MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

Sponsored by CMR Educational Society

(Affiliated to JNTU, Hyderabad, Approved by AICTE - Accredited by NBA & NAAC – 'A' Grade - ISO 9001:2015 Certified)

Maisammaguda, Dhulapally (Post Via. Kompally), Secunderabad – 500100, Telangana State, India.

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BACHELOR OF TECHNOLOGY

UNDERGRADUATE PROGRAM

ACADEMIC REGULATIONS

(Batches admitted from the academic year 2024 - 25)

Note: The regulations hereunder are subject to amendments as may be made by the Academic Council of the College from time to time. Any or all such amendments will be effective from such date and to such batches of candidates (including those already pursuing the program) as may be decided by the Academic Council.

PRELIMINARY DEFINITIONS AND NOMENCLATURES

- ” Autonomous Institution /College” means an institution/college designated as autonomous institute / college by University Grants Commission (UGC), as per the UGC Autonomous College Statutes.
- “Academic Autonomy” means freedom to the College in all aspects of conducting its academic programs, granted by the University for promoting excellence.
- “Commission” means University Grants Commission.
- “AICTE” means All India Council for Technical Education.
- “University” the Jawaharlal Nehru Technological University, Hyderabad.
- “College” means Malla Reddy College of Engineering & Technology, Secunderabad unless indicated otherwise by the context.
- “Program” means:
  - Bachelor of Technology (B.Tech) degree program
  - UG Degree Program: B.Tech
- “Branch” means specialization in a program like B.Tech degree program in Electronics & Communication Engineering, B.Tech degree program in Computer Science and Engineering etc.
- “Course” or “Subject” means a theory or practical subject, identified by its course – number and course-title, which is normally studied in a semester.
- T–Tutorial, P–Practical, D–Drawing, L-Theory, C-Credits

FOREWORD

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

Malla Reddy College of Engineering & Technology (MRCET) is proud to win the credence of all the above bodies monitoring the quality of education and has gladly accepted the responsibility of sustaining, and also improving upon the values and beliefs for which it has been striving for more than a decade in reaching its present standing in the arena of contemporary technical education. As a follow up, statutory bodies like Academic Council and Boards of Studies are constituted with the guidance of the Governing Body of the College and recommendations of the JNTUH Hyderabad to frame the regulations, course structure and syllabi under autonomous status.

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

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

"A thought beyond the horizons of success committed for educational excellence"

PRINCIPAL

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

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VISION

- To establish a pedestal for the integral innovation, team spirit, originality and competence in the students, expose them to face the global challenges and become technology leaders of Indian vision of modern society.

MISSION

- To become a model institution in the fields of Engineering, Technology and Management.
- To impart holistic education to the students to render them as industry ready engineers.
- To ensure synchronization of MRCET ideologies with challenging demands of International Pioneering Organizations.

QUALITY POLICY

- To implement best practices in Teaching and Learning process for both UG and PG courses meticulously.
- To provide state of art infrastructure and expertise to impart quality education.
- To groom the students to become intellectually creative and professionally competitive.
- To channelize the activities and tune them in heights of commitment and sincerity, the requisites to claim the never - ending ladder of **SUCCESS** year after year.

For more information: www.mrcet.ac.in

Graduates Attributes (GAs) as per NBA

1. Engineering Knowledge: Apply knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.

2. Problem Analysis: Identify, formulate, research literature and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.

3. Design/ Development of Solutions: Design solutions for complex engineering problems and design system components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal and environmental considerations.

4. Conduct investigations of complex problems using research-based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of information to provide valid conclusions.

5. Modern Tool Usage: Create, select and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. The Engineer and Society: Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice.

7. Environment and Sustainability: Understand the impact of professional engineering solutions in societal and environmental contexts and demonstrate knowledge of and need for sustainable development.

8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.

9. Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings.

10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations and give and receive clear instructions.

11. Project Management and Finance: Demonstrate knowledge and understanding of engineering and management principles and apply these to one‟s own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. Life-long Learning: Recognize the need for and have the preparation and ability to Engage in independent and life- long learning in the broadest context of technological Change.

ENGINEERING
GRADUATE

R24 ACADEMIC REGULATIONS FOR B. TECH (REGULAR)

Applicable for the students of B. Tech. (Regular) from the Academic Year 2024-25 and onwards.
The college affiliating to JNTUH, Hyderabad offers a 4-year (8 semesters) Bachelor of Technology (B.Tech.) degree programme, under Choice Based Credit System (CBCS) for the following branches of Engineering.

1.0 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 160 credits and secure 160 credits (With CGPA ≥ 5.0)

1.4 In addition to 1.3, the candidate has to register for Mandatory courses (Non-credit course) in which 50% of scoring is required for the award of the degree.

2.0 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.

3.0 Courses of study

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

S.No	Department	Department Code
01	Aeronautical Engineering	21xx
02	Computer Science Engineering	05xx
03	Computer Science Engineering (AIML)	66xx
04	Computer Science Engineering (DS)	67xx
05	Computer Science Engineering (CS)	62xx
06	Electronics & Communication Engineering	04xx
07	Mechanical Engineering	03xx
08	Electrical and Electronics Engineering	02xx

4.0 Credits

Particulars	Semester	
	* Periods perweek	Credits
Theory	04	04
	03	03
Practical	02	01
Drawing (Theory)	02	02
Drawing (Practical)	02	01
Industry Oriented Mini Project	04	02
Application Development	04	02
Project Phase-I	06	03
Project Phase-II	20	10

***Duration of each period is 60 minutes.**

5.0 Distribution and Weightage of Marks

5.1 The performance of a student in each semester shall be evaluated subject-wise for a maximum of 100 marks for a theory and 100 marks for a practical subject. In addition, Industry Oriented Mini Project and Major Project work shall be evaluated for 100 and 300 marks, respectively.

5.2 For theory subjects the distribution shall be 40 marks for Internal Evaluation and 60 marks for the End-Examination. For theory subjects, during a semester there shall be 2 mid-term examinations. Each mid- term examination consists of i) **Part – A** for 10 marks, ii) **Part – B** for 20 marks with a total duration of 2 hours as follows:

1. Mid_Term Examination for 30 marks:
   a. Part - A : Objective/quiz paper for 10 marks.
   b. Part – B : Descriptive paper for 20 marks.

The remaining 10 marks of Continuous Internal Assessment (out of 40) are distributed for Assignment/Subject Viva-Voce/Seminar/Case Study on a topic in the concerned subject.

The first 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. While the first mid-term examination shall be conducted from 1 to 2.5 units of the syllabus, the second mid-term examination shall be conducted from the remaining units. The total marks secured by the student in each mid-term examination are evaluated for 30 marks and the average of the two mid-term examinations shall be taken as the final marks secured by each candidate.

However, if any student is absent/scoring internal marks less than 35% in any subject of a mid-term examination he/she will be given a chance to write the internal exam once again after he/she re-registering for the internal exam in the concerned subject and paying stipulated fees as per the norms.

The end examination will be conducted for 60 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 and each question carrying 12 marks.

5.3 For practical subjects, there shall be a continuous evaluation during a semester for 40 sessional marks and 60 end semester examination marks. Out of the 40 marks for internal evaluation,

1. A write-up on day-to-day experiment in the laboratory (in terms of aim, components/procedure, expected outcome) which shall be evaluated for 15 marks
2. 5 marks for viva-voce **(**or) tutorial (or) case study (or) application (or) poster presentation of the course concerned.
3. Internal practical examination conducted by the laboratory teacher concerned shall beevaluated for 20 marks.
4. The Internal marks shall be evaluated after completion of laboratory course and before semester end practical examination.

The Semester End Examination for 60 marks shall be conducted with an external examiner and the laboratory teacher. The external examiner shall be appointed from the cluster / other colleges which will be decided by the examination branch of the Institution on par with the affiliating University.

There shall be two internal lab examinations in a Semester and theaverage of the two shall be considered for the award of marks for internal evaluation.

For the subject having design and/or drawing, (such as Engineering Graphics, Engineering Drawing, Machine Drawing) and Estimation, the distribution shall be 40 marks for internal evaluation (20 marks for day-to-day work and 20 marks for internal tests) and 60marks for end semester examination. There shall be two internal tests in a Semester and theaverage of the two shall be considered for the award of marks for internal tests.

5.4 There shall be an Industry Oriented Project to be taken in II-year II Semester examination which carries 2 credits. The Mini Project shall be submitted in a report form and presented before the committee. It shall be evaluated for 100 marks out of which 40 marks for Internal and 60 marks External evaluation. 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.

5.5 Out of a total of 300 marks for the Major Project work which is implemented in two phases i.e., Project I and Project II out of which Project I has to be implemented in IV Year I Semester for which 100 marks shall be allotted. Out of the 100 marks, 40 marks for Internal and 60 marks for External evaluation. Project I shall carry 3 credits and the Internal evaluation shall be on the basis of one seminar given by each student on the topic of his/her project.

5.6 Project II has to be implemented in IV Year II Semester for which 200 marks shall be allotted. Out of the 200 marks, 80 marks are for Internal and 120 marks are for External evaluation. The End Semester Examination of the Major Project work shall be conducted by the same committee as appointed for the Project I. In addition, the project supervisor shall

also be included in the committee. 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/her project.

5.7 The Laboratory marks and the sessional marks awarded by the College are subject to scrutiny and scaling by the college wherever necessary. In such cases, the sessional and laboratory marks awarded by the College will be referred to College Academic Committee. The College Academic Committee will arrive at a scaling factor and the marks will be scaled accordingly. The recommendations of the College Academic Committee are final and binding. The laboratory records andinternal test papers shall be preserved in the College as per the Affiliation University rules and produced before the Committees/Academic Council as and when asked for.

6.0 Attendance Requirements

6.1 A student is eligible to write the University examinations only if he acquires a minimum of 75% of attendance in aggregate of all the subjects.

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

6.3 Shortage of Attendance below 65% in aggregate shall not be condoned.

6.4 A student who is short of attendance in semester may seek re-admission into that semester 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 are not eligible to write their end semester examination of that class and their registration stands cancelled.

6.6 A stipulated fee as determined by the examination branch shall be payable towards condonation of shortage of attendance.

6.7 A student will be promoted to the next semester if he/she satisfies the attendance requirement of the present semester, as applicable, including the days of attendance in sports, games, NCC and NSS activities.

6.8 The candidate fulfills the attendance requirement in the present semester, he/she shall not be permitted for readmission into the same class.

7. Course Registration:

7.1 Every student has to register for a set of Courses in each Semester, with the total number of their Credits being limited by considering the permissible weekly Contact Hours (typically: 30/Week); For this, an average Course Registration of minimum 15 Credits/Semester (e.g., 6-7 Courses) and a maximum of 24 credits are generally acceptable on recommendation of concerned academic advisor by satisfying the pre-requisite conditions.

7.2 Approval of the Course Registration will be informed by the concerned Head of the Department on the beginning of the semester by taking the number of students registered (minimum **one-third** students per class) and availability of the faculty into consideration.

7.3 Dropping of the Course Registration can be permitted up to two weeks from the commencement of the semester. Thereafter no droppings are permitted.

7.4 Interchanging of Course Registrations are not permitted.

7.5 The Pre-requisite conditions for the additional course(s) registration by the students are based on the slots available in the Time Table, Class rooms and Faculty availability.

8.0 Minimum Academic Requirements

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

8.1 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 mid examination (rounded to 14 marks out of 40 marks) and also not less than 35% in end semester examination and minimum 40% of marks in the sum total of the mid-term and end semester exams put together.

8.2 A student will be eligible to be promoted from I year to II year, upon fulfilling the academic requirements of 50 % credits up to I year II semester examinations and secures prescribed minimum attendance in I year.

8.3 A student will be eligible to be promoted from II year to III year, upon fulfilling the academic requirements of 50 % credits up to II year II semester examinations and secures prescribed minimum attendance in II year.

8.4 A student will be eligible to be promoted from III year to IV year, upon fulfilling the academic requirements of 50 % credits up to III year II semester examinations and secures prescribed minimum attendance in III year.

8.5 A student shall register and put up minimum attendance in all 160 credits and shall earn total 160 credits for the award of B.Tech degree. Further, marks obtained in the 160 credits shall be considered for the calculation of percentage of marks as well as overall CGPA.

8.6 Students who fail to earn 160 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.

9.0 Course pattern

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

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

9.3 When a student is detained for lack of credits/shortage of attendance, he/she will not be promoted to the next semester for that particular academic year. However, the academic regulations under which he was first admitted shall continue to be applicable to him.

10.0 Grading Procedure

10.1 Marks will be awarded to indicate the performance of student in each theory subject, laboratory/practicals, seminar, UG mini project and UG major project. Based on the percentage of marks obtained (Continuous Internal Evaluation plus

Semester End Examination, both taken grade together) as specified in item 8 above, a corresponding letter shall be given.

10.2 As a measure of the performance of student, a 10-point absolute grading system using the following letter grades (as per UGC/AICTE guidelines) and corresponding percentage of marks shall be followed.

10.3 Letter Grades and Grade Points:

The UGC recommends a 10-point grading system with the following letter grades as given below:

Letter Grade	Points	% of Marks secured in a subject or course (Class Intervals)
O (Outstanding)	10	Greater than or equal to 90
A+(Excellent)	9	80 and less than 90
A(Very Good)	8	70 and less than 80
B+(Good)	7	60 and less than 70
B(Average)	6	50 and less than 60
C(Pass)	5	40 and less than 50
F(Fail)	0	Below 40
Ab (Absent)	0	-

A student obtaining Grade F shall be considered failed and will be required to reappear in the examination

10.4 Computation of SGPA and CGPA

The UGC recommends the following procedure to compute the Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA):

Credit points (CP) = grade point (GP) x credits …. For a course

i. The SGPA is the ratio of sum of the product of the number of credits with the grade points scored by a student in all the courses taken by a student and the sum of the number of credits of all the courses undergone by a student, i.e

$$SGPA\ (Si) = \Sigma(Ci \times Gi) / \Sigma Ci$$

where Ci is the number of credits of the ith course and Gi is the grade point scored by the student in the ith course.

ii. The CGPA is also calculated in the same manner taking into account all the courses undergone by a student over all the semesters of a programme, i.e.

$$CGPA = \Sigma(Ci \times Si) / \Sigma Ci$$

where Si is the SGPA of the ith semester and Ci is the total number of credits in that semester.

iii. The SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts.

10.5. A student obtaining 'F' grade in any subject shall be deemed to have 'failed' and is required to reappear as a 'supplementary student' in the semester end examination, as and when offered. In such cases, internal marks in those subjects will remain the same as those obtained earlier.

10.6 A student who has not appeared for examination in any subject '**Ab'** grade will be allocated in that subject, and student shall be considered **'failed'**. Student will be required to reappear as a 'supplementary student' in the semester end examination, as and when offered.

10.7 A letter grade does not indicate any specific percentage of marks secured by the student, but it indicates only the range of percentage of marks.

10.8 A student earns grade point (GP) in each subject/ course, on the basis of the letter grade secured in that subject/ course. The corresponding 'credit points' (CP) are computed by multiplying the grade point with credits for that particular subject/ course.

Credit points (CP) = grade point (GP) x credits …. For a course

10.9 The student passes the subject/ course only when **GP ≥ 5 ('C' grade or above)**

Illustration of calculation of SGPA

Course/Subject	Credits	Letter Grade	Grade Points	Credit Points
Course 1	4	A	8	4 x 8 = 32
Course 2	4	O	10	4 x 10 = 40
Course 3	4	C	5	4 x 5 = 20
Course 4	3	B	6	3 x 6 = 18
Course 5	3	A+	9	3 x 9 = 27
Course 6	3	C	5	3 x 5 = 15
	21			152

SGPA = 152/21 = 7.24

Illustration of calculation of CGPA:

Course/Subject	Credits	Letter Grade	Grade Points	Credit Points
I Year I Semester				
Course 1	4	A	8	4 x 8 = 32
Course 2	4	A+	9	4 x 9 = 36
Course 3	4	B	6	4 x 6 = 24
Course 4	3	O	10	3 x 10 = 30
Course 5	3	B+	7	3 x 7 = 21
Course 6	3	A	8	3 x 8 = 24

I Year II Semester				
Course 7	4	B+	7	4 x 7 = 28
Course 8	4	O	10	4 x 10 = 40
Course 9	4	A	8	4 x 8 = 32
Course 10	3	B	6	3 x 6 = 18
Course 11	3	C	5	3 x 5 = 15
Course 12	3	A+	9	3 x 9 = 27
	Total Credits = 42			Total Credit Points = 327

CGPA = 327/42 = 7.79

10.10 For merit ranking or comparison purposes or any other listing, **only** the **'rounded off'** values of the CGPAs will be used.

10.11 For calculations listed in regulations 10.4 to 10.9, performance in failed subjects/ courses (securing **F** grade) will also be taken into account, and the credits of such subjects/courses will also be included in the multiplications and summations. After passing the failed subject(s) newly secured letter grades will be taken into account for calculation of SGPA and CGPA. However, mandatory courses will not be taken into consideration.

11.0 Passing standards

11.1 Student shall be declared successful or 'passed' in a semester, if student secures a GP ≥ 5 ('C' grade or above) in every subject/course in that semester (i.e. when student gets an SGPA ≥ 5.00 at the end of that particular semester); and a student shall be declared successful or 'passed' in the entire under graduate programme, only when gets a CGPA ≥ 5.00 for the award of the degree as required.

11.2 After the completion of each semester, a grade card or grade sheet (or transcript) shall be issued to all the registered students of that semester, indicating the letter grades and credits earned. It will show the details of the courses registered (course code, title, no. of credits, and grade earned etc.), credits earned, SGPA, and CGPA.

12.0 Declaration of results

12.1 Computation of SGPA and CGPA are done using the procedure listed in 10.4 to 10.9.

12.2 For final percentage of formula marks equivalent to the computed final CGPA, the following formula maybe used.

% of Marks = (final CGPA – 0.5) x 10

13.0 Award of Degree

In assessing the performance of the students in examinations, the usual approach is to award marks based on the examinations conducted at various stages (sessional, mid-term, end-semester etc.,) in a semester. As per UGC Autonomous guidelines, the following system is implemented in awarding the grades and CGPA under the **Choice Based Credit System (CBCS).**

13.1 A student shall register and put up minimum attendance in all 160 credits and shall earn a total of 160 credits for the award of B.Tech degree. Further, marks obtained in the 160 credits shall be considered for the calculation of percentage of marks as well as overall CGPA ≥ 5.0, within 8 academic years from the date of commencement of the first academic year, shall be declared to have **'qualified'** for the award of the B.Tech. Degree in the chosen branch of Engineering as selected at the time of admission.

