BACHELOR OF TECHNOLOGY

Computer Science and Engineering- Data Science

COURSE STRUCTURE

(Batches admitted from the Academic Year 2024 -2025)

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

(Autonomous Institution- UGC, Govt. of India)

Accredited by NAAC with 'A+' Grade. Permanently Affiliated to JNTUH,

Approved by AICTE, 9001: 2015 Certified Institution

Maisammaguda, Dhulapally, Kompally, Secunderabad- 500 100.

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BACHELOR OF TECHNOLOGY

UNDERGRADUATE PROGRAM

ACADEMIC REGULATIONS-R24

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MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
Autonomous Institution, UGC, Govt. of India
Accredited by NAAC with A+ Grade
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Maisammaguda (V), Dhullapally (Post), (Via) Kompally, MedchalMalkajgiri Dist. T.S-500100

ACADEMIC REGU LATIONS FOR B.Tech. REGULAR STUDENTS

WITH EFFECT FROMACADEMIC YEAR 2024-2025 (R-24)

1.0   Under-Graduate Degree Programme in Engineering & Technology

Malla Reddy Engineering College for Women (MRECW) 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.

S.No	Name of the Department
1	Electrical and Electronics Engineering
2	Electronics & Communication Engineering
3	Computer Science and Engineering
4	Computer Science and Engineering(AI & ML)
5	Computer Science and Engineering (DATASCIENCE)
6	Computer Science and Engineering (CYBER SECURITY)
7	Information Technology

2.0   Eligibility for admission

2.1   Admission to the under graduate (UG) programme shall be made either on the basis of the merit rank obtained by the qualified student in entrance test conducted by the Telangana State Government (EAPCET) or the University or on the basis of any other order of merit approved by the University, subject to reservations as prescribed by the government from time to time.

2.2   The medium of instructions for the entire under graduate programme in Engineering & Technology will be **English** only.

3.0   B.Tech. Programme structure

3.1   A student after securing admission shall complete the B.Tech. programme in a minimum period of **four** academic years (8 semesters), and a maximum period of **eight** academic years (16 semesters) starting from the date of commencement of first year first semester, failing which student shall forfeit seat in B.Tech course. Each student shall secure 160 credits (with CGPA $\geq$ 5) required for the completion of the under graduate programme and award of the B.Tech. degree.

3.2   **UGC/ AICTE** specified definitions / descriptions are adopted appropriately for various terms and abbreviations used in these academic regulations/ norms, which are listed below.

3.2.1 Semester scheme

Each under graduate programme is of 4 academic years (8 semesters) with the academic year divided into two semesters of 22 weeks (≥90 instructional days) each, each semester having - 'Continuous Internal Evaluation (CIE)' and 'Semester End Examination (SEE)' under Choice Based Credit System (CBCS) and Credit Based Semester System (CBSS) indicated by UGC, and curriculum/course structure as suggested by AICTE are followed.

3.2.2 Credit courses

All subjects/ courses are to be registered by the student in a semester to earn credits which shall be assigned to each subject/ course in an L: T: P: C (lecture periods: tutorial periods: practical periods: credits) structure based on the following general pattern.

• One credit for one hour/ week/ semester for theory/ lecture (L) courses or Tutorials.

• One credit for two hours/ week/ semester for laboratory/ practical (P) courses.
 The candidate has to register for Mandatory- courses like Environmental Science, Foreign Language: French,Human Values & Professional Ethics, Indian Constitution, Indian Traditional Knowledge, Professional English, Technical Communications & Soft Skills and Gender Sensitization in which 50% of scoring is required for the award of the Degree in Internal Examination. These courses will not carry any credits.

3.2.3 Subject Course Classification

All subjects/ courses offered for the under graduate programme in E&T (B.Tech. degree programmes) are broadly classified as follows. Malla Reddy Engineering College for Women (MRECW) has followed almost all the guidelines issued by JNTUH/AICTE/UGC.

S. No.	Broad Course Classification	Course Group/Category	Course Description
1	FOUNDATION COURSES (FnC)	BS – Basic Sciences	Includes mathematics, physics and chemistry subjects
2		ES - Engineering Sciences	Includes fundamental engineering subjects
3		HS – Humanities and Social sciences	Includes subjects related to humanities, social sciences and management
4	Core Courses (COC)	PC – Professional Core	Includes core subjects related to the parent discipline/ department/ branch of Engineering.
5	Elective	PE – Professional Electives	Includes elective subjects related to the parent discipline/ department/ branch of Engineering.

6	(EℓC)	OE – Open Electives	Elective subjects which include inter- disciplinary subjects or subjects in an area outside the parent discipline/ department/ branch of Engineering.
7	Core Courses	PR-Project Work/ Innovative Product Development/ Industrial training/ Mini-project/Innovation Startup & Entrepreneurship / Technical Seminar	B.Tech. project or UG project or UG major project or Project-I & II
8			Industrial training/ Summer Internship/
			Industrial Oriented Mini-project/ Mini-project
			Innovative Product Development – I,II ,III,IV&V
			Innovation Startup & Entrepreneurship
9			Seminar based on core contents related to parent discipline/ department/ branch of Engineering.
10	Mandatory Courses (MC)	-	Mandatory Courses (non-credit)

4.0   Course Registration

4.1   A 'faculty advisor or counselor' shall be assigned to a group of 20 students, who will advise the students about the under graduate programme, its course structure and curriculum, choice/option for subjects/ courses, based on their competence, progress, pre-requisites and interest.

4.2   The academic section of the college invites 'registration forms' from students before the beginning of the semester through 'on-line registration', ensuring 'date and time stamping'. The on-line registration requests for any 'current semester' shall be **completed before the commencement of SEEs (Semester End Examinations) of the 'preceding semester'**.

4.3   A student can apply for **on-line** registration, **only after** obtaining the '**written approval**' from faculty advisor/counselor, which should be submitted to the college academic section through the Head of the Department. A copy of it shall be retained with Head of the Department, Faculty Advisor/ Counselor and the student.

4.4   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..

4.5 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.

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

4.7 Interchanging of Course Registrations are not permitted.

4.8 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.

