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.

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MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India) (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.

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

VISION

- To evolve into a centre of excellence in Engineering & Technology through creative and innovative practices in teaching-learning, promoting academic achievement & research excellence to produce internationally accepted competitive and world class professionals.

MISSION

- To provide high quality academic programmes, training activities, research facilities and opportunities supported by continuous industry institute interaction aimed at employability, entrepreneurship, leadership and research aptitude among students.

QUALITY POLICY OF THE DEPARTMENT

- Impart up-to-date knowledge to the students in Electronics & Communication area to make them quality engineers.
- Make the students experience the applications on quality equipment and tools
- Provide systems, resources and training opportunities to achieve continuous improvement.
- Maintain global standards in education, training and services.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEO1: PROFESSIONALISM & CITIZENSHIP

- To professionally with due create and sustain a community of learning in which students acquire knowledge and learn to apply it consideration for ethical, ecological and economic issues.

PEO2: TECHNICAL ACCOMPLISHMENTS

- To provide knowledge-based services to satisfy the needs of society and the industry by providing hands on experience in various technologies in core field.

PEO3: INVENTION, INNOVATION AND CREATIVITY

- To make the students to design, experiment, analyse, interpret in the core field with the help of other multi-disciplinary concepts wherever applicable.

PEO4: PROFESSIONAL DEVELOPMENT

- To educate the students to disseminate research findings with good soft skills and become a successful entrepreneur.

PEO5: HUMAN RESOURCE DEVELOPMENT

- To graduate the students in building national capabilities in technology, education and research.

PROGRAMME SPECIFIC OUTCOMES (PSOs)

PSO1

- To develop a student community who acquire knowledge by ethical learning and fulfil the societal and industry needs in various technologies of core field.

PSO2

- To nurture the students in designing, analysing and interpreting required in research and development with exposure in multi-disciplinary technologies in order to mould them as successful industry ready engineers/entrepreneurs.

PSO3

- To empower students with all round capabilities who will be useful in making nation strong in technology, education and research domains.

PROGRAM OUTCOMES (POs)

Engineering Graduates will be able to:

PO1-Engineering knowledge:

- Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2-Problem analysis:

- Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3- 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.

PO4- 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.

PO5- Modern tool usage:

- Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

PO6- 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.

PO7- 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.

PO8- Ethics:

- Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9- Individual and team work:

- Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10- 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.

PO11- Project management and finance:

- Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multi-disciplinary environments.

PO12-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 I YEAR- COURSE STRUCTURE

(CSE-AI&ML/CSE-CS/ECE/EEE/MEC/ANE)

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 I SEMESTER

S.No.	Course Code	Course Title	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R24A0401	Analog Circuits	3	1	0	4	40	60
2	R24A0261	Network analysis and Synthesis	3	0	0	3	40	60
3	R24A0402	Digital Logic Design	3	0	0	3	40	60
4	R24A0403	Signals and Systems	3	1	0	4	40	60
5	R24A0404	Probability Theory and Stochastic Processes	3	0	0	3	40	60
6	R24A0481	Analog Circuits Laboratory	0	0	2	1	40	60
7	R24A0482	Digital logic Design Laboratory	0	0	2	1	40	60
8	R24A0483	Basic Simulation Laboratory	0	0	2	1	40	60
9	R24A0008 R24A0005	Constitution of India/ Foreign Language: French	3	0	0	0	100	-
		Total	**18**	**2**	**6**	**20**	**420**	**480**

II YEAR II SEMESTER

S.No.	Course Code	Course Title	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R24A0025	Numerical Methods and Complex Variables	3	0	0	3	40	60
2	R24A0405	Electromagnetic Fields and Transmission Lines	3	0	0	3	40	60
3	R24A0406	Analog and Digital Communications	3	0	0	3	40	60
4	R24A0407	Linear and Digital IC Applications	3	0	0	3	40	60
5	R24A0408	Electronic Circuit Analysis	3	0	0	3	40	60
6	R24A0484	Analog and Digital Communications Laboratory	0	0	2	1	40	60
7	R24A0485	Linear and Digital IC Applications Laboratory	0	0	2	1	40	60
8	R24A0486	Electronic Circuit Analysis Laboratory	0	0	2	1	40	60
9	R24A0487	Real Time Project/Field Based Project	0	0	4	2	100	-
10	R24A0061	Public policy & e Governance	0	0	2	0	-	-
		Total	**15**	**0**	**12**	**20**	**420**	**480**

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
(Common to All Branches)

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 usage of arrays and functions 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:

- Understand the internal structure of computer system and learn to diagnose minor problems with the computer functioning.
- 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
- To obtain the knowledge about Electrical wiring and Soldering – Desolderingprocedures.
- To provide hands on experience in usage of different engineering materials, tools equipments and processes which are common in the engineering field.
- 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:

- Ability to identify, assemble and troubleshoot the major components of a computerand perform the installation of Operating System.
- Capacity to make effective usage of the internet for academics and developprofessional documents, spreadsheets and presentations.
- Students will be able to understand the domestic, illumination, stair-case wiringprocedures and soldering de soldering practice
- The student will have hands-on experience on manufacturing of components usingdifferent trades of engineering processes
- 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 IIlich, 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.

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.

UNIT-I

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

Vocabulary : The 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**intheformofhandoutsbasedonthe needsofthestudentsintheirrespective 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.

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

(Mandatory Course)

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.

B. TECH SYLLABUS

II YEAR- I SEMESTER

R24-REGULATION

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II Year B.Tech. ECE- I Sem **L/T/P/C 3/1/-/4**

(R24A0401) ANALOG CIRCUITS

COURSE OBJECTIVES:

1. Learn the concepts of, load line analysis and biasing techniques
2. Learn the concepts of high frequency analysis of transistors.
3. To give understanding of various types of amplifier circuits
4. Learn the concepts of small signal analysis of BJT and FET
5. To familiarize the Concept of feedback in amplifiers so as to differentiate betweennegative and positive feedback.

UNIT – I

BJT Biasing: Transistor Biasing and Stabilization - Operating point, Need for biasing, DC Load line, Biasing - Fixed Bias, Self-Bias, Bias Stability, Bias Compensation using Diode.

Analysis and Design of Small Signal Low Frequency BJT Amplifiers: Transistor Hybrid model, Analysis of single stage transistor amplifier using h-parameters: voltage gain, current gain, Input impedance and Output impedance. Comparison of transistor configurations in terms of A_i, R_i, A_V and R_O.

UNIT –II

BJT Amplifiers-Frequency Response: Frequency response of an amplifier, Analysis at low and High Frequencies, Hybrid-pi (π) common emitter transistor model, Calculation of hybrid- π model parameters, Millers theorem and its dual.

Multistage Amplifiers: Distortion in amplifiers, Analysis of cascaded BJT amplifier, Darlington pair, coupling schemes-RC coupled amplifier, Transformer coupled amplifier, and Direct coupled Amplifier.