13.2 A student who qualifies for the award of the degree as listed in 13.1 shall be placed in the following classes.

13.3 Students with final CGPA (at the end of the under graduate programme) ≥ 7.50, and shall be placed in **'First class with Distinction'**.

13.4 Students with final CGPA (at the end of the under graduate programme) ≥ 6.50 but < 7.50, shall be placed in **'First class'**.

13.5 Students with final CGPA (at the end of the under graduate programme) ≥ 5.50 but < 6.50, shall be placed in **'Second class'.**

13.6 All the other students who qualify for the award of the degree (as per item 13.1), with final CGPA (at the end of the under graduate programme) ≥ 5.00 but < 5.50, shall be placed in **'pass class'** provided they secure a total of 160 credits.

13.7 A student with final CGPA (at the end of the under graduate programme) < 5.00 will not be eligible for the award of the degree.

13.8 Students fulfilling the conditions listed under item 13.3 alone will be eligible for award of **'University Rank'** and **'Gold Medal'.**

13.9 Award of 2-Year UG Diploma Certificate

i. **A student is awarded 2-Year UG Diploma Certificate in the concerned engineering branch on completion of all the academic requirements and earned all the 80 credits (within 4 years from the date of admission) up to B. Tech II Year – II Semester, if the student want to exit the 4-Year B. Tech. program. The student once opted and awarded for 2-Year UG Diploma Certificate, the student will not be permitted to join in B. Tech. III Year – I Semester and continue for completion of remaining years of study for 4-Year B. Tech. Degree.**

14.0 Withholding of results

14.1 If the student has not paid the fees to the university/ college at any stage, or has dues pending due to any reason whatsoever, or if any case of indiscipline is pending, the result of the student may be withheld, and student will not be allowed to go into the next higher semester. The award or issue of the degree may also be withheld in such cases.

15.0 Transitory regulations.

15.1 A student who has discontinued for any reason, or has been detained for want of attendance or lack of required credits as specified, or who has failed after having undergone the degree programme, may be considered eligible for readmission to the same subjects/ courses (or equivalent subjects/ courses, as the case may be), and same professional electives/ open electives (or from set/category of electives or equivalents suggested, as the case may be) as and when they are offered (within the time-frame of 8 years from the date of commencement of student's first year first semester).

15.2 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.

15.3 In case of transferred students from other Universities, the credits shall be transferred to JNTUH as per the academic regulations and course structure of the MRCET.

The students seeking transfer to colleges affiliated to JNTUH from various other Universities/Institutions, have to pass the failed subjects which are equivalent to the subjects of prescribed curriculum of the institute, and also pass the subjects of prescribed curriculum of the institute 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 prescribed curriculum of the institute, the candidates have to study those subjects in prescribed curriculum of the institute in spite of the fact that those subjects are repeated.

16 Minimum Instruction Days

The minimum instruction days for each semester shall be 90 days.

17.0 General

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

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

17.3 In case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Principal is final.

17.4 The regulations hereunder are subject to amendments as may be made by the Academic Council of the College from time to time. Any or all such amendments will be effective from such date and to such batches of candidates (including those already pursuing the program) as may be decided by the Academic Council.

18.0 Scope

18.1 The academic regulations should be read as a whole, for the purpose of any interpretation.

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

18.3 The college may change or amend the academic regulations, course structure or syllabi at any time, and the changes or amendments made shall be applicable to all students with effect from the date notified by the academic senate of the college.

Academic Regulations for B.Tech. (Lateral Entry Scheme) w.e.f the AY 2024-25

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

The LES students after securing admission shall pursue a course of study for not less than three academic years and not more than six academic years.

2. The student shall register for 120 credits and secure total 120 credits with CGPA ≥ 5.0 from II year to IV year B.Tech. programme (LES) for the award of B.Tech. degree.

3. The students, who fail to fulfill the requirement for the award of the degree in six academic years from the year of admission, shall forfeit their seat in B.Tech.

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

5. Promotion rule

5.1 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 mid examination (rounded to 14 marks out of 40 marks) and also not less than 35% in end semester examination and minimum 40% of marks in the sum total of the mid-term and end semester exams put together.

5.2 A student will be eligible to be promoted from II year to III year, upon fulfilling the academic requirements of 50 % credits up to II-year II semester examinations and secures prescribed minimum attendance in II year.

5.3 A student will be eligible to be promoted from III year to IV year, upon fulfilling the academic requirements of 50 % credits up to III-year II semester examinations and secures prescribed minimum attendance in III year.

6. All the other regulations as applicable to B. Tech. 4-year degree course (Regular) will hold good for B. Tech. (Lateral Entry Scheme). LES Students are not eligible for 2 Year UG Diploma Certificate.

MALPRACTICES RULES

DISCIPLINARY ACTION FOR IMPROPER CONDUCT IN EXAMINATIONS

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

		appeared and shall not be allowed to appear for examinations of the remaining subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. If the imposter is an outsider, he will be handed over to the police and a case is registered against him.
4.	Smuggles in the Answer book or additional sheet or takes out or arranges to send out the question paper during the examination or answer book or additional sheet, during or after the examination.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
5.	Using objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.	Cancellation of the performance in that subject.
6.	Refuses to obey the orders of the Chief Superintendent/Assistant Superintendent / any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walk out or instigates others to walk out, or threatens the officer-in charge or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs or	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

	by visible representation, assaults the officer-incharge, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which result in damage to or destruction of property in the examination hall or any part of the College campus or engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	semester/year. The candidates also are debarred and forfeit their seats. In case of outsiders, they will be handed over to the police and a police case is registered against them.
7.	Leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the examination hall.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
8.	Possess any lethal weapon or firearm in the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat.
9.	If student of the college, who is not a candidate for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to 8.	Student of the colleges expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including

		practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat. Person(s) who do not belong to the College will be handed over to police and, a police case will be registered against them.
10.	Comes in a drunken condition to the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/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 University 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.

* * * * *

VISION

To strengthen the department into a center of academic excellence with focus on advanced technology and research by delivering the best quality technical education to the students in meeting the current and future challenges with emphasis on moral and ethical foundation

MISSION

- To create and enrich academic environment with essential resources, so as to train and mould students to promote active learning, critical thinking with innovative ideas to solve real-world problems in the field of Electrical Engineering.
- To motivate and strengthen faculty to practice effective teaching learning process and advanced research and publication work.
- To enhance industry interaction and initiate best consultancy services.

QUALITY POLICY

- Ensure high standards in teaching and learning to provide students with a comprehensive and up-to-date education in electrical and electronics engineering.
- Involve industry partners, alumni, and other stake holders in the development and evaluation of programs to ensure they meet current and future industry needs.
- To consistently embrace and carryout faculty development programs that contributes to achieving the institution's goals and objectives.

PROGRAM EDUCATIONAL OBJECTIVES

PEO1: Excellence in Career

To provide students with in-depth knowledge in the fundamental and advanced areas of electrical and electronics engineering and there by excel in professional career and higher education

PEO2: Development of Research and Industry Interaction

To train students in the software/hardware design of electrical systems and promote the development of research activity as well as interaction with the industry.

PEO3: Professional and Ethical Attitude

To inculcate professional and ethical attitude in students and enhance the ability to relate engineering issues to broader social context.

PROGRAM SPECIFIC OBJECTIVES

PSO1: To make students strong in core and advanced subjects of electrical and electronics engineering by which they can excel in their future endeavors.

PSO2: To make students exposed to latest simulation tools of electrical systems and provide a sense of direction towards research and industry interaction.

PSO3: To make the students handle social related engineering issues without deviating from professional and ethical values.

PROGRAM OUTCOMES

Engineering Graduates should possess the following:

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

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

B TECH ELECTRICAL & ELECTRONICS ENGINEERING- COURSE STRUCTURE

I Year B. Tech – I Semester

S.No	Subject Code	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R24A0023	Linear Algebra and Ordinary Differential Equations	3	1	0	4	40	60
2	R24A0201	Principles of Electrical and Electronics Engineering	3	1	0	4	40	60
3	R24A0022	Engineering Chemistry	3	0	0	3	40	60
4	R24A0501	Programming for Problem Solving	3	0	0	3	40	60
5	R24A0083	Engineering Chemistry Lab	-	0	3	1.5	40	60
6	R24A0582	Programming for Problem Solving Lab	-	0	3	1.5	40	60
7	R24A0281	Principles of Electrical and Electronics Engineering	-	0	3	1.5	40	60
8	R24A0084	Engineering and Computing Hardware Workshop	-	0	3	1.5	40	60
9	R24A0003	Human Values and Professional Ethics	2	0	0	0	100	-
		Total	**14**	**2**	**12**	**20**	**420**	**480**

I Year B. Tech – II Semester

S.No	Subject Code	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R24A0001	English for skill Enhancement	2	0	0	2	40	60
2	R24A0024	Numerical Methods and Vector Calculus	3	1	0	4	40	60
3	R24A0021	Applied Physics	3	1	0	4	40	60
4	R24A0301	Computer Aided Engineering Graphics	2	0	2	3	40	60
5	R24A0502	Data structures and Algorithms	3	0	0	3	40	60
6	R24A0081	English Language and Communication Skills Lab	-	0	2	1	40	60
7	R24A0082	Applied Physics Lab	-	0	3	1.5	40	60
8	R24A0582	Data structures and Algorithms Lab	-	0	3	1.5	40	60
9	R24A0004	Environmental Science	2	0	0	0	100	-
		Total	**15**	**2**	**11**	**20**	**420**	**480**

II Year B. Tech – I Semester

S.No	Subject Code	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R24A0025	Numerical Methods and Complex variables	3	1	0	**4**	40	60
2	R24A0202	Electrical Machines-I	3	1	0	**4**	40	60
3	R24A0204	Electrical Circuit Analysis	3	0	0	**3**	40	60
4	R24A0205	Power System-I	3	0	0	**3**	40	60
5	R24A0207	Electro Magnetic Fields	3	0	0	**3**	40	60
6	R24A0282	Electrical Machines Laboratory-I	0	0	2	**1**	40	60
7	R24A0284	Electrical Circuits Analysis Lab	0	0	2	**1**	40	60
8	R24A0285	Electrical Simulation tools Laboratory	0	0	2	**1**	40	60
9	*R24A0005	Foreign Language: French	0	0	2	**0**	100	-
		Total	15	2	8	**20**	**420**	**480**

***Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree**

II Year B. Tech – I Semester

S.No	Subject Code	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R24A0353	Solid Mechanics & Hydraulic Machines	3	0	0	**3**	40	60
2	R42A0208	Measurements and Instrumentation	3	0	0	**3**	40	60
3	R24A0203	Electrical Machines–II	3	0	0	**3**	40	60
4	R24A0461	Analog & Digital Electronics	3	0	0	**3**	40	60
5	R24A0206	Power System-II	3	0	0	**3**	40	60
6	R24A0471	Analog & Digital Electronics Laboratory	0	0	2	**1**	40	60
7	R24A0286	Measurements and Instrumentation Laboratory	0	0	2	**1**	40	60
8	R24A0283	Electrical Machines Laboratory- II	0	0	2	**1**	40	60
9	R24A0291	Real-time Research Project/ Field Based Project	0	0	4	**2**	40	60
10	*R24A0061	Public Policy and Governance	2	0	0	**0**	100	-
		Total	**17**	**0**	**10**	**20**	**460**	**540**

***Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree**

MALLA REDDY COLLEGE OF ENGINEERING ANDTECHNOLOGY

I Year B. TECH -I-SEM **L/T/P/ C**

3/1/0/ 4

(R24A0023) LINEAR ALGEBRA AND ORDINARY DIFFERENTIAL EQUATIONS

Course Objectives: To learn

1. The concept of a Rank of the matrix and applying the concept to know the consistency and solving the system of linear equations.
2. The concept of Eigen values, Eigen vectors and Diagonolisation.
3. The maxima and minima of functions of several variables.
4. The Applications of first order ordinary differential equations.
5. The methods to solve higher order differential equations.

UNIT I: Matrices **[10 hours]**

Introduction, Types of matrices, Rank of a matrix - Echelon form and Normal form, Consistency of system of linear equations (Homogeneous and Non-Homogeneous)-Gauss elimination method and LU Decomposition method.

UNIT II: Eigen values and Eigen vectors **[12 hours]**

Linear dependence and independence of vectors, Eigen values and Eigen vectors and their properties(without proof), Diagonalisation of a matrix. Cayley-Hamilton theorem(without proof), finding inverse and power of a matrix by Cayley-Hamilton Theorem; Quadratic forms and Nature of the Quadratic Forms; Reduction of Quadratic form to canonical forms by Orthogonal Transformation.

UNIT III: Multi Variable Calculus (Differentiation) **[10 hours]**

Functions of two variables-Limit, Continuity, Partial derivatives, Total differential and differentiability, Derivatives of composite and implicit functions, Jacobian-functional dependence and independence, Maxima and minima and saddle points, Method of Lagrange multipliers, Taylors theorem for two variables.

UNIT IV: First Order Ordinary Differential Equations **[12hours]**

Exact, Equations reducible to exact form, Applications of first order differential equations - Orthogonal Trajectories(Cartesian form),Newton's law of cooling, Law of natural growth and decay,.

UNIT V: Differential Equations of Higher Order **[11 hours]**

Linear differential equations of second and higher order with constant coefficients: Non-homogeneous term of the type f(x) = e^{ax}, sinax, cosax, x^n, e^{ax} V and x^n V - Method of variation of parameters.

Text Books:

i. Higher Engineering Mathematics by B V Ramana., Tata McGraw Hill.
ii. Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers.
iii. Advanced Engineering Mathematics by Kreyszig ,John Wiley & Sons .

Reference Books :

i. Advanced Engineering Mathematics by R.K Jain & S R K Iyenger, Narosa Publishers.
ii. Ordinary and Partial Differential Equations by M.D. Raisinghania, S.Chand Publishers
iii. Engineering Mathematics by N.P Bali and Manish Goyal.

Course Outcomes: After learning the concepts of this paper the student will be able to

1) Analyze the solution of the system of linear equations and to find the Eigen values and Eigen vectors of a matrix.
2) Reduce the quadratic form to canonical form using orthogonal transformations.
3) Find the extreme values of functions of two variables with / without constraints.
4) Solve first order, first degree differential equations and their applications.
5) Solve higher order differential equations.

MALLA REDDY COLLEGE OF ENGINEERING ANDTECHNOLOGY

I Year B. TECH -I-SEM **L/T/P/C**
3/1/0/4

(R24A0201) PRINCIPLES OF ELECTRICAL AND ELECTRONICS ENGINEERING

COURSEOBJECTIVES:

1. To understand the basic concepts of electrical circuits and analyze Circuits using Network Theorems.
2. To get overview of single phase A.C. Circuits.
3. To introduce the concept of DC Machines and Single-Phase Transformers.
4. To study the concepts of p-n diodes, rectifiers and Zener diodes.
5. To study the concepts of BJTs, JFET and MOSFETs.

UNIT – I: **INTRODUCTION TO ELECTRICAL CIRCUITS**:Concept of Circuit and Network, R-L-C Parameters, Ohms law and its limitations, Kirchhoff's Laws-KVL, KCL.
NETWORK ANALYSIS(D. C EXCITATION): Series and parallel connections of Resistive Networks, voltage division and current division, Mesh analysis, Nodal analysis.

UNIT–II: NETWORK THEOREMS: Thevenin's Theorem, Norton's Theorem and Superposition Theorem (for independent sources).
SINGLE PHASE A.C. CIRCUITS: Average value, R.M.S. value, Form factor and Peak factor for sinusoidal wave form. Concept of phase, Phasor representation of sinusoidal quantities, Phase difference, Active power, Reactive power and Apparent power. Sinusoidal response of pure R, pure L and pure C.

UNIT-III: MACHINES:
DC GENERATOR: Principle of operation and working, constructional features, basic concept of Lap and wave windings, emf equation.
DC MOTOR: Principle of operation, Back emf and its significance, torque equation-Gross torque and Shaft torque.
SINGLE PHASE TRANSFORMER: Principle of operation, emf equation, transformation ratio, problems on emf equation.

UNIT–IV:
P-N JUNCTION DIODE: P-N junction diode, symbol and forward biased and reverse biased conditions, V-I characteristics of P-N junction diode, Half wave, Full wave-Centre tap and Bridge rectifiers. **ZENER DIODE**: Symbol, construction, principle of operation and its applications.

UNIT–V:

BIPOLAR JUNCTION TRANSISTOR: Symbols, types, Construction and Principle of Operation of N-P-N and P-N-P transistors,Amplifying Action, Common Emitter, Common Base and Common Collector configurations.

JFET: Symbol, Construction, Principle of operation, and its Characterstics, MOSFET (Enhancement and Depletion mode): Symbol, Construction, Principle of Operation and its Characteristics.

TEXTBOOKS:

1. Engineering Circuit Analysis - William Hayt, Jack E. Kemmerly, S M Durbin, Mc GrawHill Companies.
2. Electric Circuits - A. Chakrabarhty, Dhanipat Rai & Sons.
3. Electrical Machines – P.S.Bimbra, Khanna Publishers.
4. "Electronic Devices & Circuits", Special Edition–MRCET, McGrawHillPublications,2017.
5. Integrated Electronics Analog Digital Circuits, Jacob Millman and D.Halkias, Mc GrawHill.
6. Electronic Devices and Circuits, S.Salivahanan, N.Sureshkumar, McGrawHill.

REFERENCEBOOKS

1. Network Analysis by M.E Van Valkenburg, PHI learning publications.
2. Network Analysis - N.C Jagan and C. Lakhminarayana, BS publications.
3. Electrical Circuits by A. Sudhakar, Shyammohan and S Palli, Mc Graw Hill Companies.
4. Electrical Machines by I.J. Nagrath & D. P. Kothari, Tata Mc Graw-Hill Publishers.
5. Electronic Devices and Circuits, K.LalKishore, B.S Publications
6. Electronic Devices and Circuits, G.S.N.Raju, I.K.International Publications, New Delhi, 2006.

