNIT –II

**ENDOGENOUS HAZARDS** - Volcanic Eruption – Earthquakes – Landslides – Volcanic Hazards/ Disasters - Causes and distribution of Volcanoes - Hazardous effects of volcanic eruptions - Environmental impacts of volcanic eruptions – Earthquake Hazards/ disasters - Causes of Earthquakes - Distribution of earthquakes - Hazardous effects of - earthquakes - - Earthquake Hazards in India - - Human adjustment, perception & mitigation of earthquake.

**EXOGENOUS HAZARDS/ disasters** - Infrequent events- Cumulative atmospheric hazards/ disasters, Infrequent events: Cyclones – Lightning – Hailstorms, Cyclones: Tropical cyclones & Local storms - Destruction by tropical cyclones & local storms (causes, distribution human adjustment, perception & mitigation), Cumulative atmospheric hazards/ disasters : - Floods- Droughts- Cold waves- Heat waves Floods:- Causes of floods- Flood hazards India- Flood control measures ( Human adjustment, perception & mitigation), Droughts:- Impacts of droughts- Drought hazards in India- Drought control measures- Extra Palnetary Hazards/ Disasters-

Man induced Hazards /Disasters- Physical hazards/ Disasters-Soil Erosion Soil Erosion:-- Mechanics & forms of Soil Erosion- Factors & causes of Soil Erosion- Conservation measures of Soil Erosion, Chemical hazards/ disasters:-- Release of toxic chemicals, nuclear explosion- Sedimentation processes, Sedimentation processes:-

Global Sedimentation problems- Regional Sedimentation problems- Sedimentation & Environmental problems-  
Corrective measures of Erosion & Sedimentation, Biological hazards/ disasters:- Population Explosion.

### **UNIT –III:**

#### **EMERGING APPROACHES IN DISASTER MANAGEMENT- Three Stages**

1. Pre- disaster stage (preparedness)
2. Emergency Stage
3. Post Disaster stage-Rehabilitation

#### **Natural Disaster Reduction & Management**

- a) Provision of Immediate relief measures to disaster affected people
- b) Prediction of Hazards & Disasters
- c) Measures of adjustment to natural hazards

### **UNIT –IV**

#### **DISASTER MANAGEMENT- An integrated approach for disaster preparedness, mitigation & awareness.**

Mitigation- Institutions- discuss the work of following Institution.

- a. Meteorological observatory
- b. Seismological observatory
- c. Volcanology institution
- d. Hydrology Laboratory
- e. Industrial Safety inspectorate
- f. Institution of urban & regional planners
- g. Chambers of Architects
- h. Engineering Council
- i. National Standards Committee

Integrated Planning- Contingency management Preparedness –

- a) Education on disasters
- b) Community involvement
- c) The adjustment of Human Population to Natural hazards & disasters Role of Media Monitoring Management-  
Discuss the programme of disaster research & mitigation of disaster of following organizations.
- a) International Council for Scientific Unions (ICSU)- Scientific committee on problems of the Environment (SCOPE), International Geosphere- Biosphere programme (IGBP)
- b) World federation of Engineering Organizations(WFED)
- c) National Academy of Sciences
- d) World Meteorological organizations(WMO)
- e) Geographical Information System(GIS)
- f) International Association of Seismology & Physics of Earth's Interior (IASPEI)
- g) Various U.N agencies like UNCRD, IDNDR, WHO, UNESCO, UNICEF, UNEP.

## **UNIT –V:**

- a. A regional survey of Land Subsidence, Coastal Disaster, Cyclonic Disaster & Disaster in Hills with particular reference to India
- b. Ecological planning for sustainability & sustainable development in India- Sustainable rural development: A Remedy to Disasters -Role of Panchayats in Disaster mitigations
- c. Environmental policies & programmes in India- Institutions & National Centres for Natural Disaster reduction, Environmental Legislations in India, Awareness, Conservation Movement, Education & training

### **Course Outcomes**

- Capacity to integrate knowledge and to analyse, evaluate and manage the different public health aspects of disaster events at a local and global levels.
- Capacity to describe, analyse and evaluate the environmental, social, cultural, economic, legal and organisational aspects influencing vulnerabilities and capacities to face disasters.
- Capacity to work theoretically and practically in the processes of disaster management (disaster risk reduction, response, and recovery) and relate their interconnections, particularly in the field of the Public Health aspects of the disasters.
- Capacity to manage the Public Health aspects of the disasters.
- Capacity to obtain, analyse, and communicate information on risks, relief needs and lessons learned from earlier disasters in order to formulate strategies for mitigation in future scenarios with the ability to clearly present and discuss their conclusions and the knowledge and arguments behind them.