4.9 **Open Electives:** Open elective course may be offered to the students, only if a minimum of 30 students opt for it. The students have to choose one open elective (OE-I) during III year I semester, OE-II during III year II semester, OE-III in IV year I semester and OE-IV in IV year II semester from the list of open electives given. However, the student cannot opt for an open elective subject offered by their own (parent) department, if it is already listed under any category of the subjects offered by parent department in any semester.

4.10 **Professional Electives**: The students have to choose six Professional Electives (PE-I to VI) from the list of professional electives given. Professional elective course may be offered to the students, only if a minimum of 30 students opt for it. Students have to choose Professional Elective – I (PE-I) in III year I semester, Professional Electives – II & III (PE-II and PE-III) in III year II Semester, Professional electives IV (PE-IV) in IV year – I Semester and Professional Electives – V & VI (PE-V and PE-VI) in IV year II semester from the list of professional electives given. However, the student can opt for an Professional elective subject offered by their own (parent) department.

5.0   Attendance Requirements

5.1 A student shall be eligible to appear for the semester end examinations, if the student acquires a minimum of 75% of attendance in aggregate of all the subjects/ courses (including attendance in mandatory courses like Environmental Science, Foreign Language: French, Human Values & Professional Ethics, Indian Constitution, Indian Traditional Knowledge, Technical Communications & Soft Skills and Gender Sensitization for that semester.

5.2 Shortage of attendance in aggregate up to 10% (65% and above, and below 75%) in each semester may be condoned by the college academic committee on genuine and valid grounds, based on the student's representation with supporting evidence.

5.3 A stipulated fee shall be payable for condoning of shortage of attendance.

5.4 Shortage of attendance below 65% in aggregate shall in **no** case be condoned.

5.5 **Students whose shortage of attendance is not condoned in any semester are not eligible to take their end examinations of that semester. They get detained and their registration for that semester shall stand cancelled. They will not be promoted to the next semester.** They may seek re-registration for all those subjects registered in that semester in which the student is detained, by seeking re-admission into that semester as and when offered; if there are any professional electives and/ or open electives, the same may also be re-registered if offered. However, if those electives are not offered in later semesters, then alternate electives may be chosen from the **same** set of elective subjects offered under that category.

5.6 A student fulfilling the attendance requirement in the present semester shall not be eligible for readmission into the same class.

6.0 Academic requirements

The following academic requirements have to be satisfied, in addition to the attendance requirements mentioned in item no.**5.0.**

6.1 A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course, if student secures not less than 35% (14 marks out of 40 marks) in the Continuous Internal Evaluation (CIE), not less than 35% (21 marks out of 60 marks) in the semester end examinations (SEE), and a minimum of 40% (40 marks out of 100 marks) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together; in terms of letter grades, this implies securing 'C' grade or above in that subject/ course.

6.2 A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each Field Project, Innovative Product Development-I,II&III, Industrial Oriented Mini Project/Summer Internship, Research Project-I & II , Technical Seminar, Innovation Startup & Entrepreneurship , if student secures not less than 40% marks (i.e. 40 out of 100 allotted marks) in each of them. The student is deemed to have failed, if she (i) does not submit a report on Industrial Oriented Mini Project/Summer Internship, or does not make a presentation of the same before the evaluation committee as per schedule, or (ii) does not present the Technical seminar as required in the IV year II Semester, or (iii) secures less than 40% marks Innovation Product Development-

I,II&III or Research Project –I & II or Innovation Startup & Entrepreneurship evaluations.

A student may reappear once for each of the above evaluations, when they are scheduled again; if the student fails in such 'one reappearance' evaluation also, the student has to reappear for the same in the next subsequent semester, as and when it is scheduled.

6.3 Promotion Rules

S. No.	Promotion	Conditions to be fulfilled
1	First year First semester to First year Second semester	Regular course of study of first yearfirst semester.
2	First year Second semester to Second year First Semester	(i) Regular course of study of first year second semester. (ii) Must have secured 50% credits up to first year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.
3	Second year First Semester to Second year Second Semester	Regular course of study of second Year first semester.
4	Second year Second Semester to Third year First Semester	(i) Regular course of study of Second year Second semester. (ii) Must have secured 60% credits up to second year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.
5	Third year First Semester to Third year Second Semester	Regular course of study of Third year First semester.
6	Third year Second Semester to Fourth year First Semester	(i) Regular course of study of Third year Second semester. (ii) Must have secured 60% credits up to third year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.
7	Fourth year First Semester to Fourth year Second semester	Regular course of study of Fourth year First semester.

6.4   A student (i) shall register for all courses/subjects covering 160 credits as specified and listed in the course structure, (ii) fulfills all the attendance and academic requirements for 160 credits, (iii) earn all 160 credits by securing SGPA ≥5.0 (in each semester), and CGPA (at the end of each successive semester) ≥5.0, (iv) **passesall the Mandatory Courses,** to successfully complete the under graduate programme. The performance of the student in these 160 credits shall be taken into account for the calculation of 'the final CGPA **(at the end of under graduate programme),** and shall be indicated in the grade card/ marks memo of IV year II semester.

6.5   If a student registers for 'extra subjects' (in the parent department or other departments/branches of Engg.) other than those listed subjects totaling to 160 credits as specified in the course structure of his department, the performances in those 'extra subjects' (although evaluated and graded using the same procedure as that of the required 160 credits) will not be considered while calculating the SGPA and CGPA. For such 'extra subjects' registered, percentage of marks and letter grade alone will be indicated in the grade card / marks memo as a performance measure, subject to completion of the attendance and academic requirements as stated in regulations Items 6 and 7.1 – 7.4 above.

6.6   A student eligible to appear in the end semester examination for any subject/ course, but absent from it or failed (thereby failing to secure **'C'** grade or above) may reappear for that subject/ course in the supplementary examination as and when conducted. In such cases, internal marks (CIE) assessed earlier for that subject/ course will be carried over, and added to the marks to be obtained in the SEE supplementary examination for evaluating performance in that subject.

6.7   A student **detained in a semester due to shortage of attendance may be re-admitted in the same semester in the next academic year for fulfillment of academic requirements**. The academic regulations under which a student has beenreadmitted shall be applicable. Further,no grade allotments or SGPA/ CGPA calculations will be done for the entire semester in which the student has been detained.

6.8   A student detained **due to lack of credits, shall be promoted to the next academic year only after acquiring the required academic credits.** The academic regulationsunder which the student has been readmitted shall be applicable to her.