COURSEOUTCOMES:

After the course completion the students will be able to

1. Apply the basic RLC circuit elements and its concepts to networks and circuits.
2. Analyze the circuits by applying network theorems to solve them to find various electrical parameters.
3. Illustrate the single-phase AC circuits along with the concept of impedance parameters and power.
4. Understand the Constructional Details and Principle of Operation of DC Machines and Transformers
5. To understand the concepts of p-n junction diode, rectifiers and Zener diode
6. To understand the concepts of BJTs, JFET and MOSFETs

MALLA REDDY COLLEGE OF ENGINEERING ANDTECHNOLOGY

I Year B. TECH -I-SEM **L/T/P/C**
3/0/0/3

(R24A0022) ENGINEERING CHEMISTRY

COURSE OBJECTIVES: The students will be able

1. To analyze water for its various parameters for sustainable living and interpret different problems involved in industrial utilization of water.
2. To acquire the knowledge on fundamental aspects of battery chemistry, significance of corrosion and it's control to protect the metallic structures.
3. To identify different types of polymers and their applications in various engineering fields.
4. To understand the basic concepts of fuels and its products.
5. To gain knowledge on wide variety of engineering materials like composite materials, smart materials and lubricants which have excellent engineering properties.

Unit –I Water and its treatment: **(8 hours)**

Introduction – hardness of water – causes of hardness; Types of hardness - temporary and permanent – expression and units of hardness-numerical problems on hardness; Potable water and its specifications - Steps involved in the treatment of potable water-Disinfection of potable water by chlorination and break-point chlorination.

Boiler troubles: Sludges, Scales and Caustic embrittlement. Internal treatment of Boiler feed water - Calgon conditioning - Phosphate conditioning; External treatment methods - Softening of water by ion-exchange process. Desalination of water – Reverse osmosis.

Unit–II Battery Chemistry & Corrosion: **(8 hours)**

Introduction - Classification of batteries-primary, secondary and reserve batteries with examples. Basic requirements for commercial batteries. Construction and working of Lithium ion battery; Applications of Li-ion battery to electrical vehicles. Fuel Cells- Differences between battery and a fuel cell, Construction and applications of Methanol Oxygen fuel cell. Solar cells - Introduction and applications of Solar cells.

Corrosion: Causes and effects of corrosion – theories of chemical (oxidation) and electrochemical corrosion – mechanism of electrochemical corrosion, Types of corrosion: Galvanic, waterline and pitting corrosion. Factors affecting rate of corrosion- nature of metal (position, passivity, purity, relative areas of anode and cathode); nature of environment (temperature, pH and humidity); Corrosion control methods- Cathodic protection –Sacrificial anode and impressed current methods.

Unit-III: Polymeric materials: **(8 hours)**

Definition–Classification of polymers based on source with examples–Types of polymerization– characteristics of addition and condensation polymerization with examples.

Plastics: Definition and characteristics-thermoplastic and thermosetting plastics, Preparation, properties and engineering applications of PVC, Teflon and Bakelite.

Fibers: preparation, properties and applications of Nylon 6,6.

Rubbers: Natural rubber and its vulcanization.

Conducting polymers: Characteristics and classification with examples-mechanism of conduction in trans-polyacetylene and applications of conducting polymers.

Biodegradable polymers: Concept and advantages – preparation, properties of Polylactic acid and its applications.

Unit-IV: Energy Sources: (8 hours)

Introduction- Calorific value of fuel – HCV and LCV. Classification- solid fuels: coal – analysis of coal – proximate and ultimate analysis and their significance. Liquid fuels – petroleum and its refining, cracking types – moving bed catalytic cracking. Knocking – octane and cetane rating, synthetic petrol - Fischer-Tropsch's process; Gaseous fuels – composition and uses of natural gas, LPG and CNG.

Unit- V Engineering Materials: (8 hours)

Composite materials: Introduction-Fiber reinforced plastics (FRPs) - Glass fiber reinforced plastics, Carbon fiber reinforced plastics and their applications.

Smart materials and their engineering applications

Shape memory materials- Poly L–Lactic acid. Thermo-responsive materials-Polyacryl amides, Polyvinyl amides.

Lubricants: Classification of lubricants with examples-characteristics of a good lubricant - properties of lubricants- definition and significance of viscosity, cloud and pour point, flash and fire point.

Suggested Text Books:

1. Engineering Chemistry by P.C. Jain & M. Jain: Dhanpat Rai Publishing Company (P) Ltd, New Delhi. 16th Edition, 2010.
2. Engineering Chemistry by Prasanta Rath, B. Rama Devi, C. H. Venkata Ramana Reddy, Subhendu Chakroborty, Cengage Learning Publication, India Private Limited, 2018.
3. Engineering Analysis of Smart Material Systems by Donald J. Leo, Wiley, 2007.

Reference Books:

1. Engineering Chemistry by Shashi Chawla, Dhanpat Rai Publishing Company (P) Ltd, New Delhi.
2. Engineering Chemistry, by S. S. Dara, S. Chand & Company Ltd, New Delhi.
3. P.W. Atkins, J.D. Paula, "Physical Chemistry", Oxford, 8thedition (2006).
4. B.R. Puri, L.R. Sharma and M.S. Pathania, "Principles of Physical Chemistry", S. Nagin Chand & Company Ltd., 46th edition (2013).

COURSE OUTCOMES: At the end of the course the student is expected to know the fundamental principles of Engineering Chemistry required for solving engineering problems.

The students will be able

1. To identify water as an engineering material and develop innovative methods to produce soft water for industrial use and potable water at cheaper cost.
2. To relate the knowledge of operating principles of batteries and different corrosion control techniques for sustainable development.
3. To recognize the significance of polymeric compounds in various engineering applications and biodegradable polymers to reduce environmental pollution.
4. To analyze the importance of various energy resources in day to day life.
5. To interpret the role of engineering materials for technological improvements in various sectors.

MALLA REDDY COLLEGE OF ENGINEERING ANDTECHNOLOGY

I Year B. TECH -I-SEM **L/T/P/C 3/0/0/3**

(R24A0501) Programming for Problem Solving

COURSE OBJECTIVES:

The students will be able

1. To understand basics of programming.
2. To learn how to use conditional statements and loops.
3. To structure Python programs using arrays.
4. To know the need and usage of functions
5. To learn file operations and exception handling

UNIT – I

Introduction to Programming – Computer Systems, Computer Languages, Algorithms andFlowcharts

Introduction to Python Language: Introduction to Python Language, Features of Python,Comments in Python.

Tokens- Keywords, Identifiers, Constants, Variables, Python Input and Output Statements

Basic Data Types: int, float, boolean, complex and string and its operations.

Collection Data Types: List, Tuples, Sets and Dictionaries. Data Type conversions,

UNIT – II

Operators in Python: Arithmetic operators, Assignment operators, Comparison operators, Logical operators, Identity operators, Membership operators, Bitwise operators, Precedence of operators, Expressions.

Control Flow and Loops: Indentation, if statement, if-else statement, nested if else, chained conditional if- elif -else statement, Loops: while loop, for loop using ranges, Loop manipulation using break, continue and pass.

UNIT- III

Arrays: Definition**,** Advantages of Arrays, Creating an Array, Operations on Arrays, Arrays vs List, Importing the Array Module, Indexing and Slicing on Arrays,

working with arrays using numPy - Creating arrays using numpy, numpy Attributes and functions, Matrices in numpy.

UNIT-IV

Functions: Defining a function, Calling a Function, Passing parameters and arguments, Python Function arguments: Positional Arguments, Keyword Arguments, Default Arguments, Variable-length arguments, Scope of the Variables in a Function–Local and Global Variables.

Recursive functions, Anonymous functions, Higher order functions - map(),filter() and reduce() functions in Python, command-line arguments.

UNIT-V

File Handling in Python: Introduction to files, Text files and Binary files, Access Modes, Writing Data to a File-write() and writelines(), Reading Data from a File-read(),readline() and readlines(), Random access file operations-seek() and tell().

Error Handling in Python: Introduction to Errors and Exceptions: Compile-Time Errors, Logical Errors, Runtime Errors, Types of Exceptions, Python Exception Handling Using try, except and finally statements.

COURSE OUTCOMES:

Upon completion of the course, students will be able to

1. Express proficiency in handling data types in python.
2. Understand the syntax and semantics of python control flow statements
3. Develop programs using arrays
4. Know how to write modular programs using functions.
5. Perform file operations and handle exceptions

TEXT BOOKS

1. "Mastering C", K R Venugopal, S R Prasad, Tata McGraw Hill Education (India) Private Limited.
2. R.NageswaraRao,"Core Python Programming", Dreamtech.
3. Allen B. Downey,``Think Python: How to Think Like a Computer Scientist" 2nd edition, Updated for Python3, Shroff/O'Reilly Publishers,2016.
4. Python Programming: A Modern Approach, Vamsi Kuramanchi,Pearson.

REFERENCEBOOKS:

1. Core Python Programming,W.Chun,Pearson.
2. Introduction to Python,Kenneth A. Lambert, Cengage.
3. Learning Python, Mark Lutz,Orielly.

MALLA REDDY COLLEGE OF ENGINEERING ANDTECHNOLOGY

I Year B. TECH -I-SEM **L/T /P /C -/0/3/1.5**

(R24A0083)Engineering Chemistry Lab

COURSE OBJECTIVES:

The students will be able:

1. To understand and explain scientifically the various chemistry related problems in the industry/engineering and develop experimental skills for building technical competence.
2. To familiarize with the practical implementation of fundamental concepts.
3. To gain hands on experience in handling the instruments.
4. To demonstrate the digital and instrumental methods of analysis.
5. To correlate the practical aspect with theoretical concepts.

List of Experiments

Titrimetry:

1. Estimation of Hardness of water by EDTA method.
2. Estimation of Ferrous ion by Dichrometry

Instrumental Methods

Conductometry:

3. Estimation of concentration of HCl by Conductometric titrations.
4. Estimation of concentration of Acetic acid by Conductometric titrations.

Potentiometry:

5. Estimation of amount of $Fe^{2+}$by Potentiometric titration using $KMnO_4$.

pH Metry:

6. Determination of an acid concentration using pH meter.

Preparation

7. Preparation of a Polymer-**Bakelite**

Physical Property

8. Determination of Surface Tension of a given liquid by Stalagmometer.
9. Determination of Viscosity of a given liquid using Ostwald's Viscometer.

Corrosion control method

10. Electroplating of Copper on an Iron object.

Virtual lab experiments

1. Construction of Fuel cell and it's working.
2. Smart materials for Biomedical applications
3. Batteries for electrical vehicles.
4. Functioning of solar cell and its applications.

Text Book:

1. In organic quantitative analysis, Vogel
2. A text book on experiments and calculation in Engineering Chemistry by S.S.Dara

Suggested Readings:

1. Lab manual for Engineering chemistry by B.Ramadevi and P.Aparna, S Chand Publications, New Delhi (2022)
2. Practical Engineering Chemistry by K.Mukkanti, etal, B.S.Publications, Hyderabad.

Course outcomes:

The students will be able:

1. To estimate the total hardness present in a sample of water.
2. To know the strength of an acid by conductometry, potentiometry and pHmetry.
3. To prepare a thermo setting polymer.
4. To determine the surface tension and viscosity of a given liquid.
5. To understand the electroplating method for corrosion protection of metals.

MALLA REDDY COLLEGE OF ENGINEERING ANDTECHNOLOGY

I Year B. TECH -I-SEM **L/T /P /C -/0/3/1.5**

(R24A0581) Programming for Problem Solving Lab

COURSE OBJECTIVES:

This course will enable the students:

1) to understand syntax and semantics of different data types in python
2) to learn categories of operators and control structures.
3) to know how to use arrays in python scripts.
4) to learn usage of functions.
5) to know how to handle Files and exceptions in Python.

Week 1:

Introduction to OS

Steps for creating and running python code

Week 2:

Programs using output statement

Simple programs on usage of variables and constants

Programs to read different kinds of data from user

Week 3:

Programs on creation of strings and its methods

Programs on List creation, indexing and slicing and methods

Week 4:

Programs on tuples, sets and dictionaries

Week 5 & 6:

Programs on different categories of operators and conditional statements

Week 7 & 8:

Programs using iterative statements

Week 9 & 10:

Programs on arrays using array module and numpy module

Week 11 & 12:

Programs using functions

Week 13 & 14:

Implementation of operations on files and exception handling

TEXT BOOKS:

1. R. Nageswara Rao, “Core Python Programming”, dream tech
2. Allen B. Downey , “ Think Python: How to Think Like a Computer Scientist”, Second Edition,Updated for Python 3, Shroff/O’Reilly Publishers, 2016.

COURSE OUTCOMES:

After completion of the course, Students will be able to:

1. Build basic programs using python statements and expressions.
2. Use python data structures like lists, tuples and dictionaries to represent compound data.
3. Implement conditional and loop statements in python programs.
4. Express usageofarrays andfunctions in code
5. Understand and summarize different file handling operations and exceptions.

MALLA REDDY COLLEGE OF ENGINEERING ANDTECHNOLOGY

I Year B. TECH -I-SEM **L/T/P/C**

-/0/3/1.5

(R24A0281) PRINCIPLES OF ELECTRICAL AND ELECTRONICS ENGINEERING LAB

COURSE OBJECTIVES:

1. To design an electrical systems.
2. To analyze a given network by applying various circuit laws and network theorems.
3. To expose the students to the operation of DC machine and transformer.
4. To exhibit the students to the operation of PN junction diode and Zener diode.
5. To expose the students to the operation of Rectifier.

Among the following experiments any 10 are to be conducted

1. Verification of KVL and KCL.
2. Verification of Thevenin's theorem.
3. Verification of Norton's theorem.
4. Verification of Super position theorem.
5. Magnetization characteristics of DC shunt generator.
6. Speed control of DC shunt motor using armature control method.
7. Speed control of DC shunt motor using flux control method
8. Load test on single phase transformer.
9. PN Junction diode characteristics.
10. Zener diode characteristics.
11. Half wave rectifier.
12. Full wave rectifier.

COURSE OUTCOMES:

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

1. Explain the concept of circuit laws and network theorems and apply them to laboratory measurements.
2. Be able to systematically obtain the equations that characterize the performance of an electric circuit as well as solving them.
3. Perform the required tests on transformers and DC motors.
4. Plot the characteristics of Zener diodes.
5. Determine the working of rectifiers in detail.

MALLA REDDY COLLEGE OF ENGINEERING ANDTECHNOLOGY

I Year B. TECH -I-SEM **L/T/P/C**

-/0/3/1.5

(R24A0084) Engineering and Computing Hardware Workshop

It is consisting of 2 parts: **Part I**: Computing Hardware Workshop

Part II: Engineering Workshop

COURSE OBJECTIVES:

1. Understand the internal structure of computer system and learn to diagnose minor problems with the computer functioning.
2. Know the proper usage and threats of the World Wide Web & Study in detail about the various features of Ms-Word, Excel, PowerPoint and Google Forms
3. To obtain the knowledge about Electrical wiring and Soldering – Desolderingprocedures.
4. To provide hands on experience in usage of different engineering materials, tools equipments and processes which are common in the engineering field.
5. To develop professional attitude, team work, precision and safety practices at workplace.

Part I: COMPUTING HARDWARE WORKSHOP

Task- 1: PC HARDWARE

Identification of the peripherals of a computer, components in a CPU and its functions. Block diagram of the CPU along with the configuration of each peripheral. Functions of Motherboard. Assembling and Disassembling of PC. Installation of OS. Basic Linux commands.

Task- 2: TROUBLESHOOTING

Hardware Troubleshooting: Students are to be given a PC which does not boot due to proper assembly or defective peripherals and the students should be taught to identify and correct the problem.

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.

Task 3: INTERNET

Web Browsers, Access of websites, Surfing the Web, Search Engines, Customization of web browsers, proxy settings, bookmarks, search toolbars, pop-up blockers. Antivirus downloads, Protection from various threats.

MS OFFICE

Task 4: MICROSOFT WORD

Overview of MS word features. Usage of Hyperlink, Symbols, Spell Check, Track Changes. Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge in word. Using Word to create Project Certificate, Project Abstract, News Letter, Resume.

Task 5: MICROSOFT EXCEL

Overview of Excel Features Excel formulae & Functions, conditional formatting, Charts, Hyper linking, Renaming and Inserting worksheets, Data Analysis functions.

Creating a Scheduler (Features: - Gridlines, Format Cells, Summation, auto fill, Formatting)

Calculating GPA (Features: - Cell Referencing, Formulae and functions in excel

Task 6: MICROSOFT POWER POINT

Overview of PowerPoint features, Insertion of images, slide transition, Custom animation, Hyperlinks.

Task 7: GOOGLE FORMS

Google forms introduction, opening Google forms, editing forms, add questions, copy duplicate questions, delete questions, required questions, more button, form color and themes, preview form, advance form settings, send form, view responses, close form

PART II: ENGINEERING WORKSHOP

A. LIST OF EXPERIMENTS:

1. Residential house wiring using switches, fuse, indicator, lamp and energy meter.
2. Fluorescent lamp wiring
3. Stair case wiring
4. Soldering and Desoldering practice – components, devices and circuits using general Purpose PCB.

Note: Minimum ONE experiment need to be conducted in each trade

B. TRADES FOR EXERCISES:

At least two exercises from each trade:

1. **Carpentry:**
   To prepare T-Lap Joint, Dovetail Joint.
   To pre pare Mortise & Tenon Joint.
2. **Fitting:**
   To prepare V-Fit, Dovetail Fit & Semi-circular fit.
3. **Tin-Smithy:**
   To make Square Tin, Rectangular Tray & Conical Funnel.
   Note: Minimum ONE experiment need to be conducted in each trade

Trades to demonstrate:

1. Plumbing
2. Foundry
3. Welding
4. Black smithy
5. Metal cutting (Water Plasma)

Note: Minimum a total of 3 trades to be demonstrated.

TEXT BOOKS – IT WORKSHOP

1. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education
2. Excel Functions and Formulae, Bernd held, Theodor Richardson, Third Edition

TEXT BOOKS – ENGINEERING WORKSHOP

1. Workshop Manual, P. Kannaiah and K. L. Narayana, 3rd Edition, Scitech,2015
2. Printed Circuit Boards - Design, Fabrication, Assembly and Testing, R. S. Khandpur,Tata McGraw-Hill Education, 2005.