UNIT – III

FET-Biasing and FET Amplifiers: FET biasing: fixed bias and self-bias. FET Amplifiers: Analysis of Common source (C.S), Common Drain (C.D) JFET Amplifiers, comparison of performance with BJT Amplifiers, Basic Concepts of MOSFET Amplifiers.

UNIT –IV

FEEDBACK AMPLIFIERS: Concept of Feedback and types, Effects of negative feedback on amplifiers characteristics, voltage series, current series, current shunt, and voltage shunt feedback amplifiers**.**

UNIT –V

OSCILLATORS: Classification of oscillators, Barkhausen criterion, RC phase Shift oscillator, Wien-bridge oscillator, LC oscillators- Hartley and Colpitts oscillator.

TEXT BOOKS:

1. Jacob Millman, Christos C Halkias -Integrated Electronics, McGraw Hill Education.
2. Robert L. Boylestead, Louis Nashelsky -Electronic Devices and Circuits theory, 11th Edition,2009, Pearson

REFERENCE BOOKS:

1. David A. Bell – Electronic Devices and Circuits, 5th Edition, Oxford.
2. Adel S. Sedra, Kenneth C. Smith- Microelectronic Circuits- Theory and Applications, Oxford.
3. Chinmoy Saha, Arindam Halder, Debaati Ganguly -Basic Electronics-Principles andApplications, 2018, Cambridge.

COURSE OBJECTIVES:

Upon completing this course, the students will be able to

1. Design the amplifiers with various biasing techniques.
2. Design single stage amplifiers using BJT and FET
3. Design multistage amplifiers and understand the concepts of High Frequency Analysis of BJT.
4. Utilize the Concepts of negative feedback to improve the stability of amplifiers and positivefeedback to sustained oscillations.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II Year B.Tech. ECE- I Sem **L/T/P/C**
3/-/-/3

(R24A0261) NETWORK ANALYSIS AND SYNTHESIS

COURSEOBJECTIVES:

1. To solve the two port network parameters.
2. To recognize the behaviour of R, L, C with DC excitation.
3. Concept of Series , parallel resonance and current locus diagrams
4. To know the pole zero location for driving point and transfer functions
5. To describe Foster and Cauer forms and the properties of immittance functions.

UNIT–I: TWO PORT NETWORKS:

Impedance Parameters, Admittance Parameters, Hybrid Parameters, Transmission (ABCD) Parameters, Conversion of one parameter to another parameter, Conditions for Reciprocity and symmetry, Illustrative problems.

UNIT–II: D.C.TRANSIENT ANALYSIS (FIRST & SECOND ORDER CIRCUITS):

Introduction to transient response and steady state response, Transient response of series – RL,RC, RLC Circuits for D.C excitation with Initial Conditions, Solutions using Differential Equations approach and Laplace Transform approach ,Illustrative problems.

UNIT-III: LOCUS DIAGRAMS & RESONANCE:

Locus diagrams: Locus diagrams of Series RL, RC circuits with variation of various parameters, parallel RL, RC circuits with variation of various parameters.

Resonance: Resonance-Series and Parallel circuits, Concept of Bandwidth and Quality factor.

UNIT–IV: NETWORK FUNCTIONS: Review of Network functions for one port and two port networks: – pole zero location for driving point and transfer functions-Impulse response of Network functions from pole-zero plots.

UNIT-V: SYNTHESIS OF ONE PORT NETWORKS

Synthesis of reactive one-ports by Foster's and Cauer methods (forms I and II) -Synthesis of LC, RC and RL driving-point functions.

Text Books:

1. K. S. Suresh Kumar, —Electric Circuit Analysis‖, Pearson Publications, 2013.
2. 2. Ravish R. Singh, "Network Analysis and Synthesis", McGraw-Hill Education, 2013

References:

1. Franklin Kuo, —Network Analysis and Synthesis‖, 2nd Ed.,Wiley India.
2. Van Valkenburg M.E., —Introduction to Modern Network Synthesis,‖ Wiley Eastern, 1960 (reprint 1986).
3. Van Valkenburg M.E, —Network Analysis,‖ Prentice Hall India, 2014.
4. Charles A. Desoer and Ernest S. Kuh, —Basic Circuit Theory,‖ Tata McGraw Hill Edition.
5. Chakrabarti, A., "Circuit Theory Analysis and Synthesis", Dhanpat Rai& Co., Seventh - Revised edition, 2018
6. S. K. Bhattacharya, —Network Analysis and Synthesis,‖ Pearson Education India.

COURSE OUTCOMES:

- Able to solve two port network parameters
- Able to analyze the transient and steady state analysis of RLC Circuits.
- Accomplish the computation of Quality factor, band width and current locus diagram for a given electrical circuit.
- Identify the properties and characteristics of network functions.
- Synthesize passive one-port networks using standard Foster and Cauer forms.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II Year B.Tech. ECE- I Sem **L/T/P/C**
3/-/-/3

(R24A0402) DIGITAL LOGIC DESIGN

COURSE OBJECTIVES:

1. To understand common forms of number representation in digital electronic circuits andto be able to convert between different representations.
2. To implement simple logical operations using combinational logic circuits
3. To design combinational logic circuits, sequential logic circuits.
4. To impart to student the concepts of sequential circuits, enabling them to analyze sequential systems.
5. Understanding of the different technologies related to HDLs, construct, compile and execute Verilog HDL programs using provided.
6. Designing digital circuits, behavior and RTL modeling of digital circuits using Verilog HDL.

UNIT –I:

Number Systems, Boolean Algebra and Switching Functions:
Number Systems, Base Conversion Methods, Complements of Numbers, Codes- Binary Codes, Binary Coded Decimal Code, Unit Distance Codes, Error Detecting and Error Correcting Codes, Hamming Code.

Boolean Algebra:
Basic Theorems and Properties, Switching Functions, Canonical and Standard Forms, Algebraic Simplification of Digital Logic Gates, Properties of XOR Gates, Universal Logic Gates.

UNIT –II

Minimization and Design of Combinational Circuits:
K- Map Method, up to Five variable K- Maps, Don't Care Map Entries, Combinational Design, Arithmetic Circuits, Comparator, decoder, Encoder, Multiplexers, De-Multiplexers, Code Converters.

UNIT –III:

Sequential Machines Fundamentals:
Introduction, Basic Architectural Distinctions between Combinational and Sequential circuits, classification of sequential circuits, The binary cell, The S-R-Latch Flip-Flop The D-Latch Flip-Flop,The "Clocked T" Flip-Flop, The " Clocked J-K" Flip-Flop, Conversion from one type of Flip-Flop to another.

UNIT –IV:

INTRODUCTION TO VERILOG HDL: Verilog as HDL, Levels of Design Description, Concurrency,Simulation and Synthesis, Programming Language Interface, Module.
Language Constructs and Conventions: Introduction, Keywords, Identifiers, White Space, Characters, Comments, Numbers, Strings, Logic Values, Data Types, Operators.