7.0   **Evaluation - Distribution and Weightage of marks**

7.1   The performance of a student in every subject/course (including practical's and Research Project-will be evaluated for 100 marks each, with 40 marks allotted for CIE (Continuous Internal Evaluation) and 60 marks for SEE (Semester End-Examination).In addition, Field

Project/Real Time Project,Innovative Product Development- I,II&III, Technical Seminar, Industry Oriented Mini Project, Research Project Ishall be evaluated for 100 marks each and Innovation Startup & EntrepreneurshipResearch Project II shall be evaluated for 150 marks.

7.2   In CIE, for theory subjects, during a semester, there shall be two Mid-term examinations. Each Mid-Term examination consists of 40 marks with a total duration of 2 hours.

1. Mid Term Examination for 40 marks:

   a. Part - A: Objective/quiz paper for 10marks.
   b. Part - B: Descriptive paper for 20 marks.
   c. Assignment for 5 marks
   d. Case Study/Project for 10 marks.

The descriptive paper shall be for 20 marks which contains 4 questions, the student has to answer 4 questions, each carrying 5 marks. The objective paper shall be for 10 marks, which contains ten objective questions, the student has to answer all Questions, each carrying 1mark, with a total duration of 2 hours. Five marks are allocated for Assignments (as specified by the subject teacher concerned). Ten marks are allocated for Case study (as specified by the subject teacher concerned). 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. Subject Case study should be presented before the conduct of the first mid-examination and Project should be presented before the conduct of the second mid-examination. While the first mid-term examination shall be conducted from 1 to 2 1/2 units of the syllabus, the second mid-term examination shall be conducted from 2 1/2 to 5 units. The total marks secured by the student in each mid-term examination are evaluated for 40 marks, and the average of the two mid-term examinations shall be taken as the final marks secured by each candidate.

The Student, in each subject, shall have to earn 35% of marks (i.e. 14 marks out of 40 marks) in CIE, 35% of marks (i.e. 21 marks out of 60) in SEE and Overall 40% of marks (i.e. 40 marks out of 100 marks) both CIE and SEE marks put together.The student is eligible to write Semester End Examination of the concerned subject, if the student scores ≥ 35% (14 marks) of 40 Continuous Internal Examination (CIE) marks.
In case, the student appears for Semester End Examination (SEE) of the concerned subject but not scored minimum 35% of CIE marks (14 marks out of 40 internal marks), her performance in that subject in SEE shall stand cancelled in spite of appearing the SEE.

7.3   The details of the end semester question paper pattern are as follows:

The semester end examinations (SEE), for theory subjects, will be conducted for 60 marks consisting of two parts viz. i) **Part- A** for 10 marks, ii) **Part - B** for 50 marks.

• Part-A is a compulsory question which consists of ten sub-questions from all units carrying equal marks.

• Part-B consists of five questions (numbered from 2 to 6) carrying 10 marks each. Each of these questions is from each unit and may contain sub-questions. For each question there will be an "either" "or" choice, which means that there will be two questions from each unit and the student should answer either of the two questions.

• The duration of Semester End Examination is 3 hours

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

For practical subjects there shall be a Continuous Internal Evaluation (CIE) during the semester for 40 marks and 60 marks for semester end examination. 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 10 marks

2. 10 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 be evaluated for 10 marks.

4. The remaining 10 marks are for Laboratory Report/Project and Presentation, which consists of the Design (or) Software / Hardware Model Presentation (or) App Development (or) Prototype Presentation submission which shall be evaluated after completion of laboratory course and before semester end practical examination.

The Semester End Examination 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 University. In the Semester End Examination held for 3 hours, total 60 marks are divided and allocated as shown below:

1. 10 marks for write-up

2. 15 for experiment/program

3. 15 for evaluation of results

4. 10 marks for presentation on another experiment/program in the same laboratory course and

5. 10 marks for viva-voce on concerned laboratory course.

The end semester examination shall be conducted with an external examiner and the laboratory teacher. The external examiner shall be appointed from the Autonomous colleges which are decided by the Principal of the College.

7.5 For the subject, Computer Aided Engineering Graphics, the Continuous Internal Evaluation (CIE) and Semester End Examinations (SEE) evaluation pattern is same as for other theory subjects.

7.6 For Mandatory Courses like Environmental Science, Foreign Language: French, Human Values & Professional Ethics, Indian Constitution , Indian Traditional Knowledge , Technical Communications & Soft Skills and Gender Sensitization, a student has to secure 50 marks out of 100 marks (i.e. 50% of the marks allotted) in the continuous internal evaluation for passing the subject/course.

7.7 The Innovative Product Development shall be carried out in Three stages: Innovative Product Development-I during III Year I semester, Innovative Product Development-II during III Year II semester, Innovative Product Development-III during IV Year I semester. Each stage will be evaluated for 100 marks. Student has to work for implementation of their innovative idea, prepare a technical report and submit it to the department. Out of a total of 100 marks for the Innovative Product Development in each stage,40 marks shall be for internal and 60 marks shall be for external end semester examination (Viva – Voce). The Internal marks evaluation shall be evaluated by the departmental committee consisting of Head of the Department, mentor and a senior faculty member. External marks shall be evaluated by the committee consisting of an external examiner from Industry; Head of the Department and mentor based on the work carried out in Innovative Product Development.

A student shall acquire 1 credit assigned to the each stage of Innovative Product Development. The student is deemed to have failed, if she (i) does not submit a report Innovative Product Development or does not make a presentation of the same before the external examiner as per schedule, or (ii) secures less than 40% marks in the sum total of the CIE and SEE taken together.

A student who has failed may reappear once for the above evaluation, when it is scheduled again; if student fails in such 'one reappearance' evaluation also, she has to reappear for the same in the next subsequent semester, as and when it is scheduled.

7.8 There shall be Field Project/Real time Project &Industry oriented Mini-Project / Internship, in collaboration with an Industry of the relevant specialization, to be registered immediately after II Year II Semester &III Year II Semester examinations, and taken up during the summer vacation for about four weeks duration.