COURSE OUTCOMES:

1. Ability to identify, assemble and troubleshoot the major components of a computerand perform the installation of Operating System.
2. Capacity to make effective usage of the internet for academics and developprofessional documents, spreadsheets and presentations.
3. Students will be able to understand the domestic, illumination, stair-case wiringprocedures and soldering de soldering practice
4. The student will have hands-on experience on manufacturing of components usingdifferent trades of engineering processes
5. The student will be able to perform in a team, adhering to industrial safety practicesand follow professional working standards.

MALLA REDDY COLLEGE OF ENGINEERING ANDTECHNOLOGY

I Year B.TECH –I-SEM **L/T/P/C**

2/0/0 /0

(R24A0003) HUMAN VALUES AND PROFESSIONAL ETHICS

COURSE OBJECTIVES:

This introductory course input is intended:

1. To help the students appreciate the essential complementarily between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
2. To facilitate the development of a holistic perspective among students towards life, profession and happiness, based on a correct understanding of the Human reality and the rest of Existence. Such a holistic perspective forms the basis of value based living in a natural way.
3. To highlight plausible implications of such a holistic understanding in terms of ethical human conduct, trustful and mutually satisfying human behavior and mutually enriching interaction with Nature.

UNIT - I:

Course Introduction -Need, Basic Guidelines, Content and Process for Value Education.

Self-Exploration – Definition, content and process., A look at basic Human Aspirations- Continuous Happiness and Prosperity, Right understanding of Relationships and Physical Facilities, Method to fulfill the above human aspirations. Understanding and living in harmony at various levels.

UNIT - II:

Understanding Harmony in the Human Being - Harmony in Myself, Understanding human being as a co-existence of the sentient 'I' and the material 'Body'. Understanding the needs of Self ('I') and 'Body'. Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer).

Understanding the harmony of I with the Body- Sanyam and Swasthya, Programs to ensure Sanyam and Swasthya.

UNIT - III:

Understanding Harmony in the Family and Society- Understanding harmony in the Family- Understanding values in human - human relationship, Meaning of Nyaya and program for its fulfillment to ensure Ubhay- tripti, Trust (Vishwas) and Respect (Samman) as the foundational values of relationship.

Understanding the harmony in the society- Samadhan, Abhay, Sah-astiva as comprehensive Human Goals, Undivided Society (Akhand Samaj), Universal Order.

UNIT - IV:

Understanding Harmony in the Nature and Existence - Understanding the harmony in the Nature-Interconnectedness and mutual fulfillment among the four orders of nature. Recyclability and self-regulation in nature. Understanding Existence as Co-existence (Sah-astitva) of mutually interacting units in all- pervasive space. Holistic perception of harmony at all levels of existence.

UNIT - V:

Implications of the above Holistic Understanding of Harmony on Professional Ethics: Basic concepts of Professional Ethics, Natural acceptance of human values, Definitiveness of Ethical Human Conduct, Competence in Professionalethics, Ethical dilemmas, Role of Emotional intelligence in ethical decision-making

TEXT BOOKS:

1. R. R. Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course in Human Values and Professional Ethics.
2. Prof. K. V. Subba Raju, 2013, Success Secrets for Engineering Students, Smart Student Publications, 3rdEdition.

REFERENCE BOOKS:

1. Ivan IIIich, 1974, Energy & Equity, The Trinity Press, Worcester, and HarperCollins, USA
2. E. F. Schumancher, 1973, Small is Beautiful: a study of economics as if people mattered. Blond & Briggs, Britain.
3. A Nagraj, 1998 Jeevan Vidya ek Parichay, Divya Path Sansthan, Amarkantak.
4. Sussan George, 1976, How the Other Half Dies, Penguin Press, Reprinted 1986,1991.
5. P. L. Dhar, R. R. Gaur, 1990, Science and Humanism, Common wealth Publishers. A. N. Tripathy, 2003, Human Values, New Age International Publishers.
6. Subhas Palekar, 2000, How to practice Natural Farming, Pracheen (Vaidik) Krishi Tantra Shodh, Amravati.
7. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, Limits to Growth - Club of Rome's report, Universe Books.
8. E G Seebauer & Robert L.Berry, 2000, Fundamentals of Ethics for Scientists & Engineers, Oxford University Press.
9. M Govindrajan, S Natrajan & V. S Senthil kumar, Engineering Ethics (including Human Values), Eastern Economy Edition, Prentice Hall of India Ltd.

Relevant CDs, Movies, Documentaries & Other Literature:

1. Value Education website, http://www.uptu.ac.in
2. Story of Stuff, http://www.storyofstuff.com
3. AI Gore, An Inconvenient Truth, Paramount Classics, USA
4. Charle Chaplin, Modern Times, United Artists, USA
5. IIT Delhi, Modern Technology - the Untold Story

COURSE OUTCOMES:

1. The students will be able to obtain happiness and prosperity in their life.
2. They will develop harmony at all levels.
3. They can have satisfying human behavior throughout their life

MALLA REDDY COLLEGE OF ENGINEERING ANDTECHNOLOGY

I Year B. TECH -II-SEM **L/T/P/C**
2/0/0/2

(R24A0001) ENGLISH FOR SKILL ENHANCEMENT

Course Objectives: This course will enable the students to:

1. Improve the language proficiency of students in English with an emphasis on Vocabulary, Grammar, Reading and Writing skills.
2. Develop study skills and communication skills in various professional situations.
3. Equip students to study engineering subjects more effectively and critically using the Theoretical and practical components of the syllabus.

UNIT-I

Chapter entitled '*Toasted English*' by R.K.Narayan **from** *"English: Language, Context and Culture"* **published by Orient Black Swan, Hyderabad.**

Vocabulary **: T**he Concept of Word Formation
Grammar **:** Articles and Prepositions.
Reading **:** Reading and Its Importance-Techniques for Effective Reading.
Writing **:** Sentence Structures-Use of Phrases and Clauses in Sentences-Importance of Proper Punctuation-Techniques for writing precisely–Paragraph Writing–Types, Structures and Features of a Paragraph – Creating Coherence-Organizing Principles of Paragraphs in Documents.

UNIT-II

Chapter entitled **'Appro JRD' by Sudha Murthy** from ***"English: Language ,Context and Culture" published*** by Orient Black Swan, Hyderabad.

Vocabulary **:** Words Often Miss pelt- Homophones, Homonyms and Homographs
Grammar **:** Noun- pronoun Agreement and Subject- verb Agreement.
Reading **:** Sub- Skills of Reading– Skimming and Scanning– Exercises for Practice
Writing **:** Defining/ Describing People, Objects, Places and Events–Classifying-Providing Examples or Evidence.

UNIT-III

Chapter entitled **'Abraham Lincoln's Letter to His Son's Teacher'**

Vocabulary : Idioms & Words Often Confused.

Grammar : Misplaced Modifiers and Tenses.

Reading : Intensive Reading and Extensive Reading – Exercises for Practice.

Writing : Format of a Formal Letter-Writing Formal Letters E.g.., Letter of Complaint, Letter of Requisition, Email Etiquette, Job Application with CV/Resume.

UNIT-IV

Chapter entitled **'Artand Literature 'by Abdul Kalam** from***"English: Language, Contextand Culture"*** published by Orient Black Swan, Hyderabad.

Vocabulary : Standard Abbreviation sin English

Grammar : Transitive and Intransitive and Voices

Reading : Survey, Question, Read, Recite and Review (SQ3RMethod)-Exercises for Practice

Writing : Writing Practices-Essay Writing-Writing Introduction and Conclusion-Précis Writing.

UNIT-V

Chapter entitled **'Go, Kiss the World' by Subroto Bagchi** fro ***"English:Language,Context and Culture"*** published by Orient Black Swan, Hyderabad.

Vocabulary : Technical Vocabulary and their Usage

Grammar : Direct and Indirect Speech and Degrees of Comparison

Reading : Reading Comprehension-Exercises for Practice

Writing : Technical Reports- Introduction – Characteristics of a Report – Categories of Reports Formats- Structure of Reports (Manuscript Format) -Types of Reports - Writing a Report.

Note: Listening and Speaking Skills which are given under Unit-6 in AICTE Model Curriculum are covered in the syllabus of ELCS Lab Course.

- **Note: 1**. As the syllabus of English given in AICTE *Model Curriculum-2018 for B.Tech First Year is* ***Open-ended,*** besides following the prescribed textbook, it is required to prepareteaching/learningmaterials**bytheteacherscollectively**intheformofhandoutsbasedont heneedsofthestudentsintheirrespective colleges for effective teaching/learning in the class.
- **Note**: **2**.Based on the recommendations of NEP2020, teachers are requested to be flexible to adopt Blended Learning in dealing with the course contents .They are advised to teach 40percentofeachtopicfromthe syllabus in blended mode.

TEXTBOOK:

1. English: Language, Context and Culture" by Orient Black Swan Pvt. Ltd, Hyderabad.2022.Print.

REFERENCEBOOKS:

1. Effective Academic Writing by Liss and Davis(OUP)
2. Richards, Jack C. (2022) Interchange Series. Introduction, 1,2,3.CambridgeUniversityPress
3. Wood,F.T.(2007).Remedial English Grammar Macmillan.
4. Chaudhuri, Santanu Sinha.(2018).Learn English: A Fun Book of Functional Language, Grammar and Vocabulary.(2nd ed.,).Sage Publications India Pvt. Ltd.
5. (2019).Technical Communication. Wiley India Pvt. Ltd.
6. Vishwamohan,Aysha.(2013).EnglishforTechnicalCommunicationforEngineeringStudents.Mc Graw-HillEducationIndia Pvt.Ltd.
7. Swan, Michael. (2016).Practical English Usage. Oxford University Press. Fourth Edition.

Course Outcomes: Students will be able to:

1. Understand the importance of vocabulary and sentence structures.
2. Choose appropriate vocabulary and sentence structures for their oral and written communication.
3. Demonstrate their understanding of the rules of functional grammar.
4. Develop comprehension skills from the known and unknown passages.
5. Take an active part in drafting paragraphs, letters, essays, abstracts, précis and reports in various contexts.
6. Acquire basic proficiency in reading and writing modules of English.

MALLA REDDY COLLEGE OF ENGINEERING ANDTECHNOLOGY

I Year B. TECH -II-SEM **L / T / P / C**

3 / 1/ 0 /4

(R24A0024) NUMERICAL METHODS AND VECTOR CALCULUS

Course Objectives: To Learn

1) Numerical methods which provide systematic methods for solving problems in a numerical form using the given initial data, also used to find the roots of an equation and to solve differential equations.
2) The Concept of interpolation to find an unknown function which approximates the given data points and the objective of curve fitting is to find the relation between the variables x and y from given data and such relationships which exactly pass through the data (or) approximately satisfy the data under the condition of sum of least squares of errors.
3) The concept of multiple integrals.
4) The physical quantities involved in engineering field related to vector valued functions.
5) The basic properties of vector-valued functions and their applications to line, surface and volume integrals.

UNIT – I: Interpolation and Curve fitting **[12 hrs]**

Interpolation: Introduction, errors in polynomial interpolation, Finite differences - Forward differences, Backward differences, central differences. Newton's formulae for interpolation, Gauss's central difference formulae, Interpolation with unevenly spaced points - Lagrange's Interpolation.

Curve Fitting: Fitting a straight line, second degree curve, exponential curve, power curve by method of least squares.

UNIT – II: Numerical Methods **[12 hrs]**

Solution of algebraic and transcendental equations: Introduction, Bisection Method, Method of false position, Newton Raphsonmethod and their graphical interpretations.

Numerical integration: Generalized quadrature formula - Trapezoidal rule, Simpson's $1/3^{rd}$ and Simpson's $3/8^{th}$ rules.

Numerical solution of ordinary differential equations: Solution by Taylor's series method, Euler's method, Euler's modified method, Runge - Kutta fourth order method.

UNIT - III: Double and Triple Integrals **[12 hrs]**

Double integrals (Cartesian and polar), Change of order of integration in double integrals, Change of variables (Cartesian to polar), Triple integrals (Cartesian form). Applications: Areas (by double integrals) and volumes (by triple integrals).

UNIT-IV: Vector Differentiation [8hrs]

Introduction, Scalar point function and Vector point function, Gradient, Directional derivative, Divergence and Curl- Solenoidal and irrotational vectors,Vector identities.

UNIT-V: Vector Integration [10hrs]

Line integral - Work done, Surface integrals, Volume integral. Vector integral theorems - Green's theorem, Stoke's theorem and Gauss's Divergence theorems (Statement & their Verification).

Text Books:

i) Higher Engineering Mathematics by B V Ramana ., Tata McGraw Hill.
ii) Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers.
iii) Mathematical Methods by S.R.K Iyenger,R.K.Jain,Narosa Publishers.

Reference Books:

i) Elementary Numerical Analysis by Atkinson-Han, Wiley Student Edition.
ii) Advanced Engineering Mathematics by Michael Greenberg –Pearson publishers.
iii) Introductory Methods of Numerical Analysis by S.S. Sastry, PHI

Course Outcomes: After learning the contents of this paper the student will be able to

1. Find the roots of algebraic, non-algebraic equations and predict the value at an intermediate point from a given discrete data.
2. Find the most appropriate relation of the data variables using curve fitting andthis method of data analysis helps engineers to understand the system for better interpretation and decision making.
3. Evaluate multiple integrals.
4. Find Gradient, Divergence, Directional Derivative and Curl.
5. Evaluate the line, surface, volume integrals and converting themfrom one to another using vector integral theorems.

MALLA REDDY COLLEGE OF ENGINEERING ANDTECHNOLOGY

I Year B. TECH -II-SEM **L / T / P / C**
3 / 1 / 0 / 4

(R24A0021) APPLIED PHYSICS

COURSE OBJECTIVES:

1 To understand the basic principles of lasers and optical fibers.
2 To interpret dual nature of the matter quantum mechanically and classify the solids based on electrical conductivity.
3 To understand the concepts of semiconductors and devices.
4 To analyze dielectric, magnetic and superconducting properties of the materials.
5 To understand the properties of nano materials and analyze its characterization techniques.

UNIT – I

LASERS & FIBER OPTICS **(15 Hours)**

Lasers: Characteristics of lasers, Absorption, Spontaneous and Stimulated emissions, Einstein's coefficients, Meta stable state, Population inversion, Types of pumping, Components of Laser, Lasing action, Construction and working of Ruby Laser, He-Ne Laser, Semiconductor diode Laser, Applications of lasers.

Fiber Optics: Introduction to optical fiber, Construction and working principle of an Optical Fiber, Acceptance angle and Numerical aperture, Types of Optical fibers - Mode and index profile, Optical Fibers in Communication System, Applications of optical fibers.

UNIT – II

QUANTUMMECHANICS AND FREE ELECTRON THEORY OFSOLIDS **(15 Hours)**

Introduction, wave and particle, de-Broglie's hypothesis, Matter waves, Davisson and Germer's experiment, Heisenberg's uncertainty principle, Schrodinger's time-independent wave equation-Physical significance of wave function, Particle in one dimensional square well potential.

Classical free electron theory-Assumptions and drawbacks, Quantum free electron theory-Assumptions and drawbacks, Fermi-Dirac statistical distribution, Fermi level , Electron in a periodic potential - Bloch's theorem(qualitative), Kronig–Penny model (qualitative), E-k curve, Effective mass of an electron ,Origin of energy bands in solids, Classification of materials: Metals, semiconductors and insulators.

UNIT-III

SEMICONDUCTOR PHYSICS **(15Hours)**

Intrinsic and Extrinsic semiconductors, Carrier concentration of electrons and holes in intrinsic and extrinsic semiconductors. Dependence of Fermi level on carrier concentration and temperature, Formation of PN Junction, V-I characteristics of PN Junction diode, Energy Diagram of PN diode, Hall effect, Construction and working of LED, Solar cell.

UNIT – IV

DIELECTRICS, MAGNETIC AND SUPERCONDUCTING MATERIALS (12 Hours)

Dielectrics: Introduction, Types of polarizations – Electronic, Ionic polarizations and calculation of polarizabilities, Internal field, Clausius Mossotti relation.

Magnetic materials: Introduction, Bohr magneton, Classification of Dia, Para, Ferro magnetic materials based on magnetic moment, Properties of Anti-Ferro and Ferri magnetic materials, Hysteresis curve , Soft and Hard magnetic materials.

Super conductivity: Introduction, Meissener effect, Types of superconductors.

UNIT-V

NANO SCIENCE & NANO TECHNOLOGY (8 Hours)

Nano scale, Types of Nano materials , Surface to volume ratio, Quantum confinement, Bottom-up synthesis : Precipitation, Sol-gel method, Top-down synthesis: Ball milling, Physical vapor deposition (PVD), Chemical vapor deposition (CVD),Characterization techniques - XRD, SEM, Applications of nano materials.

COURSE OUTCOMES:

At the end of the course students,

1 Can apply the principles of lasers and optical fibers in various industrial applications.
2 Basic principles of quantum mechanics can be applied to analyze the band structure of solids.
3 Concepts of semiconductors can be applied to predict the importance of electronic devices relevant to engineering domains.
4 Examine the dielectric, magnetic and superconducting properties of the materials and apply them in engineering material technology.
5 Can identify and compare the nano fabrication methods and gaining insight to the nano materials.

TEXT BOOKS:

1. Engineering Physics by Kshirsagar & Avadhanulu, S. Chand publications.
2. Engineering Physics - B.K.Pandey, S.Chaturvedi, Cengage Learning
3. Essentials of Nano science & Nano technology by Narasimha Reddy Katta,Typical Creative's NANODIGEST,1st Edition,2021.

REFERENCES:

1. Engineering Physics – R.K. Gaur and S.L. Gupta, DhanpatRai Publishers.
2. A.K.Bhandhopadhya- Nano Materials, New Age International, 1st Edition, 2007.
3. Engineering physics 2nd edition –H.K. Malik and A.K. Singh.
4. Engineering Physics – P.K. Palaniswamy, Scitech publications.
5. Physics by Resnick and Haliday.