UNIT –V:

GATE LEVEL MODELING: Introduction, AND Gate Primitive, Module Structure, Other Gate Primitives, Illustrative Examples, Design of Flip- Flops with Gate Primitives, Delay.
MODELING AT DATAFLOW LEVEL: Introduction, Continuous Assignment Structure, Delays and Continuous Assignments.
BEHAVIORAL MODELING: Introduction, Operations and Assignments, 'Initial' Construct, 'always' construct, , Design at Behavioral Level, The 'Case' Statement, 'If' and 'if-Else' Constructs

TEXT BOOKS:

1. Digital Design- Morris Mano, PHI, 3rd Edition.
2. Switching Theory and Logic Design-A. Anand Kumar, PHI, 2nd Edition.
3. T.R. Padmanabhan, B Bala Tripura Sundari, Design through Verilog HDL, Wiley 2009.
4. Verilog HDL - Samir Palnitkar, 2nd Edition, Pearson Education, 2009.

REFERENCE BOOKS:

1. Introduction to Switching Theory and Logic Design – Fredriac J. Hill, Gerald R. Peterson, 3rdEd,John Wiley & Sons Inc.
2. Digital Fundamentals – A Systems Approach – Thomas L. Floyd, Pearson, 2013.
3. Switching Theory and Logic Design – Bhanu Bhaskara –Tata McGraw Hill Publication, 2012
4. Fundamentals of Logic Design- Charles H. Roth, Cengage Learning, 5th, Edition, 2004.
5. Fundamentals of Digital Logic with Verilog Design - Stephen Brown,Zvonkoc Vranesic, TMH, 2nd Edition.
6. Advanced Digital Design with Verilog HDL - Michel D. Ciletti, PHI, 2009.

COURSE OUTCOMES:

Upon completion of the course, student should possess the following skills:

1. Be able to manipulate numeric information in different forms
2. Be able to manipulate simple Boolean expressions using the theorems and postulates of Boolean algebra and to minimize combinational functions.
3. Be able to design and analyze small combinational circuits and to use standard combinational functions to build larger more complex circuits.
4. Be able to design and analyze Digital circuits
5. Verify behavior and Implement RTL models on FPGAs.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II Year B.Tech. ECE- I Sem **L/T/P/C**
3/1/-/4

(R24A0403) SIGNALS AND SYSTEMS

COURSE OBJECTIVES:

The main objectives of the course are:

1) Knowledge of time-domain representation and analysis concepts of basic elementary signals
2) Knowledge of Fourier Series for Continuous Time Signals
3) Knowledge of frequency-domain representation and analysis concepts F.T., L.T. & Z.T and Concepts of the sampling process.
4) Mathematical and computational skills needed to understand the principal of Linear System and Filter Characteristics of a System.
5) Mathematical and computational skills needed to understand the concepts of auto correlation and cross correlation and power Density Spectrum.

UNIT I:

INTRODUCTION TO SIGNALS: Elementary Signals- Continuous Time (CT) signals, Discrete Time (DT) signals, Classification of Signals, Basic Operations on signals.

FOURIER SERIES: Representation of Fourier series, Continuous time periodic signals, Dirichlet's conditions, Trigonometric Fourier Series, Exponential Fourier Series, Properties of Fourier series, Complex Fourier spectrum.

UNIT II:

FOURIER TRANSFORMS: Deriving Fourier transform from Fourier series, Fourier transform of arbitrary signal, Fourier transform of standard signals, Properties of Fourier transforms.

SAMPLING: Sampling theorem – Graphical and analytical proof for Band Limited Signals, impulse sampling, Natural and Flat top Sampling, Reconstruction of signal from its samples, effect of under sampling – Aliasing.

UNIT III:

SIGNAL TRANSMISSION THROUGH LINEAR SYSTEMS: Introduction to Systems, Classification of Systems, Linear Time Invariant (LTI) systems, impulse response, Transfer function of a LTI system. Filter characteristics of linear systems. Distortion less transmission through a system, Signal bandwidth, System bandwidth, Ideal LPF, HPF and BPF characteristics.

UNIT IV:

CONVOLUTION AND CORRELATION OF SIGNALS: Concept of convolution in time domain, Cross correlation and auto correlation of functions, properties of correlation function, Energy density spectrum, Parseval's theorem, Power density spectrum, Relation between convolution and correlation.

UNIT V:

LAPLACE TRANSFORMS: Review of Laplace transforms, Inverse Laplace transform, Concept of region of convergence (ROC) for Laplace transforms, Properties of L.T's relation between L.T's, and F.T. of a signal.

Z–TRANSFORMS: Concept of Z- Transform of a discrete sequence. Distinction between Laplace,

Fourier and Z transforms, Region of convergence in Z-Transform, Inverse Z- Transform, Properties of Z-transforms.

TEXT BOOKS:

1) "Signals & Systems", Special Edition – MRCET, McGraw Hill Publications, 2017
2) Signals, Systems & Communications – B.P. Lathi, BS Publications, 2003.
3) Signals and Systems – A.V. Oppenheim, A.S. Willsky and S.H. Nawab, PHI, 2nd Edn.
4) Signals and Systems – A. Anand Kumar, PHI Publications, 3rd edition.

REFERENCE BOOKS:

1) Signals & Systems – Simon Haykin and Van Veen, Wiley, 2nd Edition.
2) Network Analysis – M.E. Van Valkenburg, PHI Publications, 3rd Edn.,2000.
3) Fundamentals of Signals and Systems Michel J. Robert, MGH International Edition,2008.
4) Signals, Systems and Transforms – C. L. Philips, J. M. Parr and Eve A. Riskin, Pearson education.3rd Edition, 2004.

COURSE OUTCOMES:

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

1) Understand the basic elementary signals
2) Determine the Fourier Series for Continuous Time Signals
3) Analyze the signals using F.T, L.T & Z.T and study the properties of F.T., L.T. & Z.T.
4) Understand the principal of Linear System and Filter Characteristics of a System.
5) Understand the concepts of auto correlation and cross correlation and power Density Spectrum.

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(R24A0404) PROBABILITY THEORY AND STOCHASTIC PROCESSES

COURSE OBJECTIVES:

1) To expose the students to the basics of probability theory and random processes essential for their subsequent study of analog and digital communication.
2) To understand the basic concepts of probability, single and multiple random variables and to introduce some standard distributions applicable to engineering which can describe real life phenomenon
3) To understand the basic concepts of random processes.
4) To understand the concept of correlation and spectral densities.
5) To understand the significance of linear systems with random inputs.

UNIT I:
PROBABILITY AND RANDOM VARIABLE

Probability: Set theory, Experiments and Sample Spaces, Discrete and Continuous Sample Spaces, Events, Probability Definitions and Axioms, Joint Probability, Conditional Probability, Total Probability, Bayes' Theorem, and Independent Events, Bernoulli's trials.

The Random Variable: Definition of a Random Variable, Conditions for a Function to be a Random Variable, Discrete and Continuous.

UNIT II:
DISTRIBUTION AND DENSITY FUNCTIONS AND OPERATIONS ON ONE RANDOM VARIABLE

Distribution and density functions: Distribution and Density functions, Properties, Binomial, Uniform, Exponential, Gaussian and Conditional Distribution and Conditional Density function and its properties, problems.