7.8.1 The Field Project/Real time Project &Industrial Oriented Mini Project/Summer Internship shall be submitted in a report form and presented before the committee in III year I Semester and IV year I semester respectively . Out of a total of 100 marks for the Industry Oriented Mini Project / Internship, 40 marks shall be for internal and 60 marks shall be for external End Semester Examination (Viva – Voce). The Field Project &Industrial Oriented Mini Project/Summer Internship shall be evaluated by the departmental committee consisting of Head of the Department, Supervisor and a senior faculty member. External marks shall be evaluated by the committee consisting of an External Examiner, Head of the Department and Supervisor.

7.9 UG Research project work shall be carried out in two stages: Research Project– I duringEach Student shall start the Project-I during the IV Year I Semester, as per the instructions of the Project Guide/Project Supervisor assigned by the Head of Department. Out of total 100 marks allotted for the Project Work, 40 marks shall be for CIE (Continuous Internal Evaluation) and 60marks for the SEE (End Semester Viva-voce Examination). The report and the presentation shall be evaluated by the departmental committee consisting of Head of the Department, Project supervisor and a senior faculty member. It shall be evaluated for 40 marks by Project Supervisor and the other 60 marks shall be awarded by a Departmental Committee consisting of Head of the Department, Senior faculty member and Project Supervisor based on the work carried out . A student shall acquire 2 credits assigned to the Research Project-I, when she secures 40% or more marks for the total of 100 marks. The Research Project-I shall be evaluated at the end of VII semester by the department committee. There shall be no external evaluation for Project-I.

The student is deemed to have failed, if she (i) does not submit a report on Project- I or does not make a presentation of the same before the committee as per schedule, or (ii) secures less than 40% marks in the sum total of the Continuous Internal Evaluation and Semester End Examination taken together.

A student who has failed may reappear once for the above evaluation, when it is scheduled again; if she fails in such 'one reappearance' evaluation also, she has to reappear for the same in the next subsequent semester, as and when it is scheduled.

7.10 The ResearchProject – II shall be evaluated at the end of VIII semester by the external marks evaluation committee constituting of external examiner, Head of the Department and supervisor shall evaluate the project work for 100 marks and the internal marks evaluation committee constituting of Head of the department, senior faculty of the department and project supervisor shall evaluate it for 50 marks. A student shall acquire 8 credits assigned to the Research Project -II, when she secures 40% or more marks for the total of 150 marks. The student is deemed to have failed, if she (i) does not submit a report on Project Stage - II, or does not make a presentation of the same before the

external examiner as per schedule, or (ii) secures less than 40% marks in the sum total of the CIE and SEE taken together.

A student who has failed may reappear once for the above evaluation, when it is scheduled again; if student fails in such 'one reappearance' evaluation also, she has to reappear for the same in the next subsequent semester, as and when it is scheduled.

7.11   There shall be a Technical Seminar presentation in IV year II semester. For the seminar, the student shall collect the information on a specialized topic, prepare a technical report, and submit it to the department. It shall be evaluated by the departmental committee consisting of Head of the Department, seminar supervisor and a senior faculty member. The seminar report shall be evaluated for 100 internal marks. There shall be no external evaluation for the Technical Seminar.
Note: The topics for industrial oriented mini project/Internship, Technical seminar and Project –I &II shall be different from one another.

7.12   Innovation Startup & Entrepreneurship work shall be carried out in IV Year II Semester. Each Student shall start the Innovation Startup & Entrepreneurship Work as per the instructions of the mentor assigned by the Head of Department. Student has to work for implementation of their innovative idea, prepare a technical report and submit it to the department. The technical report shall be evaluated for 150 internal marks. It shall be evaluated for 50 marks by mentor and the other 100 marks shall be awarded by a Departmental Committee consisting of Head of the Department, senior faculty member and mentor based on the work carried out.
A student shall acquire 3 credits assigned to the Innovation Startup & Entrepreneurship, when she secures 40% or more marks for the total of 150 marks. Semester End Examination for The Innovation Startup & Entrepreneurship shall be completed before the commencement of Semester End Theory examinations. There shall be no external evaluation for Innovation Startup & Entrepreneurship.

8.0   Course pattern

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

8.2   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.

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

9.0 Grading procedure

9.1   Grades will be awarded to indicate the performance of students in each theory subject,laboratory / Practical's, Technical seminar, Industry Oriented Mini Project, and project-I & II, Innovation Product Development-I,II& III and Innovation Startup & Entrepreneurship based on the percentage of marks obtained (Continuous Internal Evaluation plus Semester End Examination, both taken together) as specified in item 7 above, a corresponding letter grade shall be given.

9.2   As a measure of the performance of a 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:

Letter Grade (UGC Guidelines)	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	-

9.3   A student who has obtained an '**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.

9.4   To a student who has not appeared for an examination in any subject, '**AB**' grade will be allocated in that subject, and he is deemed to have '**failed**'. A student will be required to reappear as a 'supplementary student' in the semester end examination, as and when offered next. In this case also, the internal marks in those subjects will remain the same as those obtained earlier.

9.5   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.

9.6   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.

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

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

9.8   The Semester Grade Point Average (SGPA) is calculated by dividing the sum of credit points (CP) secured from all subjects/ courses registered in a semester, by the total number of credits registered during that semester. SGPA is rounded off to **two** decimal places. SGPA is thus computed as

$$\text{SGPA} = \left[\sum_{i=1}^{N} C_i C_j \right] / \left[\sum_{i=1}^{N} C_i \right] \quad \textbf{…. For each semester},$$

where 'i' is the subject indicator index (takes into account all subjects in a semester), 'N' is the no. of subjects 'registered' for the semester (as specifically required and listed under the course structure of the parent department), C_i is the no. of credits allotted to the ith subject, and G represents the grade points (GP) corresponding to the letter grade awarded for that ith subject.

9.9   The Cumulative Grade Point Average (CGPA) is a measure of the overall cumulative performance of a student in all semesters considered for registration. The CGPA is the ratio of the total credit points secured by a student in **all** registered courses in **all** semesters, and the total number of credits registered in **all** the semesters. CGPA is rounded off to **two** decimal places. CGPA is thus computed from the I year II semester onwards at the end of each semester as per the formula

$$\text{CGPA} = \left[\sum_{j=1}^{M} C_j G_j \right] / \left[\sum_{j=1}^{M} C_j \right] \quad \textbf{…. for all S semesters registered}$$

<div align="center">

(i.e., up to and inclusive of S semesters, S≥2),

</div>

where '**M**' is the **total** no. of subjects (as specifically required and listed under the course structure of the parent department) the student has '**registered**' i.e., from the 1st semester onwards up to and inclusive of the **8th** semester, 'j' is the subject indicator index (takes into account all subjects from 1 to 8th semesters), C_j is the no. of credits allotted to the jth subject, and G represents the grade points (GP) corresponding to the letter grade awarded

for that j[th]subject. After registration and completion of I year I semester, the SGPA of that semester itself may be taken as the CGPA, as there are no cumulative effects.