MALLA REDDY COLLEGE OF ENGINEERING ANDTECHNOLOGY

I Year B. TECH -II-SEM **L/T/P/C 2/0/2/3**

(R24A0301) COMPUTER AIDED ENGINEERING GRAPHICS

Course Objectives:

1. To learn basic engineering graphics and Auto CAD concepts.
2. To learn the 2D principles of orthographic projections and Multiple views of the same
3. To know the planes and solid Projection
4. To gain the capability of designing 3D objects with isometric principles by usingcomputer aided sketches
5. To know the conversion of Orthographic Views to isometric Views and isometric to Orthographic views

UNIT-I

Introduction to Auto CAD: Introduction to software interface, Standard toolbar/menu; Understanding the co-ordinate systems-2D and 3D Visualization; Setting the Paper sizes and title block importance, printing and plotting; Draw commands: line, arc, circle, rectangle, polygons, ellipse, polyline, splines, text; Modify commands: copy, mirror, offset, arrays, move, extend, break, trim, lengthen, chamfer, fillet, etc.; Constraints: horizontal, vertical, parallel, concentric, perpendicular, symmetric, equal, collinear; Dimensioning Commands: Dimensioning and Dimension Style; Division: Line division, and circle division; Polygons: Constructing regular polygons - inscribed and circumscribed methods and general method**.**

UNIT-II

Projection of Points: Introduction to reference planes, four quadrants, importance of reference lines; Projection of points in all the four quadrants.

Projection of Lines: Parallel to both the reference planes, Parallel to one plane and perpendicular to other plane, Inclined to one plane and parallel to other plane, Inclined to both planes.

UNIT-III

Projection of Planes: Introduction to Regular planes, Parallel/Perpendicular to one reference plane, Inclined to one reference plane, Inclined to both the reference planes.

Projection of Solids: Introduction - Prisms, Pyramids, Cone and Cylinder, Axis parallel and perpendicular to one reference plane, Axis inclined to one reference plane.

UNIT-IV

Isometric Projection: Introduction, Isometric projection of simple plane figures, Solids - right regular prisms, pyramids, cylinder, cone on H.P, V.P.

UNIT -V

Conversions: Conversion of Isometric Views to Orthographic Views and Orthographic Views to Isometric Views.

TEXT BOOKS:

1. Engineering Drawing – N.D. Bhatt & V.M. Panchal, 48th edition, 2005 Charotar Publishing House, Gujarat.
2. "Computer Aided Engineering Drawing" by Dr. M H Annaiah, Dr C N Chandrappa and Dr B Sudheer Prem Kumar Fifth edition, New Age International Publishers

REFERENCE BOOKS:

1. Computer Aided Engineering Drawing – S. Trymbaka Murthy, - I.K. International Publishing House Pvt. Ltd., New Delhi, 3rd revised edition-2006.
2. Engineering Graphics - K.R. Gopalakrishna, 32nd edition, 2005- Subash Publishers, Bangalore.

COURSE OUTCOMES:

After the completion of course the student will be able:

1. To produce geometric construction, dimensioning & Curves and detail drawings.
2. To compile Projections of points, lines, then create virtual drawing by using computer
3. To sketch the Planes and Solid Projections
4. To develop isometric drawings of simple objects reading the orthographic projections of those objects.
5. To understand and visualize the 3-D view of engineering objects. Elaborate the conversions of 2D -3D and Vice-Versa.

MALLA REDDY COLLEGE OF ENGINEERING ANDTECHNOLOGY

I Year B. TECH –II-SEM **L/T /P/C**

3/0/0/3

(R24A0502) Data structures and Algorithms

COURSE OBJECTIVES:

This course will enable students to

1. Understand Algorithm complexities and build program logic on Array-Based Search and Sorting Techniques.
2. Learn Object Oriented Programming concepts in Python.
3. Understand the usage of linear data structures.
4. Implement graphs and its traversal techniques in Python.
5. Analyse how non- linear data structures will work.

UNIT – I

Data Structures: Introduction to Algorithm and their properties, Concepts of Analysis of algorithm with asymptotic notations (Big Oh) and their properties, time and space complexities
Types of Data Structures in Python: Built-in and user-defined data structures.
Searching - Linear Search and Binary Search
Sorting - Bubble Sort, Selection Sort, Merge Sort, Quick Sort - efficiency of algorithms - notation of time and space complexity; notations of best, worst and average case performance analysis.

UNIT – II

Oops Concepts - class, object, constructors, types of variables, types of methods. Inheritance: single, multiple, multi-level, hierarchical, hybrid, Polymorphism: with functions, with class methods, with inheritance, Abstraction: abstract classes.

UNIT – III

Stacks - Overview of Stack, Implementation of Stack (List), Applications of Stack
Queues: Overview of Queue, Implementation of Queue (List), Applications of Queues,
Linked Lists – Implementation of Singly Linked Lists, Doubly Linked Lists, Circular Linked Lists. Implementation of Stack and Queue using Linked list.

UNIT – IV

Non-linear Data Structure - **Graphs** - Introduction, Characteristics of a Graphs, Graph Traversals: Breadth First Search, Depth First Search - Applications of Graphs.

UNIT –V

Non-linear Data Structure: Trees- Tree Terminologies, Characteristics of Trees, Operations on Binary Trees and Binary Search Trees: find, insert and delete.
Tree traversal techniques: Inorder, Preorder, Postorder Traversal, Applications of Trees.

TEXTBOOKS:

1. Core Python Programming -Second Edition ,R. Nageswara Rao, Dreamtech Press
2. Data structures and algorithms in python by Michael T. Goodrich
3. Data Structures and Algorithmic Thinking with Python by Narasimha Karumanchi

REFERENCE BOOKS:

1. Hands-On Data Structures and Algorithms with Python: Write complex and powerful code using the latest features of Python 3.7, 2nd Edition by Dr. Basant Agarwal, Benjamin Baka.
2. Data Structures and Algorithms with Python by Kent D. Lee and Steve Hubbard.
3. Problem Solving with Algorithms and Data Structures Using Python by Bradley N Miller and David L.Ranum.

COURSE OUTCOMES:

The students should be able to:

1. Interpret the concepts of Object-Oriented Programming as used in Python.
2. Know the usage of various searching and sorting techniques
3. Design programs using linear and non-linear data structures, including stacks, queues and Linked lists
4. Develop few Graph traversal techniques
5. Design programs for implementing Tree data structure.

MALLA REDDY COLLEGE OF ENGINEERING ANDTECHNOLOGY

I Year B. TECH -II-SEM **L/T/P/C -/0/2/1**

(R24A0081)English Language and Communication Skills Lab

The English Language and Communication Skills (ELCS) Lab focuses on the production and practice of sounds of language and familiarizes the students with the use of English in everyday situations both in formal and informal contexts.

Course Objectives:

1. To facilitate computer-assisted multi-media instruction enabling individualized and Independent language learning
2. To sensitize the students to the nuances of English speech sounds, word accent, intonation and rhythm
3. To bring about a consistent accent and intelligibility in students' pronunciation of English by providing an opportunity for practice in speaking
4. To improve the fluency of students in spoken English and neutralize the impact of dialects.
5. To train students to use language appropriately for public speaking, group discussions and interviews

Course Outcomes: Students will be able to:

1. Understand the nuances of English language through audio- visual experience and group activities
2. Neutralise their accent for intelligibility
3. Speak with clarity and confidence which in turn enhances their employability skills

Syllabus: English Language and Communication Skills Lab (ELCS) shall have two parts:

a. Computer Assisted Language Learning (CALL) Lab

b. Interactive Communication Skills (ICS) Lab

Listening Skills:

Objectives

1. To enable students develop their listening skills so that they may appreciate the 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 recognize them and find the distinction between different sounds, to be able to mark stress and recognize and use the rig ht intonation in sentences.

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

Speaking Skills:

Objectives

1. To involve students in speaking activities in various contexts
2. To enable students express themselves fluently and appropriately in social and professional contexts

- Oral practice
- Describing objects/situations/people
- Role play – Individual/Group activities
- Just A Minute (JAM) Sessions

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

Lab.

Exercise – I

CALL Lab:

Understand: Listening Skill- Its importance – Purpose- Process- Types- Barriers- Effective Listening.

Practice: Introduction to Phonetics – Speech Sounds – Vowels and Consonants – Minimal Pairs Consonant Clusters- Past Tense Marker and Plural Marker- Testing Exercises

ICS Lab:

Understand: Spoken vs. Written language- Formal and Informal English.

Practice: Ice-Breaking Activity and JAM Session- Situational Dialogues – Greetings – Taking Leave –Introducing Oneself and Others.

Exercise – II

CALL Lab:

Understand: Structure of Syllables – Word Stress– Stress pattern in sentences – Intonation.

Practice: Basic Rules of Word Accent - Stress Shift - Weak Forms and Strong Forms- Stress pattern in sentences – Intonation - Testing Exercises

ICS Lab:

Understand: Features of Good Conversation – Strategies for Effective Communication.

Practice: Situational Dialogues – Role Play- Expressions in Various Situations –Making Requests and Seeking Permissions - Telephone Etiquette.

Exercise - III

CALL Lab:

Understand: Errors in Pronunciation-Neutralising Mother Tongue Interference (MTI).

Practice: Common Indian Variants in Pronunciation – Differences between British and American Pronunciation -Testing Exercises

ICS Lab:

Understand : Descriptions- Narrations- Giving Directions and Guidelines – Blog Writing

Practice : Giving Instructions – Seeking Clarifications – Asking for and Giving Directions – Thanking and Responding – Agreeing and Disagreeing – Seeking and Giving Advice – Making Suggestions.

Exercise – IV

CALL Lab:

Understand : Listening for General Details.

Practice : Listening Comprehension Tests - Testing Exercises

ICS Lab:

Understand : Public Speaking – Exposure to Structured Talks - Non-verbal Communication Presentation Skills.

Practice : Making a Short Speech – Extempore- Making a Presentation.

Exercise – V

CALL Lab:

Understand : Listening for Specific Details.

Practice : Listening Comprehension Tests -Testing Exercises

ICS Lab:

Understand : Group Discussion

Practice : Group Discussion

Minimum Requirement of infrastructural facilities for ELCS Lab:

1. Computer Assisted Language Learning (CALL) Lab:

The Computer Assisted Language Learning Lab has to accommodate 40 students with 40 Systems, with one Master Console, LAN facility and English language learning software for self-study by students.

System Requirement (Hardware component):

Computer network with LAN facility (minimum 40 systems with multimedia) with the following Specifications:

i) Computers with Suitable Configuration

ii) High Fidelity Headphones

2. Interactive Communication Skills (ICS) Lab:

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

Source of Material (Master Copy):

Exercises in Spoken English. Part 1,2,3. CIEFL and Oxford University Press

Note: Teachers are requested to make use of the master copy and get it tailor-made to suit the contents of the syllabus.

Suggested Software:

- Cambridge Advanced Learners' English Dictionary with CD.
- Grammar Made Easy by Darling Kindersley.
- Punctuation Made Easy by Darling Kindersley.
- Oxford Advanced Learner's Compass, 10th Edition.
- English in Mind (Series 1-4), Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge.
- English Pronunciation in Use (Elementary, Intermediate, Advanced) Cambridge University
- Press.
- English Vocabulary in Use (Elementary, Intermediate, Advanced) Cambridge University
- Press.
- TOEFL & GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS).
- Digital All
- Orell Digital Language Lab (Licensed Version)

REFERENCE BOOKS:

1. (2022). English Language Communication Skills – Lab Manual cum Workbook.Cengage Learning India Pvt. Ltd.
2. Shobha, KN &Rayen, J. Lourdes. (2019). Communicative English – A workbook. Cambridge University Press
3. Kumar, Sanjay &Lata, Pushp. (2019). Communication Skills: A Workbook. Oxford University Press
4. Board of Editors. (2016). ELCS Lab Manual: A Workbook for CALL and ICS Lab Activities. Orient Black Swan Pvt. Ltd.
5. Mishra, Veerendra et al. (2020). English Language Skills: A Practical Approach. Cambridge University Press

MALLA REDDY COLLEGE OF ENGINEERING ANDTECHNOLOGY

I Year B. TECH -II-SEM **L/T/P/C -/0/3/1.5**

(R24A0082)Applied Physics Lab

COURSE OBJECTIVES:

1. To experience the mechanical oscillations and resonance phenomena.
2. To verify the basic concepts of magnetism
3. To understand the concepts of laser and optical fibers.
4. To analyze voltage/current phase behavior of RC and LCR circuits.
5. To study the characteristics of semiconductor devices.

LIST OF EXPERIMENTS:

1. Melde's experiment –Frequency of electrical vibrator.
2. Stewart and Gee's method- Variation of magnetic field along the axis of current carrying coil.
3. Laser-Wavelength of light by using Diffraction grating.
4. CR circuit – Time constant of an RC circuit.
5. LCR Circuit- Quality factor and resonant frequency of LCR circuit.
6. LED -Characteristics of LED.
7. Solar cell -Characteristics of a Solar cell.
8. Optical fiber- Numerical aperture of an optical fiber.
9. Semiconductor-Energy gap of a given semiconductor.
10. Hall Effect – Hall coefficient of semiconducting samples.

REFERENCE BOOKS:

1. Practical physics by Dr. Aparna, Dr K.V Rao, V.G.S. Publications.
2. Engineering physics practical lab manual – MRCET.

COURSE OUTCOMES:

1. Students can analyze how stationary waves are produced to determine the frequency of vibrating bar in different modes.
2. Students can realize Tangent and Biot-Savart law of magnetism.
3. Wavelength of the given laser can be determined by using diffraction phenomenon.
4. By understanding basic electrical principles, Time constant of RC and resonance phenomenon of LCR circuits can be analyzed.
5. Energy gap and V-I characteristics of various semiconductor devices can be illustrated.

MALLA REDDY COLLEGE OF ENGINEERING ANDTECHNOLOGY

I Year B. TECH -II-SEM **L / T / P / C**

- /0 /3/1.5

(R24A0582) Data Structures and Algorithms Lab

COURSEOBJECTIVES:

1. To simulate searching and sorting techniques.
2. To understand a range of Object-Oriented Programming, as well as in-depth data and information processing techniques.
3. To know how linear data structures work
4. To illustrate non-linear data structures.
5. To develop programs for performing operations on Trees and Graphs.

LIST OF PROGRAMS:

1. a. Write a program to implement Linear Search
   b. Program on Binary search using oops concepts in python (iterative or non recursive function)

2. a. Write a program to arrange the following list in ascending order using bubble sort
   b. Write a program to arrange all the alphabets of "CSIPLEARNING" hubinto descending order using bubble sort

3. a. Write a python program to sort the following data using Selection sort
   b. Write a python program to sort the following data using Selection sort
   14, 21, 27, 41, 43, 45, 46, 57, 70

4. Write a Python program for implementation of MergeSort

5. a. Write a python program to implement Quick Sort Algorithm
   b. Write a python program to implement Quick sort using following list
   50, 23, 9, 18, 61, 32

6. a. Write a simple program to create class and object to access the class members
   b. Write a python program to Create Student Class
   c. Write a python program to Create Student Class with Constructor and Destructor

7. a. Write a program to implement single Inheritance
   b.Write a python program to implement multiple or multilevel inheritance
   c. Write a program to implement abstract classes

8. a. Write a program to implement Method Overloading
   b. Write a program to implement Method Overriding
   c. Write a python program to implement operator Overloading

9. Implement the following stack operations in python
   a. Insertion b. Deletion c. Display
   d. Implement a python program to reverse a string using stack

10. Implement the following Queue operations in python
    a. Insertion b. Deletion c. Display
11. Write a python program to implement a following singly linked list operations.
    a. Create a singly linked list
    b. Add the elements in single linked list
    c. Access elements from the singly linked list
    d. Remove elements from the singly linked list

12. Write a python program to implement a doubly linked list.
    a. Create a doubly linked list
    b. Add elements to a doubly linked list
    c. Access elements from the doubly linked list
    d. Remove elements from the doubly linked list.

13. a. Write a python program to implement stack a using list
    b. Write a python program to implement Queue using list

14. a. Write a program to implement any one operation on Binary Search Tre
    b.Write a python program to implement Binary tree traversal
    i. Preorder ii. Inorder iii. Postorder

COURSE OUTCOMES:

After completion of the course, the students should be able to:
1. Illustrate how searching and sorting can be done.
2. Interpret the concepts of Object-Oriented Programming as used in Python.
3. Implement stacks, queues and linked list.
4. Implement Non-Linear data structures like graphs
5. Solve problems using various trees

MALLA REDDY COLLEGE OF ENGINEERING ANDTECHNOLOGY

I Year B.TECH –II-SEM **L/T/P/C 2/0/0 /0**

(R24A0004) ENVIRONMENTAL SCIENCES

Course Objectives: On successful completion of this course, students will be able:

1. To differentiate the inter relationship between biotic and abiotic component.
2. To categorize various types of natural resources available on the earth surface.
3. To detect the causes, and control measures for various environmental pollution.
4. To articulate the issues related to solid waste and its management.
5. To understand the importance of ecological balance for sustainable development.

UNIT-I ECOSYSTEM (6 hours)

Definition: Scope, and Importance of ecosystem. **Classification**: natural and artificial ecosystems, **Structure**- abiotic and biotic component, functions of an ecosystem, food chains, food webs and ecological pyramids, biomagnification and bioaccumulation, ecosystem value, services and carrying capacity.

Activities: Case studies, poster making

UNIT-II NATURAL RESOURCES (6 hours)

Classification of Resources: Definition of natural resource, renewable and non -renewable resources.

Renewable resources: water resources: use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. **Land resources:** Forest functions and deforestation. **Energy resources:** growing energy needs-solar energy, hydro energy, biogas and biofuel.

Non-Renewable Resources: Fossil fuels, refining of coal, petroleum, and natural gas.

Activities: Case studies, News articles

UNIT-III ENVIRONMENTAL POLLUTION AND CONTROL MEASURES (6 hours)

Definition, Types of pollution: **Air Pollution:** Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards, control measures of air pollution and prevention techniques. **Water pollution:** causes, effects, control measures and techniques.

Activities: Work sheets, Debate

UNIT-IV SOLID WASTE MANAGEMENT AND GLOBAL ISSUES (6 hours)

Definition of Solid waste, characteristics of solid waste, solid waste management: collection to disposal methods, e-waste management techniques. **Global environmental Issues and efforts:** Climate change and impacts on human environment. Ozone depletion and Ozone depleting

substances (ODS).**International conventions/protocols:** Earth summit, Kyoto protocol, and Montreal Protocol, NAPCC-GOI Initiatives.
Activities: Quiz, seminars

UNIT-V SUSTAINABLE DEVELOPMENT (6 hours)
Introduction to concept of sustainable development: Sustainable development goals, threats and strategies to achieve sustainability. Sustainable developmental activities: Green building concept, Crazy Consumerism, Ecological Foot Print, Low carbon life style.
Activities: Seminars, slogans

SUGGESTED TEXT BOOKS

1. Textbook of Environmental Studies for Undergraduate Courses by ErachBharucha for University Grants Commission.
2. Environmental Studies by R. Rajagopalan, Oxford University Press.
3. Textbook of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications.
4. Dr. P. D Sharma, “Ecology and Environment”, Rastogi Publications, New Delhi, 12 Edition, 2015.