Operation on One Random Variable: Expected value of a random variable, function of a random variable, moments about the origin, central moments, variance, characteristic function, moment generating function.

UNIT III:
MULTIPLE RANDOM VARIABLES AND OPERATIONS ON MULTIPLE RANDOM VARIABLES

Multiple Random Variables: Joint Distribution Function and Properties, Joint density Function and Properties, Marginal Distribution and density Functions, conditional Distribution and density Functions, Statistical Independence.

Operations on Multiple Random Variables: Expected Value of a Function of Random Variables, Joint Moments about the Origin, Joint Central Moments.

UNIT IV:

Random Processes-Temporal Characteristics: The Random process Concept, Classification of Processes, Deterministic and Nondeterministic Processes, Distribution and Density Functions, Statistical Independence and concept of Stationarity: First-Order Stationary Processes, Second-Order and Wide-Sense Stationarity, Nth-Order and Strict-Sense Stationarity, Autocorrelation Function and Its Properties, Cross-Correlation Function and Its Properties, Covariance Functions and its properties.

Linear system Response: Mean and Mean-squared value, Autocorrelation, Cross-Correlation

Functions.

UNIT V:

Random Processes-Spectral Characteristics: The Power Spectrum and its Properties, Relationship between Power Spectrum and Autocorrelation Function, the Cross-Power Density Spectrum and Properties, Relationship between Cross-Power Spectrum and Cross- Correlation Function.

Spectral characteristics of system response: Power Density Spectrum of response of linear system, Cross Power Spectral Density of input and output of a Linear System.

TEXT BOOKS:

1) Probability, Random Variables & Random Signal Principles -Peyton Z. Peebles, TMH, 4th Edition, 2001.
2) Probability and Random Processes-Scott Miller, Donald Childers,2Ed,Elsevier,2012

REFERENCE BOOKS:

1) Theory of probability and Stochastic Processes-Pradip Kumar Gosh, University Press
2) Probability and Random Processes with Application to Signal Processing - Henry Stark and John W. Woods, Pearson Education, 3rd Edition.
3) Probability Methods of Signal and System Analysis- George R. Cooper, Clave D. MC Gillem, Oxford, 3rd Edition, 1999.
4) Statistical Theory of Communication -S.P. Eugene Xavier, New Age Publications 2003
5) Probability, Random Variables and Stochastic Processes Athanasios Papoulis and S.Unnikrishna Pillai, PHI, 4th Edition, 2002.

COURSE OUTCOMES

1) Exposed to the basics of probability theory and random processes essential for their subsequent study of analog and digital communication.
2) Understand the axiomatic formulation of modern Probability Theory and think of random variables as an intrinsic need for the analysis of random phenomena.
3) Characterize probability models and function of random variables based on single & multiples random variables.
4) Evaluate and apply moments & characteristic functions and understand the concept of inequalities and probabilistic limits.
5) Understand the concept of random processes and determine covariance and spectral density of stationary random processes.

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(R24A0481) ANALOG CIRCUITS LAB

COURSE OBJECTIVES:

1) To study the characteristics of BJT in different types of configurations.
2) To calculate h parameters in CE, CB Configurations.
3) To analyze various amplifiers such as Common Emitter, Common Source amplifiers.
4) To design Feedback amplifiers.
5) To design Oscillators.

List of Experiments (Minimum 12 Experiments):

1. Input & Output Characteristics of Transistor CB configuration
2. Input & Output Characteristics of Transistor CE Configuration
3. Calculation of h –Parameters of CB Configuration from Input & Output Characteristics
4. Calculation of h –Parameters of CE Configuration from Input & Output Characteristics
5. Frequency Response of CE Amplifier
6. FET Characteristics
7. Frequency Response of CS Amplifier
8. Transistor as A Switch Characteristics
9. Frequency Response of Two Stage RC Coupled Amplifier
10. Cascode Amplifier
11. Voltage Series Feedback Amplifier
12. Current Shunt Feedback Amplifier
13. Coliptts Oscillator
14. Hartley Oscillator
15. Wein Bridge Oscillator using Transistors

Course Outcomes:

Upon completing this course, the students will be able to:

1. Analyze the input and output characteristics of BJT in various configurations (CE, CB, CC).
2. Determine the hybrid (h) parameters in BJT configurations and apply them in small-signal analysis.
3. Evaluate the performance of amplifier circuits such as Common Emitter and Common Source amplifiers in terms of gain, input/output resistance, and frequency response.
4. Design and analyze negative feedback amplifier circuits to improve stability, gain, and bandwidth.
5. Design and implement various oscillator circuits like RC phase shift, Hartley, and Colpitts to generate desired frequencies.

Major Equipment required for Laboratories:

1. Regulated Power Suppliers, 0-30V
2. 20 MHz, Dual Channel Cathode Ray Oscilloscopes
3. Functions Generators-Sine and Square wave signals
4. Multimeters
5. Electronic Components

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(R24A0482) DIGITAL LOGIC DESIGN LAB

COURSE OBJECTIVES:

1) To design basic combinational logic and sequential circuits using HDL.
2) To develop familiarity and confidence with designing, building and testing digital circuits, including the use of CAD tools.

HDL Simulation programs:

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

1. HDL code to realize all the logic gates
2. Design of 2-to-4 Decoder
3. Design of 8-to-3 Encoder
4. Design of Priority Encoder
5. Design of 8-to-1 Multiplexer
6. Design of 1 x 8 De-Multiplexer.
7. Design of 4-bit Binary to Gray Code Converter
8. Design of 2-bit Comparator
9. Design of Full Adder using 3 modeling styles
10. Design of Full Subtractor
11. Design of SR, JK, T & D Flip Flops

COURSE OUTCOMES:

1. Design and simulate the combinational and sequential logic circuits using hardware description languages.
2. Analyze the results of logic and timing simulations and to use these simulation results to debug digital systems.

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(R24A0483) BASIC SIMULATION LAB

COURSE OBJECTIVES:

1) To learn basic Operations on Matrices.
2) To simulate generation of basic waveforms and general operations on signals.
3) To Understand the Concept of auto correlation, cross correlation and Convolution of given Signal/ sequence and simulate it accordingly.
4) To learn various transforms like Fourier and Z-transform of various signals.

NOTE:

1) All the experiments are to be simulated using MATLAB or equivalent software
2) Minimum of 10 experiments are to be completed

List of experiments:

1) Basic operations on matrices.
2) Generation of various signals and Sequences (periodic and aperiodic) such as unit impulse, unit step, square, saw tooth, triangular, sinusoidal, ramp, sine.
3) Operations on signals and sequences such as addition, multiplication, scaling, shifting, folding, computation of energy and average power.
4) Finding the even and odd parts of signal/sequence and real and imaginary part of signal.
5) Convolution between signals and sequences.
6) Auto correlation and cross correlation between signals and sequences.
7) Verification of linearity properties of a given continuous /discrete system.
8) Verification of time invariance properties of a given continuous discrete system.
9) Computation of unit sample, unit step and sinusoidal response of the given LTI system and verifying stability properties.
10) Finding the Fourier transform of a given signal and plotting its magnitude and phase spectrum.
11) Locating the zeros and poles and plotting the pole zero maps in s-plane and z-plane for the given transfer function.
12) Sampling theorem verification.