Illustration of calculation of SGPA

Course/Subject	Credits	LetterGrade	GradePoints	CreditPoints
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 up to 3rd semester:

Semester	Course/Subject Title	Credits Allotted	Letter Grade Secured	Corresponding Grade Point (GP)	Credit Points (CP)
I	Course 1	3	A	8	24
I	Course 2	3	O	10	30
I	Course 3	3	B	6	18
I	Course 4	4	A	8	32
I	Course 5	3	A+	9	27
I	Course 6	4	C	5	20
II	Course 7	4	B	6	24
II	Course 8	4	A	8	32
II	Course 9	3	C	5	15
II	Course 10	3	O	10	30
II	Course 11	3	B+	7	21
II	Course 12	4	B	6	24
II	Course 13	4	A	8	32
II	Course 14	3	O	10	30
III	Course 15	2	A	8	16

III	Course 16	1	C	5	5
III	Course 17	4	O	10	40
III	Course 18	3	B+	7	21
III	Course 19	4	B	6	24
III	Course 20	4	A	8	32
III	Course 21	3	B+	7	21
	Total Credits	**69**		**Total Credit Points**	**518**
		CGPA = 518/69 = 7.51			

The above illustrated calculation process of CGPA will be followed for each subsequent semester until 8th semester. The CGPA obtained at the end of 8th semester will become the final CGPA secured for entire B.Tech. Programme.

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

9.11   For calculations listed in regulations 9.6 to 9.9, 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.

10.0   Passing standards

10.1   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 bedeclared successful or 'passed' in the entire under graduate programme, only when gets a CGPA ≥ 5.00 for the award of the degree as required.

10.2   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.

11.0   Declaration of results

11.1   Computation of SGPA and CGPA are done using the procedure listed in 9.6 to 9.9.

11.2 For final percentage of marks equivalent to the computed final CGPA, the following formula may be used

% of Marks = (final CGPA – 0.5) x 10

12.0 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 (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).**

12.1 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.

12.2 A student who qualifies for the award of the degree as listed in 12.1 shall be placed in the following classes.

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

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

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

12.6 All the other students who qualify for the award of the degree (as per item 12.1), 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.

12.7 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.

12.8 Students fulfilling the conditions listed under item 12.3 alone will be eligible for award of **'university rank'** and **'gold medal'.**

13.0   Withholding of results

13.1   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.

14.0   Transitory regulations.

14.1   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).

14.2   After the revision of the regulations, the students of the previous batches will be given two chances for passing in their failed subjects, one supplementary and the other regular. If the students cannot clear the subjects in the given two chances, they shall be given equivalent subjects as per the revised regulations which they have to pass in order to obtain the required number of credits.

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

15.0   Minimum Instruction Days

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

16.0   General

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

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

16.3   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.

16.4   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.

17.0   Scope

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

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

17.3   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 College Authorities.

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

With Effect From ACADEMIC YEAR 2024-2025

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 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 (14 marks out of 40 marks) and also not less than 35% in end semester examination (21 marks out of 60 marks) 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 60 % 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 60 % 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)**

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.
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	In case of students of the college, they shall be expelled from

Malla Reddy Engineering College for Women (Autonomous Institution-UGC,Govt.of India)

	Superintendent/Assistant Superintendent / any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walk out or instigates others to walk out, or threatens the officer-in charge or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs or by visible representation, assaults the officer-incharge, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other 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.	examination halls and cancellation of their performance in that subject and all other subjects the candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the subjects of that semester/year. The candidates also are debarred and forfeit their seats. In case of outsiders, they will be handed over to the police and a police case is registered against them.
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

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		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 practicalexaminations 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	Punishments to the candidates as per the above guidelines.

	reported to the Principal for further action to award suitable punishment.	

BACHELOR OF TECHNOLOGY

Computer Science and Engineering-

Data Science

COURSE STRUCTURE

(Batches admitted from the Academic Year 2024 -2025)

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

(Autonomous Institution- UGC, Govt. of India)

Accredited by NAAC with 'A+' Grade, UGC, Govt. of India

Permanently Affiliated to JNTUH, Approved by AICTE, ISO 9001:2015 Certified Institution

Maisammaguda, Dhullapally, Secunderabad, Kompally-500100

COURSE STRUCTURE

I Year B. Tech – I Semester

S. No	Course Code	Subject	L	T	P	C	Max. Marks	
							INT.	EXT.
1	2400BS01	Linear Algebra and Differential Equations	3	1	0	4	40	60
2	2405ES01	Programming for Problem Solving	3	0	0	3	40	60
3	2400BS06	Engineering Chemistry	3	0	0	3	40	60
4	2403ES01	Computer Aided Engineering Graphics	1	0	4	3	40	60
5	2400HS01	English for Skill Enhancement	2	0	0	2	40	60
6	2400BS62	Engineering Chemistry Lab	0	0	2	1	40	60
7	2400HS61	English Language and Communication skills Lab	0	0	3	1.5	40	60
8	2405ES61	Programming for Problem Solving Lab	0	0	5	2.5	40	60
9	2400MC02	Foreign Language: German/French *	2	0	0	0	100	0
10		Induction Programme	-	-	-	-		
		TOTAL	14	1	14	20	420	480

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

I Year B. Tech – II Semester

S.No	Course Code	Subject	L	T	P	C	Max.Marks	
							Int.	Ext.
1	2400BS02	Numerical Techniques and Vector Calculus	3	1	0	4	40	60
2	2405ES02	Data Structures	3	0	0	3	40	60
3	2402ES01	Basic Electrical and Electronics Engineering	3	0	0	3	40	60
4	2400BS05	Applied Physics	3	1	0	4	40	60
5	2403ES61	Engineering Workshop	0	0	3	1.5	40	60
6	2402ES61	Basic Electrical and Electronics Engineering Lab	0	0	2	1	40	60
7	2405ES62	Data Structures Lab	0	0	5	2.5	40	60
8	2400BS61	Applied Physics Lab	0	0	1	1	100	0
9	2400MC01	Environmental Science*	2	0	0	0	100	0
		TOTAL	14	2	11	20	420	480