### **TEXT BOOK:**

1. Disaster Mitigation: Experiences And Reflections by Pardeep Sahni

### **REFERENCES:**

1. R.B.Singh (Ed) Environmental Geography, Heritage Publishers New Delhi,1990
2. Kates,B.I & White, G.F The Environment as Hazards, oxford, New York, 1978
3. R.B. Singh (Ed) Disaster Management, Rawat Publication, New Delhi, 2000
4. H.K. Gupta (Ed) Disaster Management, Universiters Press, India, 2003
5. Dr. Satender , Disaster Management t in Hills, Concept Publishing Co., New Delhi, 2003
6. A.S. Arya Action Plan For Earthquake,Disaster, Mitigation in V.K. Sharma (Ed) Disaster Management IIPA Publication New Delhi, 1994
7. R.K. Bhandani An overview on Natural & Manmade Disaster & their Reduction, CSIR, New Delhi
8. M.C. Gupta Manuals on Natural Disaster management in India, National Centre for Disaster Management, IIPA, New Delhi, 2001

2013-17

CODE:302D2

MALLA REDDY ENGINEERING COLLEGE  
(Autonomous)

IV Year B.Tech EEE II-Sem

L	T/P/D	C
4	-/-/-	4

RELIABILITY ENGINEERING AND IT APPLICATIONS TO POWER SYSTEMS  
(Elective-III)

**Objective ;**

This subject deals with the basic of probability its theorem and extension to reliability and its analysis. The markov modeling plays a major role in control system applications so its evaluation models are also studied in terms of frequency and duration techniques.

**UNIT – I Basics of Probability theory & Distribution**

Basic probability theory – rules for combining probabilities of events – Bernoulli's trials – probabilities density and distribution functions – binomial distribution – expected value and standard deviation of binomial distribution.

**UNIT – II Network Modeling and Reliability Analysis & Reliability functions**

Analysis of Series, Parallel, Series-Parallel networks – complex networks – decomposition method.

Reliability functions  $f(t)$ ,  $F(t)$ ,  $R(t)$ ,  $h(t)$  and their relationships – exponential distribution – Expected value and standard deviation of exponential distribution – Bath tub curve – reliability analysis of series parallel networks using exponential distribution – reliability measures MTTF, MTTR, MTBF.

**UNIT – III Markov Modelling**

Markov chains – concept of stochastic transitional probability Matrix, Evaluation of limiting state Probabilities. – Markov processes one component repairable system – time dependent probability evaluation using Laplace transform approach – evaluation of limiting state probabilities using STPM – two component repairable models.

**UNIT – IV Frequency & Duration Techniques**

Frequency and duration concept – Evaluation of frequency of encountering state, mean cycletime, for one , two component repairable models – evaluation of cumulative probability and cumulative frequency of encountering of merged states.

**UNIT – V GENERATION SYSTEM , COMPOSITE SYSTEMS AND DISTRIBUTION SYSTEM  
RELIABILITY ANALYSIS**

Reliability model of a generation system– recursive relation for unit addition and removal – load modeling - Merging of generation load model – evaluation of transition rates for merged state model – cumulative Probability, cumulative frequency of failure evaluation – LOLP, LOLE.

**Reliability Analysis**

Decompositions method – Reliability Indices – Weather Effects on Transmission Lines.

**Distribution systems**

Basic Concepts – Evaluation of Basic and performance reliability indices of radial networks.

**TEXT BOOKS:**

1. Reliability Evaluation of Engg. System – R. Billinton, R.N.Allan, Plenum Press, New York, reprinted in India by B.S.Publications, 2007.
2. Reliability Evaluation of Power systems – R. Billinton, R.N.Allan, Pitman Advance Publishing Program, New York, reprinted in India by B.S.Publications, 2007.