COURSE OUTCOMES

After going through this course the student will be able to

1) Do the various operations on matrices.
2) Perform various operations on the signals including Time shifting, Scaling, Reversal, Amplitude Scaling.
3) Determine the correlation & Convolution between Signals and sequences.
4) Understand the various transforms of signals and sequences.

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(R24A0008) CONSTITUTION OF INDIA

COURSE OBJECTIVES:

Students will be able to:

- Understand the premises informing the twin themes of liberty and freedom from a civil rights perspective.
- To address the growth of Indian opinion regarding modern Indian intellectuals' constitutional role and entitlement to civil and economic rights as well as the emergence of nationhood in the early years of Indian nationalism.
- To address the role of socialism in India after the commencement of the Bolshevik Revolution in 1917 and its impact on the initial drafting of the Indian Constitution.

Unit - 1 History of Making of the Indian Constitution- History of Drafting Committee.

Unit - 2 Philosophy of the Indian Constitution- Preamble Salient Features

Unit - 3 Contours of Constitutional Rights & Duties - Fundamental Rights

- Right to Equality
- Right to Freedom
- Right against Exploitation
- Right to Freedom of Religion
- Cultural and Educational Rights
- Right to Constitutional Remedies
- Directive Principles of State Policy
- Fundamental Duties.

Unit - 4 Organs of Governance: Parliament, Composition, Qualifications and Disqualifications, Powers and Functions, Executive, President, Governor, Council of Ministers, Judiciary, Appointment and Transfer of Judges, Qualifications, Powers and Functions

Unit - 5 Local Administration: District's Administration head: Role and Importance, Municipalities: Introduction, Mayor and role of Elected Representative, CEO of Municipal Corporation. Panchayat raj: Introduction, PRI: Zila Panchayat. Elected officials and their roles, CEO ZilaPanchayat: Position and role. Block level: Organizational Hierarchy (Different departments), Village level: Role of Elected and Appointed officials, Importance of grass root democracy

Unit - 6 Election Commission: Election Commission: Role and Functioning. Chief Election Commissioner and Election Commissioners. State Election Commission: Role and Functioning. Institute and Bodies for the welfare of SC/ST/OBC and women.

Suggested Reading:

1. The Constitution of India, 1950 (Bare Act), Government Publication.
2. Dr. S. N. Busi, Dr. B. R. Ambedkar framing of Indian Constitution, 1st Edition, 2015.
3. M. P. Jain, Indian Constitution Law, 7th Edn., Lexis Nexis, 2014.
4. D.D. Basu, Introduction to the Constitution of India, Lexis Nexis, 2015

COURSE OBJECTIVES:

Students will be able to:

- Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.
- Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.
- Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution
- Discuss the passage of the Hindu Code Bill of 1956.

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MANDATORY COURSE – IV
(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–er verbs 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 A1 level.
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.

B.TECH II YEAR
II SEMESTER SYLLABUS

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(R24A0025) NUMERICAL METHODS AND COMPLEX VARIABLES

COURSE OBJECTIVES:

1) The expansion of a given function by Fourier series.
2) The Fourier sine and cosine transforms, properties, inverse transforms, and finite Fourier transforms.
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:

Fourier series: Definition of periodic function, Fourier expansion of periodic functions in a given interval of length 2. Determination of Fourier coefficients – Fourier series of even and odd functions – Half-range Fourier sine and cosine Expansions-Fourier series in an arbitrary interval.

UNIT – II:

Fourier Transforms: Fourier integral theorem - Fourier sine and cosine integrals, Fourier transforms – Fourier sine and cosine transforms – properties – inverse transforms – Finite Fouriertransforms.

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 – IV:

Singularities and Residues: Radius of convergence – Expansion in Taylor's series, Laurent's series. Singular point – Isolated singular point – pole of order m – essential singularity. Residue – Evaluation of residue by formula and by Laurent series – Residue theorem. Evaluation of integralsof the type

(a) Improper real integrals $\int_{-\infty}^{} f(x)dx$ (b) $\int_{c}^{} f(cos\Theta, sin\Theta)d\Theta$

UNIT – V:

Conformal mapping: Transformation of z-plane to w-plane by a function, Conformal transformation. Standard transformations- Translation; Magnification and rotation; Inversion and reflection, Transformations like 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:

1) Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers.
2) Higher Engineering Mathematics by Ramana B.V, Tata McGraw Hill.
3) Complex Variables : Theory and Applications by H.S Kasana.

REFERENCES:

1) Complex Variables by Murray Spiegel, Seymour Lipschutz, et al. by Schaum's outlines series.
2) Advanced Engineering Mathematics by Kreyszig, John Wiley & Sons.
3) Advanced Engineering Mathematics by Michael Greenberg –Pearson publishers.

COURSE OUTCOMES:

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

1) Find the expansion of a given function by Fourier series in the given interval and hence this concept can be used in the analysis of signals.
2) Find Fourier sine, cosine transforms and inverse transformations; hence this concept can be used in designing electrical circuits, signal processing and image processing etc.
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 and which can be used in different physical situations.

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(R24A0405) ELECTROMAGNETIC FIELDS AND TRANSMISSION LINES

COURSE OBJECTIVES

The course objectives are:

1. To introduce the student to the coordinate system and its implementation to electromagnetics.
2. To elaborate the concept of electromagnetic waves and transmission lines, and their practical applications.
3. To study the propagation, reflection, and transmission of plane waves in bounded unbounded media.
4. To present the concepts of transmission lines, and this is a prerequisite course for "Antennas"

UNIT - I:

Electrostatics: Review of coordinate system, Coulomb's Law, Electric Field Intensity - Fields due to Different Charge Distributions, Electric Flux Density, Gauss Law and Applications, Electric Potential, Relations Between E and V, Maxwell's Equations for Electrostatic Fields, , Continuity Equation, Relaxation Time, Poisson's and Laplace's Equations Illustrative Problems.

UNIT - II:

Magnetostatics: Biot - Savart's Law, Ampere's Circuital Law and Applications, Magnetic Flux Density, Maxwell's Equations for Magnetostatic Fields, Magnetic Scalar and Vector Potentials, Forces due to Magnetic Fields, Ampere's Force Law,

Maxwell's Equations (Time Varying Fields): Faraday's Law, Inconsistency of Ampere's Law and Displacement Current Density, Maxwell's Equations in Different Final Forms, Conditions at a Boundary Surface: Dielectric - Dielectric, Illustrative Problems.

UNIT - III:

EM Wave Characteristics: Wave Equations for Conducting and Perfect Dielectric Media, Uniform Plane Waves - Definition, All Relations Between E & H , Reflection and Refraction of Plane Waves - Normal for both perfect Conductor and perfect Dielectrics, Brewster Angle, Critical Angle and Total Internal Reflection, Poynting Vector and Poynting Theorem , Illustrative Problems.