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

II Year B. Tech – I Semester

S.No	Course Code	Subject	L	T	P	C	Max.Marks Int.	Max.Marks Ext.
1	2467PC01	Introduction to Data Science	3	0	0	3	40	60
2	2462PC02	Computer Organization & Operating Systems	3	1	0	4	40	60
3	2405PC01	Software Engineering	3	0	0	3	40	60
4	2400BS04	Probability & Statistics	3	1	0	4	40	60
5	2405PC04	Object Oriented Programming through Java	3	0	0	3	40	60
6	2467PC61	R Programming for Data Science Lab	0	0	3	1.5	40	60
7	2405PC63	Object Oriented Programming through Java Lab	0	0	3	1.5	40	60
8	2400MC03	Human Values and Professional Ethics*	2	0	0	0	100	
		TOTAL	17	2	6	20	380	420

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

II Year B. Tech – II Semester

S.No	Course Code	Subject	L	T	P	C	Max. Marks Int.	Max. Marks Ext.
1	2467PC02	Statistical Foundation of Data Science	3	1	0	4	40	60
2	2400HS03	Business Economics and Financial Analysis	3	0	0	3	40	60
3	2405PC03	Discrete Mathematics	3	0	0	3	40	60
4	2405PC07	Design and Analysis of Algorithms	3	0	0	3	40	60
5	2405PC08	Database Management Systems	3	1	0	4	40	60
6	2467PC62	Statistical Foundation of Data Science Lab	0	0	3	1.5	40	60
7	2405PC64	Database Management Systems Lab	0	0	3	1.5	40	60
9	2400MC04	Indian Constitution *	2	0	0	0	100	0
		TOTAL	17	2	6	20	380	420

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

III Year B. Tech – I Semester

S.No	Course Code	Subject	L	T	P	C	Max.Marks	
							Int.	Ext.
1	2467PC03	Data Handling and Visualization	3	0	0	3	40	60
2	2412PC02	Automata Theory & Compiler Design	3	0	0	3	40	60
3		**Professional Elective-1**						
	2467PE02	Distributed Systems	3	0	0	3	40	60
	2462PE16	Cyber Security Essentials						
	2405PE01	Object Oriented Analysis and Design						
	2467PE01	Data Modeling and Simulation						
	2405PE02	Computer Graphics & Multimedia						
	2412PE01	Mobile Computing						
4		**Professional Elective-2**						
	2412PE04	Distributed Database	3	0	0	3	40	60
	2467PE02	Spatial and Multimedia Databases						
	2405PE05	Software Architecture and Design Patterns						
	2405PE04	Fundamentals of Computer Networks						
	2466PE07	Computer Vision & Robotics						
	2412PE03	Information Retrieval Systems						
5		**Open Elective-1**	3	0	0	3	40	60
6	2467PR02	Filed Project / Real Time Project	0	0	0	1	100	-
7	2405PC65	Compiler Design Lab	0	0	3	1.5	40	60
8	2467PC63	Data Handling and Visualization Lab	0	0	3	1.5	40	60
9	2467PR01	Innovative Product Development -I	0	0	2	1	40	60
10	2400MC05	Technical Communications and Soft Skills*	2	0	0	0	100	0
		Total	19	0	8	20	520	480

*Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree
 Field Project/ Real Time Project :During Summer Vacation-Evaluation in III-II

III Year B. Tech – II Semester

S. No	Course Code	Subject	L	T	P	C	Max. Marks	
							Int.	Ext.
1	2412PC03	Full Stack Development	3	0	0	3	40	60
3	2467PC04	Data Warehousing & Data Mining	3	0	0	3	40	60
4	2400HS02	Professional English	3	0	0	3	40	60
		Professional Elective-3						
5	2467PE17	Distributed Computing	3	0	0	3	40	60
	2462PE13	Social Media Security						
	2405PE03	Software Testing Methodologies						
	2467PE05	Healthcare Data Analytics						
	2405PE11	Image Processing						
	2405PE06	Cloud Computing						
6		**Open Elective – 2**	3	0	0	3	40	60
7	2412PC64	Full stack Development Lab	0	0	3	1.5	40	60
8	2467PC64	Data Mining Lab	0	0	3	1.5	40	60
9	2400HS05	Design Thinking	2	0	0	1	40	60
10	2467PR03	Innovative Product Development -II	0	0	2	1	100	0
11	2400MC06	Indian Tradition Knowledge *	2	0	0	0	100	0
		TOTAL	19	1	8	20	460	540

*Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree Industry Oriented Mini Project/ Internship - During Summer Vacation-Evaluation in IV-I

IV Year B. Tech – I Semester

S.No	Course Code	Subject	L	T	P	C	Max. Marks	
							Int.	Ext.
1	2467PC05	Big Data Analytics	3	0	0	3	40	60
2	2466PC02	Machine Learning	3	1	0	4	40	60
3	2400HS04	Fundamentals of Management and Entrepreneurship	2	0	0	2	40	60
4		Professional Elective-IV	3	0	0	3	40	60
	2466PE05	Large Language Models						
	2462PE19	Web & Database Security						
	2405PE04	Agile Software Development						
	2467PE06	Text Analytics						
	2405PE07	Block Chain Technology						
	2467PE18	Managing Data science and Security						
5		Open Electives - III	3	0	0	3	40	60
6	2466PC62	Machine Learning Lab	0	0	2	1	40	60
7	2467PC65	Big Data Analytics lab	0	0	2	1	40	60
8	2467PR05	Industry Oriented Mini Project / Internship / Skill Development	0	0	2	1	40	60
9	2467PR04	Innovative Product Development-III	0	0	2	1	40	60
10	2467PR06	Research Project- 1	0	0	4	2	40	60
11	2400MC07	Gender Sensitization*	2	0	0	0	100	0
		TOTAL	14	1	14	20	500	600

*Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree
*Summer between III & IV Year: Mini Project