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CODE:302D3

**MALLA REDDY ENGINEERING COLLEGE**  
(Autonomous)

IV Year B.Tech EEE II-Sem

L	T/P/D	C
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**LINEAR SYSTEMS ANALYSIS**  
(Elective-III)

**Objective ;**

This subject deals with types of analogous system and their classifications and mathematical modeling with different examples. This subject is extension to the control systems basics which already studied and also network theory. It highlights the importance of mathematical transforms like Fourier, Laplace and etc.

**UNIT-I ANALOGOUS SYSTEMS**

Analogous systems – Classifications of systems – linear, non linear , dynamic and static – time invariant systems – mechanical systems – translational and rotational systems dalembert's principle – force voltage analog – force current analog- mechanical coupling device – gears – mathematical representation – state variable representation simple problems

**UNIT – II STATE VARIABLE ANALYSIS**

Choice of state variables in Electrical networks-Formulation of state equations for Electrical networks-Equivalent source method. Network topological method - Solution of state equations-Analysis of simple networks with state variable approach.

**UNIT-III 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 – IV LAPLACE TRANSFORM APPLICATIONS**

Application of Laplace transform Methods of Analysis – Response of RL, RC, RLC Networks to Step, Ramp, and impulse functions, Shifting Theorem – Convolution Integral – Applications

Representation of non periodic functions - 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-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

Elements of reliability-Hurwitz polynomials-positive real functions-Properties-Testing-Sturm's Test, examples.

**TEXT BOOKS:**

1. Linear system analysis – A. Chang
2. Network analysis and synthesis – B C Kuo
3. 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 Design- Gopal G Bhisk & Umesh

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MALLA REDDY ENGINEERING COLLEGE

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IV Year B.Tech EEE II-Sem

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**ADVANCED CONTROL SYSTEMS**  
(Elective-IV)

**Objective ;**

This subject deals with the detailed introduction to stability in terms of controllability and observability, and different non-linear systems and their properties and their analysis with different methods like describing function, phase plane methods. It also deals with modal control with optimization and principles of variation in calculus.

**UNIT – I            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 form Jordan canonical form and other canonical forms.

**STABILITY ANALYSIS**

Stability in the sense of Lyapunov., Lyapunov's stability and Lyapunov's instability theorems. Direct method of Lyapunov for the Linear and Nonlinear continuous time autonomous systems.

**UNIT – II            DESCRIBING FUNCTION ANALYSIS**

Introduction to nonlinear systems, Types of nonlinearities, describing functions, describing function analysis of nonlinear control systems.

**UNIT – III PHASE-PLANE ANALYSIS**

Introduction to phase-plane analysis, Method of Isoclines for Constructing Trajectories, singular points, phase-plane analysis of nonlinear control systems.

**UNIT - IV            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 –V            OPTIMAL CONTROL AND CALCULUS OF VARIATIONS**

Formulation of optimal control problem. Minimum time, Minimum energy, minimum fuel problems. State regulator problem. Output regulator problem. Tracking problem, Continuous-Time Linear Regulators.

**CALCULUS OF VARIATIONS**

Minimization of functionals of single function, Constrained minimization. Minimum principle. Control variable inequality constraints. Control and state variable inequality constraints. Euler Lagrange Equation

**TEXT BOOKS:**

1. Modern Control System Theory – by M. Gopal, New Age International Publishers, 2<sup>nd</sup> edition, 1996

**REFERENCE BOOKS:**

1. Modern Control Engineering – by K. Ogata, Prentice Hall of India, 3<sup>rd</sup> edition, 1998
2. Control Systems Engineering by I.J. Nagarith and M.Gopal, New Age International (P) Ltd.
3. Digital Control and State Variable Methods – by M. Gopal, Tata Mc Graw-Hill Companies, 1997.
4. Systems and Control by Stainslaw H. Zak , Oxford Press, 2003.