UNIT - IV:

Transmission Lines - I: Types, Parameters, Transmission Line Equations, Primary & Secondary Constants, Expressions for Characteristics Impedance, Propagation Constant, Phase and Group Velocities, Infinite Line Concepts, , Distortion - Condition for Distortionless Transmisssion and Minimum Attenuation, Illustrative Problems.

UNIT - V:

Transmission Lines - II: SC and OC Lines, Input Impedance Relations, Reflection Coefficient, VSWR, Smith Chart - Configuration and Applications, Illustrative Problems.

TEXT BOOKS:

1. Elements of Electromagnetics - Matthew N. O. Sadiku, 4th., Oxford Univ. Press.
2. Electromagnetic Waves and Radiating Systems - E.C. Jordan and K. G. Balmain, 2nd Ed., 2000, PHI.
3. Transmission Lines and Networks - Umesh Sinha, Satya prakashan, 2001, (Tech. India Publications), New Delhi.

REFERENCES BOOKS:

1. Engineering Electromagnetics - Nathan Ida, 2nd Ed., 2005, Springer (India) Pvt. Ltd., New Delhi.
2. Engineering Electromagnetics - William H. Hay Jr. and John A. Buck, 7th Ed., 2006, TMH.
3. Electromagnetics Fields Theory and Transmission Lines - G. Dashibhushana Rao, Wiley India, 2013.
4. Networks, Lines and Fields - John D. Ryder, 2nd Ed., 1999, PHI.

COURSE OUTCOMES

Upon the successful completion of the course, students will be able to;

1. Study time varying Maxwell equations and their applications in electromagnetic problems
2. Determine the relationship between time varying electric and magnetic field and electromotive force
3. Analyze basic transmission line parameters in phasor domain
4. Use Maxwell equation to describe the propagation of electromagnetic waves in vaccum
5. Show how waves propagate in dielectrics and lossy media
6. Demonstrate the reflection and refraction of waves at boundaries
7. Explain the basic wave guide operation and parameters

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(R24A0406) ANALOG & DIGITAL COMMUNICATIONS

COURSE OBJECTIVES:

1) To analyze and design various continuous wave Amplitude modulation and demodulation techniques.
2) To understand the concept of Angle modulation and demodulation, and the effect of noise on it.
3) To attain the knowledge about the functioning of different AM, FM Transmitters and Receivers.
4) To analyze and design the various Pulse Modulation Techniques (Analog and Digital Pulse modulation)
5) To understand the concepts of Digital Modulation Technique, Baseband transmission and Optimum Receiver.

UNIT – I

Amplitude Modulation: Need for modulation, Amplitude Modulation - Time and frequency domain description, single tone modulation, power relations in AM waves, Generation of AM waves -Switching modulator, Detection of AM Waves - Envelope detector, DSBSC modulation - time and frequency domain description, Generation of DSBSC Waves - Balanced Modulators, Coherent detection of DSB-SC Modulated waves, COSTAS Loop, SSB modulation - time and frequency domain description, frequency discrimination and Phase discrimination methods for generating SSB, Demodulation of SSB Waves, Vestigial side band modulation.

UNIT - II

Angle Modulation: Basic concepts of Phase Modulation, Frequency Modulation: Single tone Frequency modulation, Narrow band FM, Wide band FM, Spectrum Analysis of Sinusoidal FM Wave using Bessel functions, Constant Average Power, Transmission bandwidth of FM Wave - Generation of FM Signal- Armstrong Method, Direct method- Reactance Modulator, Detection of FM Signal: Balanced slope detector, Phase locked loop, Comparison of FM and AM., Concept of Pre-emphasis and de-emphasis.

UNIT - III

Transmitters: Classification of Transmitters, AM Transmitters, FM Transmitters

Receivers: Radio Receiver - Receiver Types - Tuned radio frequency receiver, Superhetrodyne receiver, RF section and Characteristics - Frequency changing and tracking, Intermediate frequency, Image frequency, AGC, Amplitude limiting, FM Receiver, Comparison of AM and FM Receivers.

UNIT - IV

Pulse Modulation: Types of Pulse modulation- PAM, PWM and PPM. Comparison of FDM and TDM.

Pulse Code Modulation: PCM Generation and Reconstruction, Quantization Noise, Non- Uniform Quantization and Companding, DPCM, DM and Adaptive DM, Noise in PCM and DM.

UNIT - V

Digital Modulation Techniques: ASK- Modulator, Coherent ASK Detector, FSK- Modulator and Non-Coherent FSK Detector, FSK detection using PLL BPSK- Modulator, Coherent BPSK Detection, Principles of QPSK, Differential PSK and QAM.

Baseband Transmission and Optimal Reception of Digital Signal: A Baseband Signal Receiver, Probability of Error, Optimum Receiver, ISI, Eye Diagrams.

TEXT BOOKS:

1) Analog and Digital Communications – Simon Haykin, John Wiley, 2005.
2) Electronics Communication Systems-Fundamentals through Advanced-Wayne Tomasi, 5th Edition, 2009, PHI.
3) Communication Systems-Simon Haykin, 2nd Edition.

REFERENCE BOOKS:

1) Principles of Communication Systems - Herbert Taub, Donald L Schilling, Goutam Saha, 3rd Edition, McGraw-Hill, 2008.
2) Analog and Digital Communication – K. Sam Shanmugam, Willey, 2005.

COURSE OUTCOMES:

Upon completing this course, the student will be able to

1) Analyze and Design various continuous wave Amplitude modulation and demodulation techniques.
2) Understand the concept of Angle modulation and demodulation, and the effect of noise on it.
3) Attain the knowledge about the functioning of different AM, FM Transmitters and Receivers.
4) Analyze and design the various Pulse Modulation Techniques (Analog and Digital Pulse modulation)
5) Understand the concepts of Digital Modulation Technique, Baseband transmission and Optimum Receiver.

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(R24A0407) LINEAR AND DIGITAL IC APPLICATIONS

COURSE OBJECTIVES:

1) To introduce the basic building blocks of linear integrated circuits.
2) To teach the linear and non-linear applications of operational amplifiers.
3) To introduce the theory and applications of analog multipliers and PLL.
4) To teach the theory of ADC and DAC.
5) To introduce the concepts of wave form generation and introduce some special function ICs.

UNIT – I:

Operational Amplifier: Ideal and Practical Op-Amp, Op-Amp Characteristics, DC and AC Characteristics, Features of 741 Op-Amp, Modes of Operation – Inverting, Non-Inverting, Differential, Instrumentation Amplifier, AC Amplifier, Differentiators and Integrators, Comparators, Schmitt Trigger, Introduction to Voltage Regulators.

UNIT – II:

Op-Amp, IC-555 & IC 565 Applications: Introduction to Active Filters, Characteristics of Band pass, Band reject and All Pass Filters, Analysis of 1^{st} order LPF & HPF Butterworth Filters, waveform Generators – Triangular, Saw tooth, Square wave, IC555 Timer – Functional Diagram, Monostable and Astable Operations, Applications, IC565 PLL – Block Schematic, Description of Individual Blocks, Applications.