IV Year B. Tech - II Semester

S.No	Course code	Subject	L	T	P	C	Max. Marks	
							INT	EXT
1		Professional Elective-5	3	0	0	3	40	60
	2466PE08	Natural Language Processing						
	2462PE20	Cyber laws and IT security						
	2405PE08	Software Process and Project Management						
	2467PE08	Social Network Analytics						
	2412PE10	3D Modeling Design						
	2462PE23	Data Privacy Security						
2		Professional Elective-6	3	0	0	3	40	60
	2466PE06	Generative AI						
	2462PE17	Digital forensics						
	2405PE09	Software Quality Assurance Testing						
	2467PE09	Web and Social Media Analytics						
	2466PE10	Augmented Reality and virtual Reality						
	2467PE10	Cloud Security						
3		Open Elective-3	3	0	0	3	40	60
4	2405PR07	Technical Seminar	2	0	0	2	100	0
5	2405PR08	Innovation Startup & Entrepreneurship	0	0	8	4	40	60
6	2405PR09	Research Project-II	0	0	10	5	40	60
7	2400MC08	Research Methodologies & IPR*	2	0	0	0	100	0
		TOTAL	13	0	18	20	400	300

Semester	I-I	I-II	II-I	II-II	III-I	III-II	IV-I	IV-II	TOTAL
Credits	20	20	20	20	20	20	20	20	160

OPEN ELECTIVES

R-24 List of Open Electives offered by Various Departments for B.Tech. III & IV Year

Department	Open Elective-I	Open Elective-II	Open Elective-III	Open Elective-IV
Computer Science and Engineering	2405OE01-Fundamentals of DBMS 2405OE02-Computer Organization & Operating Systems	2405OE03-Data Structures 2405OE04-Advanced Compiler Design	2405OE05-Java Programming 2405OE06-CASE Tools & Software Testing	2405OE07-Data & Knowledge Engineering 2405OE08-Web Application Development
Information Technology	2412OE01-Advanced Computer Architecture 2412OE02-Advanced Operating Systems	2412OE03-Scripting Language 2412OE04-Embedded Systems	2412OE05-Advanced Computer Networks 2412OE06-Advanced Algorithms	2412OE07-Computational Complexity 2412OE08-Robotic Process Automation
Artificial Intelligence & Machine Learning	2467OE01-Knowledge Representation & Reasoning 2467OE02-Neural Networks	2467OE03-Artificial Intelligence 2467OE04-Reinforcement Learning	2467OE05-Deep Learning using Python 2467OE06-Edge Analytics	2467OE07-Cognitive Computing & Applications 2467OE08-Quantum Computing
Data Science	24670E01-Computer Oriented Statistical Methods 24670E02-Data Visualization Techniques	24670E03-Data Wrangling using Python 24670E04-Data Science Tools	242670E05-Data Science Applications 24670E06-Big Data Architecture	24670E07-Business Analytics 24670E08-Soft computing
Cyber Security	24620E01-Ethical Hacking 24620E02-Cyber Security Essentials	24620E03-Cloud Security Essentials 24620E04-Vulnerability Assessment & Penetration Techniques	24620E05-Social Media Security 24620E06-Authorization and Authentication Techniques	24620E07-Security incident & Response Management 24620E08-Cyber Security & Laws
ECE	2404OE01-Computer Organisation 2404OE02-Sensor &Actuators	2404OE03-Principles of Electronic Communication 2404OE04-Image Processing	2404OE05-Principles of Computer Communication and Network 22404OE06-Pattern Recognition-	2404OE07-5G Technologies 2404OE08-RTOS and System Programming

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

2400BS01: LINEAR ALGEBRA AND DIFFERENTIAL EQUATIONS

B.TECH I YEAR I SEMESTER   **L T P C**
                                                              3 1 0 4

Course Objectives: To learn

- Types of Matrices and their properties, concept of a rank of the matrix and applying this concept to know the consistency and solving the system of linear equations.
- Study concept of Eigen values and Eigen vectors.
- Methods for solving the first and higher order differential equations.
- Partial differentiation, concept of total derivative, finding maxima and minima of function of two variables.
- Geometrical approach to the mean value theorems, their application to mathematical problems.

Course Outcomes:

After learning the contents of this course, the student must be able to

- Write the matrix representation of a set of linear equations and to analyze the solution of the system of equations
- Find the Eigen values and Eigen vectors.
- Solve the first order differential equations and higher order differential equations.
- Find the extreme values of functions of two variables**.**
- Solve the applications on mean value theorems.

UNIT-I: **10 L**

Matrices: Types of Matrices, Symmetric; Skew-symmetric; Hermitian; Skew-Hermitian; Orthogonal matrices; Unitary Matrices; Rank of a matrix by Echelon form and Normal form, Inverse of Non-singular matrices by Gauss-Jordan method; System of linear equations; Solving system of Homogeneous and Non-Homogeneous equations.

UNIT-II: **10 L**

Eigen values and Eigen vectors: Eigen values and Eigenvectors and their properties (only statements);Cayley-Hamilton Theorem (without proof); Finding inverse and powers of a matrix

by Cayley-Hamilton Theorem; Diagonalization of a matrix.**Vector Space, basis, linear dependence and independence (Only Definitions).**

UNIT-III: 10L

Ordinary Differential Equations: Exact differential equations, Linear and Bernoulli's equations. Applications:Newton's law of cooling. Second order linear differential equations with constant coefficients: Non-Homogeneous terms of the type e^{ax}, *sin ax, cos ax*, polynomials in x, $e^{ax}V(x)$ and *x V(x)*.

UNIT-IV: 9 L

Partial Differentiation: Definitions of Limit and Continuity. Partial Differentiation; Euler'sTheorem; Total derivative; Jacobian; Functional dependence & independence, Maxima and minima of functions of two variables.

UNIT-V: 9 L

Differential Calculus: Rolle's mean value theorem (without proof), Lagrange's Mean value theorem (without proof) with their Geometrical Interpretation, Cauchy's Mean value Theorem (without proof).

TEXTBOOKS:
1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 44thEdition, 2017.
2. R. K. Jain and S.R.K. Iyengar, Advanced Engineering Mathematics,Narosa Publications, 5th Edition, 2016.