REFERENCE BOOKS

1. Environmental Studies by AnubhaKaushik, 4 Edition, New age international publishers.
2. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL Learning Pvt. Ltd, New Delhi.
3. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela. 2008 PHL Learning Pvt. Ltd, New Delhi.
4. Environmental Science by Daniel B. Botkin& Edward A. Keller, Wiley INDIA edition.

COURSE OUTCOMES: The basic concepts included in this course will help the student to:

1. Gain knowledge and appreciate the interdependence of environment with ecosystem.
2. Learn about natural resource, its importance and environmental impacts of human activities on natural resources.
3. Understand severity of environmental pollution, its impact on environment and evaluate relevant practices.
4. Develop empathy towards environment and apply the knowledge of recycling techniques associated with waste management.
5. Adopting sustainability as a practice into their lifestyle on the basis of ecological principles.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

B. TECH-II-YEAR-I-SEM **L/T/P/C**

3/1/-/4

(R24A0025) Numerical Methods and Complex Variables

Objectives: To learn

1. Numerical methods for solving ordinary differential equations.
2. The properties of Laplace Transform, Inverse Laplace Transform and Convolution theorem.
3. Differentiation and integration of complex valued functions. Evaluation of integrals using Cauchy's integral formula.
4. Taylor's series, and Laurent's series expansions of complex functions, evaluation of integrals using residue theorem.
5. Transform a given function from z - plane to w – plane. Identify the transformations like translation, magnification, rotation, reflection, inversion, and Properties of bilinear transformations.

UNIT– I:

Numerical Methods

Definition of Interpolation, Finding root by Iterative method, Solving first order ODE by Picards method, Taylors series method for solving second order ODE, Runge-Kutta method for solving second order ODE and Numerical Differentiation.

UNIT-II:

Laplace Transforms

Definition of Laplace 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, Periodic function.

Inverse Laplace transform by Partial fractions, 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.

UNIT–III:

Analytic functions

Complex functions and its representation on Argand plane, Concepts of limit, continuity, differentiability, Analyticity, and Cauchy-Riemann conditions, Harmonic functions – Milne – Thompson method. Line integral – Evaluation along a path and by indefinite integration – Cauchy's integral theorem (singly and multiply connected regions)–Cauchy's integral formula– Generalized integral formula.

UNIT– V:

Conformal Mappings

Conformal mapping: Transformation of z-plane tow-plane by a function, conformal transformation. Standard transformations- Translation; Magnification and rotation; inversion and reflection, Transformations like e^z , log z, z^2, and Bilinear transformation. Properties of Bilinear transformation, determination of bilinear transformation when mappings of 3 points are given (cross ratio).

TEXT BOOKS:

i) Higher Engineering Mathematics by B.S.Grewal, KhannaPublishers.
ii) Higher Engineering Mathematics by Ramana B.V,Tata Mc Graw Hill.
iii) Complex Variables: Theory and Applications by H.S Kasana.

REFERENCES:

i) Complex Variables by Murray Spiegel, Seymour Lipschutz, etal. By Schaum's out lines series.
ii) Advanced Engineering Mathematics by Kreyszig, John Wiley &Sons.
iii) Advanced Engineering Mathematics by Michael Greenberg–Pearson publishers.

Course Outcomes: After going through this course the students will be able to

1. Understand the Numerical differentiation and able to solve the second order ODE by Numerical methods.
2. Solve differential equations with initial conditions using Laplace Transformation.
3. Analyze the complex functions with reference to their analyticity and integration using Cauchy's integral theorem.
4. Find the Taylor's and Laurent series expansion of complex functions and solution of improper integrals can be obtained by Cauchy's-Residue theorem.
5. Understand the conformal transformations of complex functions can be dealt with Ease.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II YEAR B. Tech EEE–ISEM **L/T/P/C**

3/1/0/4

(R24A0202) ELECTRICAL MACHINES - I

Course Objectives:

1. To study and understand construction, operation and applications of DC generators
2. To study and understand construction, operation and applications of DC Motors
3. To study and understand the performance of DC machines by various testing methods
4. To study and understand construction, operation of single-phase transformers
5. To study and understand the performance of single-phase transformers by various testing methods and poly phase transformers

UNIT - I:

D.C. GENERATORS:

Principle of operation – constructional features – armature windings – lap and wave windings—E.M. F Equation, Numerical Problems. Armature reaction - Cross magnetizing and De-magnetizing AT/pole – compensating winding – interpoles. –. Types of d c generators – separately excited and self-excited generators – build-up of E.M.F in self-excited generator - causes for failure to self-excite and remedial measures- critical field resistance and critical speed, Characteristics and applications of shunt, series and compound generators.

UNIT - II:

D.C MOTORS:

Principle of operation – Significance of Back E.M.F. –Torque equation, Numerical Problems. Types of d c motors, Characteristics and Applications of shunt, series and compound motors. Speed control of D.C. Shunt Motors - Armature control and field or flux control methods. DC Motor starters - 3-point starters.

UNIT - III:

TESTING OF D.C. MACHINES:

Losses - Constant & Variable losses – Efficiency – condition for maximum efficiency, Numerical Problems. Methods of Testing: Direct Test (Brake test), Indirect Test (Swinburne's test) and Regenerative test (Hopkinson's test) - Field's test.

UNIT-IV

SINGLE PHASE TRANSFORMERS:

Principle of operation- constructional features- Types step-up and step down- EMF equation- Numeric problems- operation on no load and on load with phasor diagram-
Equivalent circuit- condition for maximum efficiency- losses and efficiency- regulation - All day efficiency- Numerical Problems. Applications.

UNIT - V:

TESTING OF TRANSFORMERS AND POLY-PHASE TRANSFORMERS:

Predetermination of efficiency and regulation by Open Circuit and Short Circuit tests - Sumpner's test – parallel operation with equal and unequal voltage ratios. -Auto transformers: Working principle and equivalent circuit.

Poly-phase transformers: Poly-phase connections - Y/Y, Y/Δ, Δ/Y, Δ/Δ, -Scott connection and Application.

TEXT BOOKS:

1. P. S. Bimbhra, "Electrical Machinery", Khanna Publishers, 2011
2. I. J. Nagrath and D. P. Kothari, "Electric Machines", McGraw Hill Education, 2010.

REFERENCE BOOKS:

1. Abhijith Chakrabarthi & Subitha Debnath, "Electrical Machines", Mc Graw Hill, 2015
2. A. E. Fitzgerald and C.Kingsley, "Electric Machinery", NewYork, McGraw Hill Education,2013

Course Outcomes: At the end of this course, students will be able to

1. Discuss the construction and operation of DC machine
2. Discuss the operation, starting and speed control of DC Motor
3. Use different tests to calculate the efficiency of DC machines
4. Explain the construction and operation of single phase transformers
5. Calculate the efficiency and regulation of single phase transformers

MALLAREDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II YEAR B. Tech EEE–I SEM **L/T/P/C**

3/0/0/3

(R24A0204) ELECTRICAL CIRCUITS ANALYSIS

COURSEOBJECTIVES:

1. To understand and analyze the DC Circuits
2. To evaluate network parameters of given electrical network.
3. To understand the concept of DC and AC Transients.
4. Tolearnthevariousconnectionsof3-phasecircuits and coupled circuits.
5. To study the locus diagrams of series and parallel combination of R-L-C –circuits and Concept of the concept of resonance.

UNIT-I

INTRODUCTION TO ELECTRICAL CIRCUITS:

Classification of Network Elements, Types of Sources, Source Transformation, Circuit Reduction Technique-Series and Parallel connection (R, L, C), Star-Delta and Delta –Star Transformation.

NETWORK THEOREMS:

Reciprocity Theorem, Maximum Power Transfer Theorem, Milliman's Theorem (DC SUPLLY ONLY)

UNIT-II NETWORK PARAMETERS:

Two port network parameters–Z, Y, ABCD and hybrid parameters. Condition for reciprocity and symmetry. Conversion of Z and Y parameters, Interconnection of Two port networks in series, parallel and cascaded configuration. (ALL PROBLEMS IN RESITANCE VALUES ONLY)

UNIT–III

TRANSIENT ANALYSIS:

Initial conditions, Transient response of R-L and R-C circuits for D.C. and A.C. excitations - Solution using differential equation method.

UNIT–IV:

THREE PHASE CIRCUITS:

Analysis of balanced and unbalanced 3-phase circuits, Star and delta connections, Measurement of three-phase power for balanced loads (single wattmeter method & two wattmeter method).

Coupled circuits: Concept of self and mutual inductance, Dot convention, Coefficient of coupling, Analysis of circuits with mutual inductance

UNIT – V:

LOCUS DIAGRAMS & RESONANCE:

Series and Parallel combination of R-L and R-C circuits with variation of various parameters. Resonance for series and parallel circuits, concept of band width and Q factor.

TEXTBOOKS:

1. William Hart Hayt, Jack Ellsworth Kemmerly,Steven M.Durbin(2007),Engineering CircuitAnalysis,7thedition,McGraw-HillHigher Education,New Delhi, India
2. Josepha. Edminister (2002), Schaum'soutlineofElectricalCircuits,4th edition, Tata Mc Graw Hill Publications, New Delhi, India.
3. A.Sudhakar, Shyam mohan S. Palli(2003), Electrical Circuits, 2ndEdition, Tata McGrawHil l,New Delhi

REFERENCE BOOKS:

1. L.Wadhwa(2008), Electric Circuits Analysis, 2ndedition,NewAgeInternationalPublications,New Delhi.
2. A.Chakrabarty (2010),CircuitTheory,5thedition,DhanpatRai&SonsPublications,New Delhi.
3. VanValkenburg, M.E.(1974),NetworkAnalysis,3rdEdition,PrenticeHallofIndia ,NewDelhi.
4. A Text Book on Electrical Technology. –BLTHERAJA, Vol1, S.Chand Publications.

COURSEOUTCOMES:

At the end of this course the students would be able to:

1. Analyze electric circuits using network theorems.
2. Understand and evaluate the different types of two portent work parameters.
3. Analyze the transient and steady-state response of electrical circuits.
4. Able to understand the concept of balanced and unbalanced loads in three phase circuits and coupled circuits.
5. Analyze the behavior of series and parallel R-L-C circuits at resonance basic concept of Locus diagrams of R-L, R-C series and parallel circuits.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II YEAR B. Tech EEE– I SEM **L/T/P/C**
3/0/0/3

(R24A0205) POWERSYSTEM-I

Prerequisite: Electrical Circuit Analysis. Course Objectives:

1. To understand the power generation through conventional and non-conventional sources.
2. To illustrate the economic aspects of power generation and tariff methods.
3. To calculate overhead transmission line inductances and capacitances.
4. To study the performance of transmission lines
5. To know about DC distribution systems

UNIT-I

GENERATION OF ELECTRIC POWER:

Conventional Sources Energy Sources: Layout and major components of Hydro station, Steam Power Plant, Nuclear Power Plant (Qualitative treatment only). Non-Conventional Energy Sources: Principles of Solar, Wind and Geothermal Power Generations (Elementary treatment only).

UNIT – II

ECONOMIC ASPECTS OF POWER GENERATION:

Definitions of Connected load, maximum demand, demand factor, load factor, diversity factor, Load duration curve, number and size of generator units. Base load and peak load plants.

Tariff Methods: Costs of Electrical Energy-Fixed, Semi-fixed and Running Cost. Types of Tariff: Simple, Flat Rate, Block-Rate, two-part, three –part, power factor tariff methods and Numerical Problems.

UNIT – III

OVER HEAD TRANSMISSION LINES:

Line conductors, inductance and capacitance of single phase and three phase lines with symmetrical and unsymmetrical spacing, Composite conductor transposition, bundled conductors, and skin and proximity effects.

UNIT - IV:

PERFORMANCE OF TRANSMISSION LINES:

Representation of lines, short transmission lines, medium length lines, nominal T and PI-representations, long transmission lines and Ferranti Effect.

CORONA: Introduction, disruptive critical voltage, corona loss, Factors affecting corona lossand methods of reducing corona loss, Disadvantages of corona.

UNIT-V:

DC DISTRIBUTION:

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

TEXT BOOKS:

1. C.L. Wadhwa, “Generation, Distribution and Utilization of Electrical Energy”, 2 n d Edition, New Age International, 2009.
2. V.K Mehta and Rohit Mehta, “Principles of Power Systems”, S. Chand & Company Ltd, New
Delhi, 2004.

REFERENCE BOOKS:

1. A. Chakrabarti, M.L. Soni, P.V. Gupta, U.S. Bhatnagar, “A Text book on Power System Engineering”, Dhanpat Rai Publishing Company (P) Ltd, 2008.
2. C.L. Wadhwa, “Electrical Power Systems”, 5 th Edition, New Age International, 2009.
3. M.V. Deshpande, “Elements of Electrical Power Station Design”, 3 rd. Edition, Wheeler Pub. 1998.
4. H.Cotton & H. Barber, “The Transmission and Distribution of Electrical Energy”, 3 rd. Edition, 1970.
5. W.D.Stevenson, “Elements of Power System Analysis”, 4 th Edition, McGraw Hill, 1984.

Course Outcomes:

After learning the contents of this paper the student must be able to

1. Understand the operation of conventional and renewable electrical power generating stations.
2. Evaluate the power tariff methods and Economics associated with power generation.
3. Analyze transmission line inductance and capacitance.
4. Analyze transmission line performance.
5. Analyze the operations of Distribution systems.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II YEAR B. Tech EEE– I SEM **L/T/P/C 3/0/0/3**

(R24A0207) ELECTRO MAGNETIC FIELDS

COURSE OBJECTIVES: -

1. To introduce the concepts of electric field, magnetic field.
2. To Analyze Maxwell's equation in different forms in Electrostatic, Magnetic time varying fields.
3. To solve the problems in different EM fields.
4. To analyze moving charges in Magnetic fields.
5. To understand electric and magnetic fields in the development of theory for electrical machines.

UNIT – I ELECTROSTATICS:

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 – Potential gradient – Gauss's law– Application of Gauss's Law – Maxwell's first law, div (D)=ρv – Laplace's and Poison's equations.

UNIT – II

DIELECTRICS & CAPACITANCE: Behavior of conductors in an electric field – Conductors and Insulators – Dielectric boundary conditions – Capacitance – Capacitance of parallel plates– spherical co-axial capacitors—– Current density – conduction and Convection current densities - Ohm's law in point form – Equation of continuity

UNIT – III MAGNETO STATICS:

Static magnetic fields – Boit-Savart's law – Magnetic field intensity (MFI)– MFI due to a straight current carrying filament – MFI due to circular, current Carrying wire – Relation between magnetic flux and magnetic flux density –Maxwell's second Equation, div(B)=0, Ampere's circuital law and its applications – Point form of Ampere's circuital law -Maxwell's third equation, Curl (H)=Jc

UNIT – IV

FORCE IN MAGNETIC FIELDS:

Magnetic force Moving charges in magnetic field – Lorentz force equation – Self and Mutual inductance – determination of self-inductance of a solenoid and torrid – energy stored and density in a magnetic field.

UNIT – V

TIME VARYING FIELDS:

Time varying fields – Faraday's laws of electromagnetic induction –
Its integral and point forms – Maxwell's fourth equation, Curl (E)=-dB/dt – Statically and Dynamically induced EMFs – Simple problems -Modification of Maxwell's equations for time varying fields – Displacement current.

TEXT BOOKS:

1. "William H.Hayt& John. A. Buck","Engineering Electromagnetic" ,Mc.Graw-HillCompanies, 7thEdition,2009.
2. "Sadiku", "Electromagnetic Fields", Oxford Publications, 4th Edition,2009.

REFERENCE BOOKS:

1. "CR Pauland S.A.Nasar", "Introduction to Electromagnetic", Mc GrawHill Publications, 3rd Edition, 1997.
2. "Nathan Ida", "Engineering Electromagnetic", Springer (India) Pvt. Ltd. 2 nd Edition, 2015.
3. "DJ Griffiths", "Introduction to Electro Dynamics", Prentice-HallofIndia Pvt.Ltd, 3rdedition, 1999.
4. "J.DKraus", "Electromagnetic" ,McGraw-HillInc. 4th edition, 1992.

COURSE OUTCOMES:

At the end of this course the students would be able to:

1. Understand The Basic Laws Of Electro Magnetism.
2. Obtain The Electric And Magnetic Fields For Simple Configurations Under Static Conditions.
3. Analyze Time Varying Electric And Magnetic Fields.
4. Understand Maxwell's Equation In Different Forms And Different Media.
5. Understand The Faraday's Law Of Electromagnetic Induction.

MALLA REDDY COLLEGE OF ENGINEERINGANDTECHNOLOGY

II YEAR B. Tech EEE– I SEM **L/T/P/C**
0/0/2/1

(R24A0282) Electrical Machines Laboratory-I

Course Objectives:

1. To conduct various tests on different D C Generators
2. To conduct various tests on different D C Motors
3. To perform different tests on Single and Three Phase Transformers

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

1. Magnetization characteristics of DC shunt generator (Determination of critical field resistance and critical speed)
2. Load test on DC shunt generator (Determination of characteristics)
3. Load test on DC series generator (Determination of characteristics)
4. Hopkinson's test on two identical DC shunt machines (Predetermination of efficiency)
5. Swinburne's test on DC Machine (Predetermination of efficiencies)
6. Speed control of DC shunt motor using Armature control and Field control Methods
7. Brake test on DC shunt motor (Determination of performance curves)
8. OC and SC Tests on Single Phase Transformer

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

1. Load test on DC compound generator (Determination of characteristics)
2. Field's test on two identical DC series machines (Determination of efficiency)
3. Brake test on DC compound motor (determination of efficiency)
4. Load Test on Single Phase Transformer (Calculate Efficiency and Regulation)
5. Measurement of Voltage, Current and Real Power in primary and Secondary Circuits of a Single-Phase Transformer.