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MALLA REDDY ENGINEERING COLLEGE  
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CODE:302E2

IV Year B.Tech EEE II-Sem

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EHV AC TRANSMISSION  
(Elective-IV)

**Objective ;**

This subject deals with the necessity of EHV AC transmission and modes of propagation with examples. It also discussed with corona effects, voltage control and travelling wave theory.

**Unit – I: Preliminaries:**

Necessity of EHV AC transmission – advantages and problems–power handling capacity and line losses-mechanical considerations – resistance of conductors – properties of bundled conductors – bundle spacing and bundle radius- Examples.

**Line and ground reactive parameters:**

Line inductance and capacitances – sequence inductances and capacitances – modes of propagation – ground return – Examples

**Unit – II: Voltage gradients of conductors:**

Electrostatics – field of sphere gap – field of line charges and properties – charge – potential relations for multi-conductors – surface voltage gradient on conductors – distribution of voltage gradient on sub-conductors of bundle – Examples.

**Unit – III: Corona effects – I:**

Power loss and audible noise (AN) – corona loss formulae – charge voltage diagram – generation, characteristics - limits and measurements of AN – relation between 1-phase and 3-phase AN levels – Examples.

Radio interference (RI) - corona pulses generation, properties, limits – frequency spectrum – modes of propagation – excitation function – measurement of RI, RIV and excitation functions – Examples.

**Unit – IV: Electro static field AND Traveling wave theory**

Electrostatic field: calculation of electrostatic field of EHV/AC lines – effect on humans, animals and plants – electrostatic induction in unenergised circuit of double-circuit line – electromagnetic interference-Examples.

Traveling wave expression and solution- source of excitation- terminal conditions- open circuited and short-circuited end- reflection and refraction coefficients-Lumped parameters of distributed lines-generalized constants-No load voltage conditions and charging current.

**Unit –V: Voltage control:**

Power circle diagram and its use – voltage control using synchronous condensers – cascade connection of shunt and series compensation – sub synchronous resonance in series capacitor – compensated lines – static VAR compensating system.

**TEXT BOOKS:**

1. EHVAC Transmission Engineering by R. D. Begamudre, New Age International (p) Ltd.
2. HVAC and DC Transmission by S. Rao

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MALLA REDDY ENGINEERING COLLEGE  
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CODE:302E3

IV Year B.Tech EEE II-Sem

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INTRODUCTION TO NANOTECHNOLOGY  
(Elective-IV)

**Objective ;**

This subject deals with the detailed introduction to nano materials and its technology. In addition the different nano techniques and their characterization with applications are also discussed.

**UNIT-I: Introduction to nanotechnology:**

Importance of nanoscale, Nanostructure types, electronic, magnetic, optical properties of Nanomaterials, top-down and bottom-up approach to nanostructures.

**Quantum Mechanical phenomenon in nanostructures:**

Quantum confinement of electrons in semiconductor nano structures, one dimensional confinement (Quantum wires),two dimensional confinements (Quantum wells), three dimensional confinements (Quantum dots).

**UNIT-II: Carbon Nano Structures:**

Carbon nanotubes (CNTs), Fullerenes, C60, C80 and C240 Nanostructures, properties (mechanical, optical and electrical) and applications.

**Fabrication of Nanomaterials:**

Physical Methods: Inert gas condensation, Arc discharge, RF plasma, Plasma arc technique, Ion sputtering, Laser ablation, Laser prolysis, Molecular beam epitaxy, chemical vapour deposition method.

**UNIT-III: Nano scale characterization techniques:**

Scanning probe techniques (AFM, MFM,STM,SEM,TEM), XRD.

**Nanodevices and Nanomedicine:**

Lab on chip for bioanalysis, core/Shell Nanoparticles in drug delivery system I(site specific and targeted drug delivery), cancer treatment, and bone tissue treatment.

**UNIT-IV: Nano and molecular electronics:**

Resonant-Tunneling structures, single electron tunneling, single Electron transistors, coulomb blockade, giant magneto resistance, tunneling magneto resistance.

**UNIT-V: Nanolithography and Nanomanipulation:**

e-beam lithography and SEM based nanolithography and nanomanipulation, Ion beam lithography, oxidation and metallization. Mask and its application, Deep UV lithography, X-ray based lithography.