UNIT – III:

Data Converters: Introduction, Basic DAC techniques, Different types of DACs-Weighted Resistor DAC, R-2R ladder DAC, Inverted R-2R DAC, Different Types of ADCs – Parallel Comparator Type ADC, Counter Type ADC, Successive Approximation ADC and Dual Slope ADC, DAC and ADC Specifications.

UNIT – IV:

Digital Integrated Circuits: Classification of Integrated Circuits, Comparison of Various Logic Families, CMOS Transmission Gate.

Combinational Logic ICs – Specifications and Applications of TTL-74XX & CMOS 40XX Series ICs – Code Converters, Decoders, Encoders, Priority Encoders, Multiplexers, Demultiplexers, Parity Generators/Checkers, Parallel Binary Adder/Subtractor, Magnitude Comparators.

UNIT – V:

Sequential Logic IC's and Memories: Familiarity with commonly available 74XX & CMOS 40XX Series ICs – All Types of Flip-flops, Synchronous Counters, Decade Counters, Shift Registers.

Memories – ROM Architecture, Types of ROMS & Applications, RAM Architecture, Static & Dynamic RAMs.

TEXT BOOKS:

1) Linear Integrated Circuits – D. Roy Chowdhury, New Age International (p) Ltd, 2nd Edition,2003.
2) Op-Amps & Linear ICs - Ramakanth A. Gayakwad, PHI, 2003.
3) Digital fundamentals – Floyd and Jain, Pearson Education,8th Edition ,2005

REFERENCES BOOKS:

1) Op Amps & Linear Integrated circuits-Concepts and Applications James M.Fiore, Cengage Learning/Jaico,2009.
2) Operational Amplifiers with linear integrated circuits by K.Lal kishore-Pearson,2009.
3) Linear integrated circuits and applications-Salivahana,TMH.
4) Modern digital electronics-RP Jain-4/e-TMH,2010.
5) Digital design principles and practices-John.F.Wakerly 3/e,2005.
6) Operational amplifiers with linear integrated cuircuits,4/e William D.Stanley, Pearson education India,2009.

COURSE OUTCOMES:

1) A thorough understanding of operational amplifiers with linear integrated circuits.
2) Also students will be able to design circuits using operational amplifiers for various applications.
3) Understanding of the different families of digital integrated circuits and their characteristics.
4) Understanding of D/A and A/D Converters.
5) Design of combinational and sequential circuits using the TTL & CMOS ICs.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

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(R24A0408) ELECTRONIC CIRCUIT ANALYSIS

COURSE OBJECTIVES:

Upon completing this course, the student twill be able to

1. Learn the concepts of Power Amplifiers.
2. To give understanding of tuned amplifier circuits
3. Understand various multi vibrators using transistors and sweep circuits.

UNIT – I

Large Signal Amplifiers: Class A Power Amplifier- Series fed and Transformer coupled, Conversion Efficiency, Class B Power Amplifier- Push Pull and Complimentary Symmetry configurations, Conversion Efficiency, Principle of operation of Class AB and Class –C and D Amplifiers.

UNIT- II

Tuned Amplifiers: Introduction, single Tuned Amplifiers – Q-factor, frequency response, Double Tuned Amplifiers – Q-factor, frequency response, Concept of stagger tuning and synchronous tuning

UNIT - III

Multivibrators: Analysis and Design of Bistable, Monostable, Astable Multivibrators and Schmitt trigger using Transistors.

UNIT - IV

Time Base Generators: General features of a Time base Signal, Methods of Generating Time Base Waveform, concepts of Transistor Miller and Bootstrap Time Base Generator, Methods of Linearity improvement.

UNIT - V

Synchronization and Frequency Division: Pulse Synchronization of Relaxation Devices, Frequencydivision in Sweep Circuits, Stability of Relaxation Devices, Astable Relaxation Circuits, Monostable Relaxation Circuits, Synchronization of a Sweep Circuit with Symmetrical Signals.

Sampling Gates: Basic operating principles of Sampling Gates, Unidirectional and Bi-directional Sampling Gates, Four Diode Sampling Gate, Reduction of pedestal in Gate Circuits

TEXT BOOKS:

1. Jacob Millman, Christos C Halkias - Integrated Electronics, , McGraw Hill Education.
2. J. Millman, H. Taub and Mothiki S. PrakashRao - Pulse, Digital and Switching Waveforms –2nd Ed., TMH, 2008,

REFERENCE BOOKS:

1. David A. Bell - Electronic Devices and Circuits, 5th Ed., Oxford.
2. Robert L. Boylestead, Louis Nashelsky - Electronic Devices and Circuits theory, 11th Ed.,Pearson, 2009
3. Ronald J. Tocci - Fundamentals of Pulse and Digital Circuits, 3rd Ed., 2008.
4. David A. Bell - Pulse, Switching and Digital Circuits, 5th Ed., Oxford, 2015.

COURSE OUTCOMES:

Upon completing this course, the student will be able to

1. Design the power amplifiers
2. Design the tuned amplifiers and analyze is frequency response
3. Design Multivibrators and sweep circuits for various applications.
4. Utilize the concepts of synchronization, frequency division and sampling gates

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(R24A0484) ANALOG AND DIGITAL COMMUNICATIONS LABORATORY

COURSE OBJECTIVES:

1) Familiarize the students with basic analog and digital communication systems.
2) Integrate the concepts of analog modulation techniques studied in theory withexperiments.
3) Integrate the concepts of pulse modulation techniques studied in theory with experiments.
4) Integrate the concepts of Time and Frequency division multiplexing techniques studied in theory with experiments.
5) Integrate the concepts of digital modulation techniques studied in theory with experiments so that the students appreciate the knowledge gained from the theory course.

Note: Minimum 12 Experiments should be conducted: All these experiments are to be simulated first using MATLAB, COMSIM or any other simulation package and then to be realized in hardware.

LIST OF EXPERIMENTS

Analog Communication Experiments:

1) (i) Amplitude modulation and demodulation (ii) Spectrum analysis of AM
2) (i) Frequency modulation and demodulation (ii) Spectrum analysis of FM
3) DSB-SC Modulator & Detector
4) SSB-SC Modulator & Detector (Phase Shift Method)
5) Frequency Division Multiplexing & De multiplexing
6) Pulse Amplitude Modulation & Demodulation
7) Pulse Width Modulation & Demodulation
8) Pulse Position Modulation & Demodulation

Digital Communication Experiments:

1) PCM Generation and Detection
2) Time Division Multiplexing & Demultiplexing
3) Differential Pulse Code Modulation & Demodulation
4) Delta Modulation
5) Amplitude Shift Keying: Generation & Detection
6) Frequency Shift Keying: Generation & Detection
7) Binary Phase Shift Keying: Generation & Detection
8) Generation & Detection of DPSK

COURSE OUTCOMES

1. Analyze and understand the operation of a basic communication system.
2. Design the different analog modulation, demodulation circuits such as amplitude and frequency modulation, and also analyze their Spectrum.
3. Design various analog and digital pulse modulation techniques such as PAM, PPM, PWM, PCM, DPCM and DM.
4. Design and Analyze the TDM & FDM circuits.
5. Design the different digital modulation and demodulation circuits such as ASK, FSK, BPSK, and Differential PSK.