TEXT BOOKS:

1. P. S. Bimbhra, "Electrical Machinery", Khanna Publishers, 2011
2. I.J. Nagrath and D. P. Kothari, "Electric Machines", McGraw Hill Education, 2010.

REFERENCE BOOKS:

1. Prithwiraj Purkait, Indrayudh Bandyopadhyay, "Electrical Machines", Oxford, 2017.
2. M. G. Say, "Performance and design of AC machines", CBS Publishers, 2002.
3. A. E. Fitzgerald and C. Kingsley, "Electric Machinery", New York, McGraw Education, 2013.
4. A. E. Clayton and N. N. Hancock, "Performance and design of DC machines", CBSPublishers, 2004.

Course Outcomes:

At the end of this course, students will demonstrate the ability to

1. to explain the operation of DC generators and motors, including their characteristics and performance.
2. to conduct experiments to determine the characteristics of DC shunt, series, and compound generators.
3. to conduct experiments to determine the efficiency and performance of DC machines, including Hopkinson's test and brake test.
4. to design and implement speed control systems for DC shunt motors.
5. to automate the characterization of DC shunt and series generators using modern tools and techniques

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II YEAR B. Tech EEE– I SEM **L/T/P/C**

0/0/2/1

(R24A0284) ELECTRICAL CIRCUITS ANALYSIS LAB

COURSE OBJECTIVES:

1. To learn the various connections of 3-phasecircuits.
2. To understand the concept of resonance and Locus Diagrams of RL and RC Series Circuit
3. To study the Z and Y Parameters of two Port networks.
4. To study and understand the Transmission (ABCD) and Hybrid parameters of Given electrical network.

The following experiments are required to be conducted as compulsory

1) Millman's Theorem
2) Maximum power transformation Theorem
3) Series and Parallel Resonance
4) Determination of Two port network parameters - Z and Y Parameters
5) Determination of Two port network parameters -Transmission (ABCD) parameters.
6) Measurement of Active Power for Star and Delta connected balanced loads
7) Measurement of Reactive Power for Star and Delta connected balanced loads
8) Reciprocity Theorem

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

1. Determination of Two port network parameters -Hybrid parameters.
2. Locus Diagrams of RL(R-varying) and RC(R-varying) Series Circuits
3. Determination of Co-efficient of Coupling and Separation of Self and Mutual inductance in a Coupled Circuits
4. Determination of Time response of first order RL & RC circuit for periodic sinusoidal inputs – Time Constant and Steady state error.

TEXTBOOKS:

1. William HartHayt, Jack Ellsworth Kemmerly, Steven M. Durbin(2007),Engineering CircuitAnalysis,7thedition,McGraw-HillHigherEducation,New Delhi, India
2. Josepha.Edminister(2002),Schaum'sout line of Electrical Circuits,4th edition, Tata Mc Graw Hill Publications, New Delhi, India.
3. A.Sudhakar,ShyammohanS.Palli(2003),ElectricalCircuits,2ndEdition,TataMcGr awHill,NewDelhi

REFERENCEBOOKS:

1. L.Wadhwa(2008),Electric Circuits Analysis,2ndedition, New Age International Publications, New Delhi.
2. A. Chakrabarty (2010), CircuitTheory,5th edition, Dhanpat Rai & Sons Publications, New Delhi.
3. Van Valkenburg, M.E. (1974), Network Analysis,3rd Edition, Prentice Hall of India, New Delhi.
4. A Text Book on Electrical Technology. – BL THERAJA, Vol1, S. Chand Publications.

COURSE OUTCOMES:

At the end of this course the students would be able to:

1. Analyze a given network by applying millman's Theorem.
2. Explain the basics of Series and Parallel Resonance.
3. To study the Transmission (ABCD) and Hybrid parameters of two port networks.
4. Explain clearly the calculations of three phase Active and Reactive power for Star and Delta connected balanced load.
5. Apply concepts of electrical circuits across engineering.

MALLA REDDY COLLEGE OF ENGINEERING ANDTECHNOLOGY

II YEAR B. Tech EEE– I SEM **L/T/P/C**
0/0/0/2

(R24A0285) ELECTRICAL SIMULATION TOOLS LABORATORY

Course Objectives:

1. To understand basic block sets of different simulation platform used in electrical/electronic circuit design.
2. To understand use and coding in different software tools used in electrical/
   a. electronic circuit design.
3. To understand the simulation of electric machines/circuits for performance analysis.

- **Any** ten experiments **need to be performed from the following experiments from various subject domains**

1. Introduction to basic matrix operations.
2. Generation of standard test signals using suitable simulation tools.
3. Measurement of Voltage, Current and Power in DC circuits.
4. Verification of different network theorems Thevenin's & Norton's with independent
5. sources using suitable simulation tools.
6. Verification of performance characteristics of basic Electronic Devices using suitable
7. simulation tools.
8. Analysis of series and parallel resonance circuits using suitable simulation tools
9. Obtain the response of R-L circuit with standard test signals using suitable simulation
10. tools.
11. Modeling and Analysis of Low pass and High pass Filters using suitable simulation
12. Tools
13. Performance analysis of DC motor using suitable simulation tools
14. Modeling of transformer using suitable simulation tools.
15. Analysis of single-phase bridge rectifier with and without filter using suitable
16. Simulation tools.
17. Modeling and Verification of Voltage Regulator using suitable simulation tools.
18. Modeling of transmission line using simulation tools.
19. Performance analysis of Solar PV model using suitable simulation tools

TEXT BOOKS:

1. M. H. Rashid, Simulation of Electric and Electronic circuits using PSPICE – by M/s PHI Publications.
2. Agam Kumar Tyagi, "MATLAB and SIMULINK for Engineers" OUP Publisher, 2012.
3. M. Gopal, "Control Systems: Principles and Design", McGraw Hill Education,1997.
4. C. K. Alexander and M. N. O. Sadiku, "Electric Circuits", McGraw Hill Education, 2004.

REFERENCE BOOKS:

1. Reference guides of related software's
2. Rashid, Spice for power electronics and electric power, CRC Press

Course Outcomes: At the end of this course, students will demonstrate the ability to

1. Analyze a given network by applying network Theorem.
2. Develop knowledge of software packages to model and program electrical and electronics systems.
3. Model different electrical and electronic systems and analyze the results.
4. Articulate importance of software packages used for simulation in laboratory experimentation by analyzing the simulation results.
5. Apply Concepts of electrical circuits across engineering.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

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

(R24A0005) FOREIGN LANGUAGE-FRENCH

INTRODUCTION

In view of the growing importance of foreign languages as a communication tool in some countries of the world, French has been identified as one of the most popular languages after English. As a result, French program is introduced to develop the linguistic and communicative skills of engineering students and to familiarize them to the French communication skills. This course focuses on basic oral skills.

COURSE OBJECTIVES

1. To inculcate the basic knowledge of the French language
2. To hone the basic sentence constructions in day-to-day expressions for communication in their vocation
3. To form simple sentences that aids in day-to-day communication
4. To prepare the students towards DELF A1
5. To develop in the student an interest towards learning languages.

UNIT - I:

Speaking: Introduction to the French language and culture –Salutations - French alphabet - Introducing people
Writing: Understand and fill out a form
Grammar: The verbs “to be ' and “to have '' in the present tense of the indicative
Vocabulary: The numbers from 1 to 20 - Professions- Nationalities

UNIT - II:

Speaking: Talk about one’s family – description of a person - express his tastes and preferences - express possession - express negation
Writing: Write and understand a short message
Grammar: Nouns (gender and number) - Articles - The–erverbs in the present-Possessive adjectives - Qualifying adjectives
Vocabulary: The family – Clothes-Colors- The numbers from 1 to 100-The classroom

UNIT - III

Speaking: Talk about your daily activities - be in time - ask and indicate the date and time - talk about sports and recreation - express the frequency
Writing: A letter to a friend
Grammar: The expression of time– The –ir verbs in the present- The verbs do, go, take, come,- Adverbs-Reflexive verbs
Vocabulary: The days and months of the year- The sports-Hobbies

UNIT - IV

Speaking: Express the quantity - ask and give the price - express the need, the will and the capacity - compare (adjective) - speak at the restaurant / in the shops
Writing: A dialogue between a vendor and a customer at the market
Grammar: Verbs “to want”, “to can”- Express capacity / possibility- Express will / desire – the future tense

Vocabulary: The food – Meals-Fruits and vegetables– The parts of the body

UNIT - V

Speaking: Express the prohibition and the obligation - describe an apartment - talk about the weather / ask the weather - ask the opinion - give your opinion - express your agreement or disagreement

Writing: Descriptions

Grammar: Demonstrative adjectives- Prepositions- The verb 'must' to indicate obligation and necessity in the present

Vocabulary: Seasons – Holidays-The city– Furniture

NOTE: The students are exposed to simple listening and reading activities.

REFERENCE BOOKS

1. Apprenons le Français 1& 2, New Saraswati House, 2015
2. A propos, A1, Langers International, 2010
3. Easy French Step-by-step by Myrna Bell Rochester
4. Ultimate French Beginner-Intermediate (Coursebook) By Livid Language
5. Ã L'Aventure: An Introduction to French Language and Francophone Cultures by Evelyne Charvier-Berman, Anne C. Cummings.

COURSE OUTCOMES

1. The students will be able to communicate in French at A1level.
2. The student will have an advantage in the competitive job market.
3. This course benefits the graduates when pursuing study opportunities in the countries where French is the official language.
4. The students will obtain the basic knowledge of the French language
5. The students are able to perform DELFA1

MALLA REDDY COLLEGE OF ENGINEERING &TECHNOLOGY

II Year B. TECH - II- SEM **L/T/P/C**

3 /0/0/3

(R24A0353) SOLID MECHANICS AND HYDRAULIC MACHINES

Course Objectives:

1. To identify an appropriate structural system and work comfortably with basic engineering mechanics.
2. To understand the meaning of centers of gravity, centroids, moments of Inertia and rigid body dynamics.
3. Study and develop basic understanding of important mechanisms, drives and materials used in the engineering and consumer industry in conjunction with other electrical
4. To Study the characteristics of hydroelectric power plant and Design of hydraulic machinery
5. To understand the working principle of different types turbines, pumps and motors that work on the principle of hydraulic

UNIT–I:

INTRODUCTION OF ENGINEERING MECHANICS:

Basic concepts of System of Forces-Coplanar Forces–Components in Space–Resultant- Moment of Forces and its Application – Couples and Resultant of Force System-Equilibrium of System of Forces-Free body diagrams- Support reactions different beams for different types of loading – concentrated & uniformly distributed.

UNIT–II:

CENTROID AND CENTER OF GRAVITY:

Centroids – Theorem of Pappus- Centre of Gravity of Bodies – Area moment of Inertia: –polar Moment of Inertia.

SIMPLE STRESSES AND STRAINS ANALYSIS:

Concept of stress and strain- St. Venant's Principle-Stress and Strain Diagram - Elasticity and plasticity – Types of stresses and strains- Hooke's law – stress – strain diagram for mild steel – Working stress – Factor ofsafety – Lateral strain, Poisson's ratio and volumetric strain.

UNIT–III:

Power Transmitting Devices:

Belts and belt drives and simple mechanisms, Rope drive, Gears & gear trains; Friction -Types of friction, Friction clutch (cone and single plate). Brakes and bearings (types and applications only); Applications of these devices.

UNIT-IV:

BASICS OF HYDRAULIC MACHINERY:

Hydrodynamic force of jets on stationary and moving flat, inclined and curved vanes, Jet striking centrally and at tip, Velocity triangles at inlet and outlet, expressions for work done and efficiency Elements of a typical Hydropower installation – Heads and efficiencies

UNIT-V:

TURBINES & PUMPS:

Classification of turbines – Pelton wheel – Francis turbine – Kaplan turbine –working, velocity diagram, work done and efficiency, hydraulic design. Draft tube – Classification, functions and efficiency. Pump installation details – classification – work done –losses and efficiencies – specific speed. Multistage pumps – pumps in parallel

TEXT BOOKS:

1. M.V. Seshagirirao and Durgaih, "Engineering Mechanics",University Press.
2. P.N Modi and Seth, "Fluid Mechanics and Hydraulic Machinery", standard Book House.

REFERENCE BOOKS:

1. B. Bhattacharya, "Engineering Mechanics", Oxford University Publications.
2. Hibbler, "Engineering Mechanics (Statics and Dynamics)", Pearson Education.
3. Fedrinand L. Singer, "Engineering Mechanics" Harper Collings Publishers.
4. A.K.Tayal, "Engineering Mechanics" , Umesh Publication.
5. Domkundwar & Domkundwar, "Fluid mechanics & Hydraulic Machines", Dhanpat Rai & C
6. R.C.Hibbeler, "Fluid Mechanics", Pearson India Education Servieces Pvt. Ltd
7. D.S.Kumar, "Fluid Mechanic & Fluid Power Engineering", Kataria & Sons Publications Pvt. Ltd.
8. Banga & Sharma, "Hydraulic Machines" Khanna Publishers.

Course Outcomes:

After learning the contents of this paper the student must be able to

1. Solve problems dealing with forces, beam and understand distributed force systems.
2. Solve friction problems and determine moments of Inertia and centroid of practical shapes.
3. Understand the inter dependence of the thrust areas in Mechanical Engineering with other core engineering subjects in today's engineering Industry.
4. Be conversant with all basic mechanisms, drives, brakes, bearings etc that are essential parts in today's engineering products and consumer systems
5. Apply knowledge of mechanics in addressing problems in hydraulic machinery and its principles that will be utilized in Hydropower development and for other practical usages

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II YEAR B. Tech EEE–II SEM **L/T/P/C**

3/0/0/3

(R24A0208) MEASUREMENTS AND INSTRUMENTATION

Prerequisites Electrical Circuit Analysis, Analog Electronics, Electro Magnetic Fields.

Course Objectives:

1. To impart knowledge on Construction, basic principles of all measuring instruments
2. To impart knowledge on working principles of Potentiometers and Instrument transformers
3. To acquire knowledge on Wattmeter and Energy meter.
4. To study different bridge circuits for finding R LC parameters.
5. To understand the basic concepts of smart and digital metering

UNIT - I:

INTRODUCTION TO MEASURING INSTRUMENTS:

Classification of torques – deflecting, control and damping torques, PMMC expression for the deflecting torque and control torque – Errors and compensations, moving iron type instruments – expression for the deflecting torque and control torque – Errors and compensations, extension of Ammeters using only single shunts resistance and extension of Voltmeters using only single series resistance and simple problems. Quadrant type Electrostatic Voltmeter- expression for the deflecting torque and control torque.

UNIT - II:

POTENTIOMETERS & INSTRUMENT TRANSFORMERS:

Principle and operation of D.C. Crompton's potentiometer – standardization A.C. Potentiometers: Drysdale polar and Gall-Tinsley co-ordinate type's standardization – applications.

UNIT - III:

MEASUREMENT OF POWER & ENERGY:

Single phase dynamometer wattmeter, expression for deflecting and control torques, single power factor meter, Single phase induction type energy meter – driving and braking torques – errors and compensations, Measurement of active and reactive powers in balanced

UNIT - IV:

DC & AC BRIDGES:

resistance measuring of low resistance by using Kelvin's double bridge, resistance measuring of medium resistance by using Whetstone's bridge–measurement of high resistance – megger. Measurement of inductance- Maxwell's bridge, Hay's bridge, Anderson's bridge. Measurement of capacitance –Desauty Bridge, Schering Bridge. Measurement of frequency -Wien's bridge.

UNIT - V:

TRANSDUCERS:

Definition of transducers, Classification of transducers, Advantages of Electrical transducers, Characteristics and choice of transducers; Principle of operation of LVDT and its Applications, Capacitance pressure transducer, definition of Strain gauge and Strain Gauge Factor Derivation only

TEXT BOOKS:

1. A. K. Sawhney, “Electrical & Electronic Measurement & Instruments”, Dhanpat Rai & Co Publications, 2005.
2. Dr. Rajendra Prasad, “Electrical Measurements & Measuring Instruments”, Khanna Publishers 1989.

REFERENCE BOOKS:

1.G. K. Banerjee, “Electrical and Electronic Measurements”, PHI Learning Pvt. Ltd., 2 Nd Edition, 2016.
2.R. K. Rajput, “Electrical & Electronic Measurement & Instrumentation”, S. Chand and Company Ltd., 2007
3.E.W. Golding and F. C. Widdis, “Electrical Measurements and measuring Instruments”, fifth Edition, Wheeler Publishing, 2011.
4. Reissland, M. U, “Electrical Measurements: Fundamentals, Concepts, Applications”, New Age International (P) Limited Publishers, 1st Edition 2010.

Course Outcomes:

At the end of this course, students will

1. demonstrate the ability to Classify measuring instruments and discuss their construction, operation and characteristics.
2. Discuss the Potentiometers and Instrument Transformers.
3. Demonstrate the working principles of wattmeter and Energy meter.
4. Calculate all circuit parameters.
5. Classify Transducers and discuss the concepts of smart and digital metering

MALLA REDDY COLLEGE OF ENGINEERING ANDTECHNOLOGY

II YEAR B. Tech EEE– II SEM **L/T/P/C**

3/0/0/3

(R24A0203) ELECTRICAL MACHINES-II

Pre requisites: Electrical Circuit Analysis& Electrical Machines-I

Course Objectives:

1. To impart knowledge on Construction, principle of operation of three phase induction motors.
2. To impart knowledge on the performance, Starting and speed control of three phase induction motors.
3. To acquire knowledge on the Alternators.
4. To study the concept of parallel operation of alternators and synchronous motors
5. To understand operation, construction and types of single-phase motors and their applications in household appliances.

UNIT - I:

THREE PHASE INDUCTION MOTOR:

Constructional details of squirrel cage and slip ring(wound rotor) motors, production of a rotating magnetic field, principle of operation -rotor EMF and rotor frequency – rotor reactance, rotor current and Power factor at stand still and during operation. Rotor power input, rotor copper loss and mechanical power developed. and their inter relation.

UNIT - II:

CHARACTERISTICS OF THREE PHASE INDUCTION MOTOR:

Torque equation-expressions for maximum torque and starting torque - torque slip characteristic – equivalent circuit - phasor diagram - No-load Test and Blocked rotor test – Predetermination of performance. Applications. Induction generator-principle of Operation.