**TEXT BOOKS:**

1. Charles,p.pode, Introduction to nanotechnology, Springer publications.
2. Spring Handbook of Nanotechnology – Bharat Bhusan.
3. Phani kumar, principles of nanotechnology, scitech publications.

## **REFERENCES BOOKS:**

1. David Ferry "Transport in Nano structures" Cambridge University press 2000.
2. Nan biotechnology; ed.C.M.Niemeyer,C.A.Mirkin.
3. Nanofabrication towards biomedical application: Techniques, tools, Application and impact – Ed.Challa S., S.R.Kumar, J.H.Carola.
4. Encyclopedia od Nanotechnology-Hari singh Nalwa.
5. Carbon Nanotubes: Properties and Applications – Michael J.O'Connell.
6. S.Dutta "Electron Transport in Mesoscopic systems" Cambridge University press.
7. H.Grabert and M.Devoret "Single charge Tunneling " Plenum press 1992.

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MALLA REDDY ENGINEERING COLLEGE  
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IV Year B.Tech EEE II-Sem

L	T/P/D	C
4	-/-/-	4

Electrical Power Quality  
(Elective-IV)

**Objective ;**

This subject deals with the definition of power quality and types of power quality and their issues and solutions. It also discussed some of the power quality problems like interruptions, voltage sag and swells with their reliability evaluation .

**Unit 1: introduction:**

Introduction of the power quality problem, terms used in PQ: voltage, sag, swell, surges, Harmonics, over voltages, spikes, voltage fluctuations, transients, interruption, overview of power quality phenomenon. Remedies to improve power quality, power quality monitoring.

**Unit II: Interruptions**

Interruptions-definition-difference between failure, outage, interruptions-causes of long interruptions origin of interruptions-limits for the interruption frequency-limits for the interruption duration-costs of interruption-overview of reliability evaluation to power quality, comparison of observations and reliability evaluation.

Short interruptions-definitions, origin of short interruptions, basic principle, fuse saving, voltage magnitude events due to re-closing , voltage during the interruption, monitoring of short interruptions , difference between medium and low voltage systems, multiple events, single phase tripping-voltage and current during fault period, voltage and current at post fault period, stochastic prediction of short interruptions.

**Unit III: Voltage sag-characterization**

Voltage sag-definition, causes of voltage sag, voltage sag magnitude, monitoring theoretical calculation of voltage sag magnitude, voltage sag calculation in non-radial systems meshed systems. Voltage sag duration.

Three phase faults, phase angle jumps, magnitude and phase angle for three phase unbalanced sags. Load influence on voltage sags.

**Unit IV: PQ consideration in industrial power systems:**

Voltage sag-equipment behavior of power electronic loads, induction motors , synchronous motors, computers, consumer electronics adjustable speed AC drives and its operation. Mitigation of AC drives, adjustable speed DC drives and its operation, mitigation methods of DC drives.



**Unit V: mitigation of interruptions and voltage sags:**

Overview of mitigation methods-from fault trip, reducing the number of faults, reducing the fault clearing time changing the power system, installing mitigation equipment, improving equipment immunity, different events and mitigation methods. System equipment interface-voltage source converter, series voltage controller, shunt controller, combined shunt and series controller.

Power quality and EMC standards:

Introduction to standardization, IEC electromagnetic compatibility standards, European voltage characteristics standards, PO surveys.

**TEXT BOOK:**

1. "Understanding power quality problems" by math H J Bollen. IEEE press.

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MALLA REDDY ENGINEERING COLLEGE  
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Code: 30225

IV Year B.Tech. EEE II –Sem

INDUSTRY ORIENTED MINI PROJECT

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2013-17

MALLA REDDY ENGINEERING COLLEGE  
(Autonomous)

Code: 30226

IV Year B.Tech. EEE. II –Sem

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MALLA REDDY ENGINEERING COLLEGE  
(Autonomous)

Code: 30227

IV Year B.Tech. EEE. II –Sem

PROJECT

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2013-17

MALLA REDDY ENGINEERING COLLEGE  
(Autonomous)

Code: 30228

IV Year B.Tech. EEE II –Sem

COMPREHENSIVE VIVA

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