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(R24A0485) Linear and Digital IC Applications Laboratory

COURSE OBJECTIVES:

COURSE OBJECTIVES:

1) To study the hands-on experience on 741 Op-Amp applications.

2) To apply the perceptions of IC 555 Timer and PLL applications.

3) To Design and verify the IC 723 Voltage Regulator and Three terminal voltage regulators.

4) To study and hands-on experience on combinational circuits like Decoder, Comparator and Mux .

5) To study and hands-on experience on Sequential circuits like Flip-Flops, Counters, Registers and Memories

List of Experiments:

CYCLE-I: Linear IC Laboratory (Minimum Seven Experiments)

1. INTRODUCTION-STUDY OF IC 741, IC555&IC565
2. OP-AMP APPLICATIONS–ADDER, SUBTRACTOR, COMPARATOR
3. INTEGRATOR AND DIFFERENTIATOR USING IC 741 OP-AMP.
4. ACTIVE FILTER APPLICATIONS –LPF AND HPF (1^{ST}ORDER)
5. IC 741 WAVE FORM GENERATORS –SINE, SQAURE AND TRIANGULAR WAVES
6. IC 555 TIMER–MONOSTABLE AND ASTABLE MULTIVIBRATORS
7. SCHMITT TRIGGER CIRCUIT USING IC 741
8. IC565–PLL APPLICATIONS
9. VOLTAGE REGULATORS USING IC 723, THREE TERMINAL VOLTAGE REGULATORS–7805, 7809 AND 7912

CYCLE-II: Digital IC Laboratory (Minimum Seven Experiments)

1. INTRODUCTION
2. 3-8 DECODER USING 74138
3. 4-BIT COMPARATOR USING 7485
4. 8*1 MULTIPLEXER USING 7451 AND 2*4 DEMULTUPLEXER USING 74155
5. D,JK FLIP FLOPS USING 7474,7483.
6. DECADE COUNTER USING 7490
7. UP/DOWN COUNTERS USING 74163
8. UNIVERSAL SHIFT REGISTERS USING 74194/195
9. RAM (16*4) USING 74189 (Read and Write operations).

COURSE OUTCOMES:

1. Understand the various applications of linear IC's like 741 Op-amp applications.
2. Design the Multivibrator circuits using IC 555 and determine the frequency of oscillation and time delay
3. Understand the functionality of IC 723 voltage regulator and determine the load and line regulations.
4. Understand the Functionality of combinational circuits like Decoder, Comparator and Mux .
5. Understand the Functionality of Sequential circuits like Flip-Flops, Counters, Registers and Memories.

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(R24A0486) ELECTRONIC CIRCUIT ANALYSIS LABARATORY.

Course Objectives:

1. To introduce the principles and design methods of power amplifiers, including efficiency calculations.
2. To understand and design different types of multivibrators such as astable, monostable, and bistable circuits.
3. To provide foundational knowledge of logic gates and their behavior in digital circuits.
4. To familiarize students with the operation and applications of Schmitt Trigger circuits for signal conditioning.

List of Experiments:

CYCLE-I: Hardware Laboratory (Minimum Six Experiments)

1. Design transformer coupled class A power amplifier and draw the input and output waveforms Find its efficiency.
2. Design class B power amplifier and draw the input and output waveforms.
3. Design class C power amplifier and draw the input and output waveforms.
4. Design a Bistable Multivibrator and analyze the effect of commutating capacitors and Draw the wave forms at base and collector of transistors.
5. Design an Astable Multivibrator and draw the wave forms at base and collector of Transistors.
6. Design a Monostable Multivibrator and draw the input and output waveforms.
7. Draw the response of Schmitt trigger for gain of greater than and less than one.
8. Study of logic gates.

CYCLE-II: Design and Simulate in Simulation Laboratory using any Simulation Software. (Minimum eight experiments)

1. Common Emitter Amplifier.
2. Common Source Amplifier.
3. Two stage RC-Coupled amplifier.
4. Current Shunt Voltage Feedback amplifier.
5. Cascode Amplifier.
6. Class A Power Amplifier.
7. Switching Characteristics of a Transistor.
8. Design a Bistable Multivibrator and draw its waveforms.
9. Design a Astable Multivibrator and draw its waveforms.
10. Design a Monostable Multivibrator and draw its waveforms.

Course Outcomes:

Upon completing this course, the students will be able to

1. Design power amplifiers and find its efficiency.
2. Design various multi vibrators.
3. Understand the Fundamentals of Logic Gates.
4. Understand the Working Principle of Schmitt Trigger

Major Equipment required for Laboratories:

1. Computer System with latest specifications connected
2. Window XP or equivalent
3. Simulation software-Multisim or any equivalent simulation software
4. Regulated Power Suppliers, 0-30V
5. 5. 20 MHz, Dual Channel Cathode Ray Oscilloscopes.
6. Functions Generators-Sine and Square wave signals
7. Multimeters
8. Electronic Components

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(R24A0487) REAL TIME PROJECT/ FIELD BASED PROJECT

Project Requirements:

A project will typically involve the analysis, improvement, optimization or design of a process, operation, complex system or a component thereof. The student can select the project based on his/her areas of interest and to allow the course coordinator to make a judgment on the suitability of the project.

Project Definition:

•Brief background on the project
•Rationale for the project in terms of expected benefit and building on previous work
•Project scope, defining the area or department within which the project will be executed and solution developed.
Key policies or constraints that might apply to the project solution development, expected key deliverables of the project.
•Industrial engineering tools and techniques that can be used (if possible).
•A suggested high level outline of the approach that can be followed (if possible).
•A mentor/sponsor to guide the student from an industry perspective.
•Project application process and contact details.

Project Phases

The project consists of the following sequential phases:

Phase	Description
1	**Project planning** a. Background b. Problem Statement c. Project Aim & Project Approach
2	**Problem Investigation and Literature Review** a. Critical analysis of literature and the problem environment b. Identification of solution requirements and solution evaluation measures c. Data gathering d. Suggestion of an appropriate solution development approach
3	**Detailed design and/or problem solving**
4	**Completion and presentation of results**
5	Submission of Preliminary Project Report for assessment
6	Viva-Voce Examination

Important criteria for the evaluation of a project are:

1. Clarity on the expected benefit or value add of the project
2. The application of industrial engineering principles, tools and techniques
3. Clear evidence of engineering analysis and design, that is an improved or new approach, model, process, facility or system needs to be developed or formulated. In exceptional cases the project might be purely investigative in nature, but the complexity and value add need to be clear.

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(R24A0061) PUBLIC POLICY AND 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:

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. Understands various concepts, and techniques of governance and its policy-making decisions