STARTING AND SPEED CONTROL METHODS: Methods of starting, Methods of speed control Change of voltage, change of frequency, voltage/frequency, and injection of an EMF into rotor circuit (qualitative treatment only).

UNIT - III:

SYNCHRONOUS GENERATOR:

Constructional Features of Cylindrical (round) rotor and salient pole machines –Armature windings – Integral slot and fractional slot windings, Distributed and concentrated windings –distribution, pitch and winding factors – E.M.F Equation. – armature reaction - leakage reactance – synchronous reactance and impedance – experimental determination - phasor diagram – load characteristics. Regulation by synchronous impedance method, M.M.F. method and Z.P.F. method.

UNIT - IV:

PARALLEL OPERATION OF SYNCHRONOUS GENERATORS:

Synchronizing alternators with infinite bus bars – synchronizing power torque – parallel operation and load sharing - Effect of change of excitation and mechanical power input.

SYNCHRONOUS MOTORS: Theory of operation – phasor diagram – Variation of current and power factor with excitation – synchronous condenser – Hunting and its suppression –Methods of starting.

UNIT - V:

SINGLE PHASE MOTORS:

Single phase induction motor – Constructional Features-Double revolving field theory – split-phase motors – Shaded pole motor- AC series motor- Universal Motor- Applications--Stepper Motor- Brushless DC motor.

TEXT BOOKS:

1. P. S. Bimbhra, “Electrical Machinery”, Khanna Publishers, 2011.
2. I.J. Nagrath and D. P. Kothari, “Electric Machines”, McGraw Hill Education,2010

REFERENCE BOOKS:

1. Prithwiraj Purkait, Indrayudh Bandyopadhyay, “Electrical Machines”, Oxford,2017.
2. M. G. Say, “Performance and design of AC machines”, CBS Publishers, 2002
3. A. E. Fitzgerald and C. Kingsley, "Electric Machinery”, New York, McGraw Hill Education, 2013
4. A. E. Clayton and N. N. Hancock, “Performance and design of DC machines”, CBS Publishers, 2004.Course Outcomes: At the end of this course students will demonstrate the ability to
5. Discuss the Construction and the principle of operation of three phase induction motors.

the performance and discuss the methods of Starting and speed control of three phase induction motors.

6. Calculate the voltage regulation of different alternators by using different methods.
7. Discuss the concept of parallel operation of alternators and describe the synchronous motors
8. Classify various types of single-phase motors.

COURSE OUTCOMES:

After the completion of this laboratory course, the student will be able to

1. Set up testing strategies and select proper instruments to evaluate performance characteristics of electrical machines.
2. Estimate constraints, uncertainties and risks of the system (social, environmental, business, safety issues etc.)
3. Combine an understanding of the established principles, theories, concepts and terminology relevant to electrical machines with practical laboratory experimentation
4. Develop testing and experimental procedures on different types of electrical machines and analyze their operation under different loading conditions.
5. Originate a professional experience on working in a power plant or any practical field and to be ready for life-long involvement in the farther improvement of relevant technology.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II Year B. Tech EEE-II SEM **L/T/P/C**
3/0/0/3

(R24A0461) ANALOG & DIGITAL ELECTRONICS

OBJECTIVES

The main objectives of the course are:

1. Learn the concepts of load line analysis and biasing techniques
2. Learn the concepts of small signal analysis of BJT and FET
3. To understand basic number systems codes and logical gates.
4. To introduce the methods for simplifying Boolean expressions
5. To outline the formal procedures for the analysis and design of combinational circuits and sequential circuits

UNIT-I

BJT Biasing:

Transistor Biasing and Stabilization - Operating point, DC & AC load lines, Biasing - Fixed Bias, Self- Bias, Bias Stability, Bias Compensation using Diode and Transistor amplifying action.

Signal Low Frequency BJT Amplifiers: Transistor Hybrid model, Determination of h-parameters from transistor characteristics, Typical values of h- parameters in CE, CB and CC configurations

UNIT-II

Transistor at High Frequency:

Hybrid π model of Common Emitter transistor model and derivation of Hybrid π model elements.

FET Amplifiers: Analysis of Common Source and Common Drain JFET Amplifiers, Comparison of performance with BJT Amplifiers

UNIT-III

Number System and Boolean Algebra:

Number Systems, Base Conversion Methods, Complements of Numbers, Codes- Binary Codes, Binary Coded Decimal, Unit Distance Code, Digital Logic Gates (AND, NAND, OR, NOR, EX-OR, EX-NOR), Properties of XOR Gates, Universal Gates, Basic Theorems and Properties, Switching Functions, Canonical and Standard Form.

UNIT-IV

Minimization Techniques:

The Karnaugh Map Method, three variables, Prime and Essential Implications, Don't Care Map Entries, Using the Maps for Simplifying, Multilevel NAND/NOR realizations.

UNIT-V

Combinational Circuits:

Design procedure – Half adder, Full Adder, Half sub-tractor, Full sub-tractor, Multiplexer/De-multiplexer Sequential circuits: Latches, Flip-Flops-SR, JK, D, T and master slave, characteristic tables and equation.

TEXT BOOKS:

1. "Electronic Devices & Circuits", Special Edition – MRCET, McGraw Hill Publications, 2017.
2. Integrated Electronics Analog Digital Circuits, Jacob Millman and D. Halkias, McGraw Hill.
3. Electronic Devices and Circuits, S.Salivahanan, N.Suresh kumar, McGraw Hill.
4. M. Morris Mano, Digital Design, 3rd Edition, Prentice Hall of India Pvt. Ltd., 2003 /Pearson Education (Singapore) Pvt. Ltd., New Delhi, 2003.
5. Switching and Finite Automata Theory- Zvi Kohavi & Niraj K. Jha, 3rd Edition, Cambridge.

REFERENCE BOOKS:

1. Electronic Devices and Circuits,K.Lal Kishore B.S Publications
2. Electronic Devices and Circuits, G.S.N. Raju, I.K. International Publications, New Delhi, 2006.
3. John F.Wakerly, Digital Design, Fourth Edition, Pearson/PHI, 2006
4. John.M Yarbrough, Digital Logic Applications and Design, Thomson Learning, 2002.
5. Charles H.Roth. Fundamentals of Logic Design, Thomson Learning, 2003.

OUTCOMES:

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

1. Design the amplifiers with various biasing techniques
2. Design single stage amplifiers using BJT and FET
3. Understand the basic postulates of Boolean algebra and shows the correlation between Boolean expressions
4. Learn the methods for simplifying Boolean expressions
5. Understand the formal procedures for the analysis and design of combinational circuits and sequential circuits

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II YEAR B. Tech EEE– II SEM **L/T/P/C**
3/0/0/3

(R24A0206) POWER SYSTEM - II

Pre requisite: Power system-1 & Electromagnetic Fields

COURSE OBJECTIVES:

1. To know about AC distribution systems
2. To understand the concept of voltage control & PF improvement.
3. To understand and develop Y bus matrices
4. To understand and develop Z bus matrices
5. To understand the concepts load flow studies.

UNIT-I:

A.C. DISTRIBUTION:

Introduction, AC distribution, Single phase, 3-phase, 3 phase 4 wire system, bus bar arrangement. 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-II:

VOLTAGE CONTROL & POWER FACTOR IMPROVEMENT:

Introduction – methods of voltage control, shunt and series capacitors, tap changing transformers, synchronous condenser, power factor improvement methods.

UNIT III:

POWER SYSTEM NETWORK MATRICES:

Bus Incidence Matrix, Y-bus formation by Direct and Singular Transformation Methods, Numerical Problems.

UNIT IV:

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 buses

UNIT–V

LOAD FLOW STUDIES:

Derivation of Static load flow equations. Load Flow Solutions Using Gauss Seidel Method & Newton Raphson Method (Polar coordinates only): Acceleration Factor, Load flow solution with and without P-V buses, Algorithm and Flow chart. 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.

TEXT BOOKS:

1. C.L. Wadhwa, Electrical Power Systems, 3rd Edn, New Age International Publishing Co., 2001.
2. D.P.Kothari and I.J.Nagrath, Modern Power System Analysis, 4th Edn, Tata McGraw Hill Education Private Limited2011.

REFERENCE BOOKS:

1. D. P. Kothari: Modern Power System Analysis-Tata McGraw Hill Pub. Co. 2003
2. Hadi Scadat: Power System Analysis – Tata McGraw Hill Pub. Co.2002
3. W.D. Stevenson: Elements of Power system Analysis – McGraw Hill International Student Edition.

COURSE OUTCOMES:

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

1. Analyze the operations of AC Distribution systems.
2. Analyze voltage Control and Power factor improvement.
3. Evaluate the admittance matrix of a given power systems.
4. Evaluate the impedance matrix of a given power systems.
5. Understand the concept of load flow studies in power system.

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0/0/2/1

(R24A0471) ANALOG AND DIGITAL ELECTRONICS LAB

COURSE OBJECTIVES:

1. To conduct experiment and plot input and output characteristics of BJT in different configurations.
2. To analyze various amplifiers such as Common Emitter, Common Collector amplifiers
3. To study and verify Basic Gates (AND, OR & NOT), Universal Gates (NAND & NOR) and implement Boolean Functions using the gates.
4. To realize Digital Circuits for various applications.

(For Laboratory Examination – Minimum of 10 experiments)

1. Input and output characteristics of a BJT in CE configuration
2. Input and output characteristics of a BJT in CB configuration
3. Calculation of h-Parameters of CB Configuration from Input and Output Characteristics
4. Calculation of h-Parameters of CE Configuration from Input and Output Characteristics
5. Frequency Response of CE Amplifier
6. Frequency Response of CC Amplifier
7. FET Characteristics
8. Study and verification of Basic Gates (AND, OR &NOT)
9. Study and verification of Universal Gates (NAND &NOR)
10. Implementation of the given Boolean function using logic gates
11. Realization of Half Adder& Full Adder using Basic gates
12. Realization of Half Subtractor & Full Subtractor using Basic gates
13. Multiplexer and De-Multiplexer
14. Encoder and Decoder

COURSE OUTCOMES

1. Conducting experiment and plotting input and output characteristics of BJT in different configurations.
2. Analyze various amplifiers such as Common Emitter, Common Collector amplifiers
3. Studying and verifying Basic Gates (AND, OR & NOT), Universal Gates (NAND & NOR) and implement Boolean Functions using the gates.
4. Realizing Digital Circuits for various application

Major Equipment required for Laboratories:

1. Conducting experiment and plotting input and output characteristics of BJT in different configurations.
2. Analyze various amplifiers such as Common Emitter, Common Collector amplifiers
3. Studying and verifying Basic Gates (AND, OR &NOT), Universal Gates (NAND&NOR) and implement Boolean Functions using the gates.
4. Implement Applications of Combinational & Sequential logic circuits
5. Examine various arithmetic and logical combinational circuits

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0/0/2/1

(R24A0286) MEASUREMENTS AND INSTRUMENTATION LABORATORY

COURSE OBJECTIVES:

The objectives of the course are to make the students learn about:

1. To calibrate LPF Watt Meter, energy meter, P.F Meter using electro dynamometer type instrumentals the standard instrument.
2. To determine unknown inductance, resistance, capacitance by performing experiments on D.C Bridges &A.C Bridges.
3. To determine three phase active & reactive powers using single wattmeter method practically. Measurement of parameters of choke coil
4. To determine the ratio and phase angle errors of current transformer and potential transformer.
5. Measuring earth resistance, dielectric strength of transformer oil & Testing of underground cables

The following experiments are required to be conducted as compulsory

1. Calibration and Testing of single phase energy Meter
2. Measurement of low resistances by Kelvin's double Bridge
3. Measurement of capacitance by Schering Bridge
4. Measurement of inductance by Anderson Bridge
5. Measurement of parameters of a choke coil using 3 voltmeter and 3 ammeter methods.
6. Calibration of LPF wattmeter by Phantom testing
7. Calibration of dynamometer type power factor meter
8. Measurement of reactive power using single wattmeter in three-phase circuit

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

1. Measurement of voltage, current and resistance using DC potentiometer
2. Measurement of load with the help of strain gauges
3. Measurement of voltage, frequency &phase with the help of CRO
4. Dielectric testing of transformer oil
5. Measurement of Displacement with the help LVDT

TEXT BOOKS:

- A. K. Sawhney, "Electrical & Electronic Measurement & Instruments", Dhanpat Rai & Co. Publications, 2005.
- Dr. Rajendra Prasad, "Electrical Measurements & Measuring Instruments", Khanna Publishers 1989.

REFERENCE BOOKS:

- E.W. Golding and F. C. Widdis, "Electrical Measurements and measuring Instruments", fifth Edition, Wheeler Publishing, 2011.
- Reiss land, M. U, "Electrical Measurements: Fundamentals, Concepts, Applications", New Age International (P) Limited Publishers, 1st Edition 2010.

COURSE OUTCOMES:

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

1. Calibrate various electrical measuring/recording instruments. Get the ability to choose instruments and can test any instrument can find the accuracy of any instrument by performing experiment can calibrate PMMC instrument using D.C potentiometer.
2. Accurately determine the values of inductance and capacitance using a.c bridges Accurately determine the values of very low resistances
3. Measure reactive power in 3-phase circuit using single wattmeter
4. Determine ratio error and phase angle error of CT
5. Students should be able to test current transformers and dielectric strength of oil. Students should be able to calibrate LVDT and resistance strain gauge.

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0/0/2/1

(R24A0283) ELECTRICAL MACHINES LABORATORY-II

Prerequisite: Electrical Machine-I and Electrical Machines-II

Course Objectives:

1. To perform different tests on different Transformers
2. To conduct various tests on different Induction motors
3. To conduct various tests on different Synchronous Machines

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

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

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

1 Scott Connection of transformer.
2 Parallel operation of Single-phase Transformers.
3 Regulation of three-phase alternator by Z.P.F..
4 Measurement of sequence impedance of a three-phase alternator.
5 Efficiency of a three-phase alternator.

TEXT BOOKS:

1. P. S. Bimbhra, "Electrical Machinery", Khanna Publishers, 2011
2. I.J. Nagrath and D. P. Kothari, "Electric Machines", McGraw Hill Education,2010.

REFERENCE BOOKS:

1. Prithwiraj Purkait, Indrayudh Bandyopadhyay, "Electrical Machines", Oxford,2017

2. M. G. Say, "Performance and design of AC machines", CBS Publishers, 2002.
3. A. E. Fitzgerald and C. Kingsley, "Electric Machinery", New York, McGraw Hill Education, 2013.
4. A. E. Clayton and N. N. Hancock, "Performance and design of DC machines", CBS Publishers,2004.

Course Outcomes: At the end of this course, students will demonstrate the ability to

1. Set up testing strategies and select proper instruments to evaluate performance characteristics of electrical machines.
2. Estimate constraints, uncertainties and risks of the system (social, environmental, business, safety issues etc.)
3. Combine an understanding of the established principles, theories, concepts and terminology relevant to electrical machines with practical laboratory experimentation
4. Develop testing and experimental procedures on different types of electrical machines and analyze their operation under different loading conditions.
5. Originate a professional experience on working in a power plant or any practical field and to be ready for life-long involvement in the farther improvement of relevant technology

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(R24A0061) PUBLIC POLICY & GOVERNANCE

Course objectives:

1. To make the students understand in-depth analysis of public policy and to solve its ills prevailing in the society.
2. To provide an opportunity for the students to learn the basic areas of public policy analysis, implementation and evaluation.
3. To make understand the process and various approaches in public policy making.
4. To understand the theories and issues of social coordination and the nature of all patterns of rule.
5. To make the students understand the techniques of governance and emerging trends in public and private governance its policy-making and implementation.

Unit-I

Introduction of Public Policy:

Definition, Nature, Scope and Importance of Public Policy, Evolution of Public Policy and Policy Sciences, Public Policy and Public Administration.

Approaches to Public Policy Analysis:

The Process Approach, The Logical Positivist Approach, The Phenomenological Approach, The Participatory Approach and Normative Approach

Unit-II

Theories and Process of Public Policy Making:

Theories and Models of Policy Making, Perspectives of Policy Making Process, Institutions of Policy Making.

Unit-III

Policy Implementation and Evaluation:

Concept of Policy Implementation, Techniques of Policy Implementation, Concept of Policy Evaluation, Constraints of Public Policy Evaluation

Unit-IV

Introduction of Governance:

Definitions, Issues and Controversies, Reinventing Government, Reforming Institutions: The State, Market and Public domain. **State and Governance:** Origin and types of State, Democratic State and Democratic Administration, Neo-Liberalism and Rolling Back State and Governance as Government.

Unit-V

Citizen and Techniques of Governance:

Rule of Law and Human Rights, Accountability, Participation, Representation.

Techniques of Governance:

Openness and Transparency, Citizen Charter, Social Audit.

Emerging Trends in Public and Private Governance:

An Overview, Market, Civil Society, Information and Communication Technology.

TEXT AND REFERENCE BOOKS:

1. Introduction to Public Policy- Charles Wheelan, Naked Economics 2010.
2. Birkland Thomas A., (2005), An Introduction to The Policy Process: Theories, Concepts, and Models of Public Policy Making, Armonk; M.E. Sharpe.
3. Anderson J.E., (2006) Public Policy-Making: An Introduction, Boston, Houghton
4. Bardach, Eugene (1977), The Implementation Game: What Happens After a Bill Becomes a Law, Cambridge, MA: MIT.
5. Bell, S., and Hind moor, A. (2009) Rethinking Governance: The Centrality of the State in Modern Society, Cambridge: Cambridge University Bell, Stephen and Andrew Hind moor.
6. Joyee M. Mitchell & William C. Mitchell, Political Analysis & Public Policy: An Introduction to Political Science, Thomson Press Limited, New Delhi, 1972.
7. R.K. Sapru, Public Policy, Art and Craft of policy Analysis, PHI learning private limited, New Delhi, 2011.
8. Brian W. Hogwood & Lewis A. Gunn, Policy Analysis for the Real world, Oxford University, Press, 1986.

COURSE OUTCOMES

After completion of the course, student will be able to

1. Understand public policy analysis and they will be able to understand policy evaluation and implementation.
2. Understand the public policy and governance on the largest gamut of its canvas.
3. Students will understand the what are emerging trends in public and private governance and various theories in public policy making.
4. Student understand the reinventing government and concept of neo-liberalism.
5. Understand the rule of law and human rights, citizen charter.