REFERENCE BOOKS:
1. Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons, 9thEdition,2013.
2. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi,38th Reprint, 2022.
3. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, Pearson, 9thEdition, Reprint, 2002.
4. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
2405ES01: PROGRAMMING FOR PROBLEM SOLVING

B.TECH I YEAR I SEMESTER   **L T P C**
                                                                3 0 0 3

Course Objectives:
- To understand the various steps in program development.
- To learn the syntax and semantics of C programming and Python.
- Understand Lists, Dictionaries and Tuple in Python.
- To learn the usage of structured programming approach in C Programming.
- Implement Object Oriented Programming concepts in Python

Course Outcomes: The student will learn

- To write algorithms and to draw flowcharts for solving problems.
- Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries.
- To code and test a given logic in C programming language.
- To decompose a problem into functions and to develop modular reusable code.
- To use arrays, pointers, strings and structures to write C programs, Demonstrate proficiency in handling Strings and File Systems.
- Interpret the concepts of Object-Oriented Programming as used in Python.

UNIT I:
Introduction to C Programming: Structure of a C program, Identifiers, Variables (with data types and space requirements), Operators, Precedence and Expression evaluation, Type conversion.

UNIT II:
Conditional Branching and Loops: Writing and Evaluation of Conditionals with If, If-Else, else-if ladder Switch-Case, goto, Iteration with For, While, Do While Loops
Arrays: One-Two-Dimensional Arrays, Creating, Accessing and Manipulating Elements of Arrays.
Strings: Introduction To Strings, Handling Strings as Array of Characters, Basic String Functions available in C (Strlen, Strcat, Strcpy, Strstr Etc.), Arrays of Strings.

UNIT – III
Functions: Declaring a function, Parameters and return type of a function, passing parameters to functions, Recursive Functions.
Structures: Defining structures, initializing structures, unions.
Pointers: Idea of pointers, Defining pointers, Pointer to Pointer, Dynamic Memory Management functions(DMA)

File Handling in C: Creating and Reading and writing text and binary files, Appending data to existing files, Writing and reading structures using binary files, Random access using fseek, ftell and rewind functions.

UNIT – IV
Introduction to Python Programming:Modes: Interactive Mode, Scripting Mode, Identifiers, Keywords, Variables, Comments, Lines and Indentations, Quotations, Assigning Values to Variables, Data Types in Python, Mutable Vs Immutable, Fundamental Data Types: int, float, complex, bool, str, Advanced Data Types(List, Tuple, Dictionary, set, etc..).

Decision Making Statements: if Statement, if-else Statement, elif Statement. Looping Statements: For and While loops, Nested loops, using else Statement with loops, Control Statements: break Statement, continue Statement, Pass Statement.

Python Slicing & Indexing: Forward Direction Slicing with +ve Step, Backward Direction Slicing with -ve Step, Built-in String Functions.

UNIT – V
Python Functions: Creating a Function, Function Calling, Parameters in Function,Types of Arguments,Scope of Variables, Python Built-in Functions. Python Lambda Functions.

Python File Handling: Opening a File, Reading the File, Read Lines of the File, Writing the File, creating a New File Using with Statement with Files, File Pointer Position, Modifying File Pointer Position Renaming the File & Removing the File, Writing Python Output to the Files File Related Methods.

Text Books:
1. Computer Science: A Structured Programming Approach Using C, B. A. ForouzanandR. F. Gilberg, Third Edition, Cengage Learning.
2. Programming in C. P. Dey and M Ghosh, Second Edition, Oxford University Press.
3. Core Python Programming, Wesley J. Chun, Second Edition, Pearson

Reference Books:
1. The C Programming Language, B.W. Kernighan and Dennis M. Ritchie, Second Edition, Pearson education.
2. Programming with C, B. Gottfried, 3rd edition, Schaum's outlines, McGraw Hill Education (India) PvtLtd.
3. Programming Languages, A.B. Tucker, R.E. Noonan, TMH.
4. Programming Languages, K. C. Louden and K A Lambert., 3rd edition, Cengage Learning.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

2400BS06: ENGINEERING CHEMISTRY

B.TECH I YEAR I SEMESTER   **L T P C**
                                                                                      3 0 0 3

COURSE OBJECTIVES

- To acquire the knowledge of water treatment which are essential for the Engineers and in industry.
- To include the importance of fundamental aspects of battery chemistry, significance of corrosion and it's control to protect the structures.
- To account the applications of different kinds of polymers in various fields.
- To imbibe the basic concepts of petroleum products.
- To impart the basic knowledge of smart materials which have excellent engineering applications.

COURSE OUTCOMES:

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

- The modern technology and interpret different problems involved in industrial utilization of water.
- The required principles and concepts of batteries, corrosion to predict the behavior of a system under different variables.
- Knowledge of various terms related to polymer science, classification, properties, and its applications
- The potential applications of petroleum products and their practical utility in order to become good engineers and entrepreneurs.
- Apply the knowledge of various smart materials to find solutions for various engineering problems.

UNIT - I:

Water and its treatment: Introduction – hardness of water – Causes of hardness - Types of hardness: temporary and permanent – expression and units of hardness, Numerical problems. Estimation of hardness of water by complexometric method. 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: Scales, Sludges and Caustic Embrittlement. Internal treatment of Boiler feed water - Calgon conditioning, Phosphate conditioning. External treatment methods - Softening of water by ion- exchange processes. Desalination of water –Reverse osmosis.

;,

UNIT - II:
Battery Chemistry and Corrosion
Introduction- Classification of batteries-primary, secondary and reserve batteries with examples. Basic requirements for commercial batteries. Construction, working and applications ofZn-air and Lithium-ion battery, Applications of Li-ion battery to electrical vehicles. Fuel Cells-Differences between battery and a fuel cell, Construction and applications of solid oxide fuel cell.**Electrochemical sensors:** Potentiometric Sensors and voltammetric sensors. Examples: analysis of Glucose.
Corrosion: Causes and effects of corrosion,Theories of chemical and electrochemical corrosion – mechanism of electrochemical corrosion. Factors affecting rate of corrosion, Corrosion control methods- Cathodic protection – Sacrificial anode and impressed current cathodic methods. Surface coatings – metallic coatings – methods of application: Galvanizing and Tinning.

UNIT-III
Polymeric materials
Definition–Classification of polymers with examples–Types of polymerizations–addition (free radical addition) and condensation polymerization–Nylon 6,6. Glass transition temperature (Tg).
Plastics: Definition and characteristics-thermoplastic and thermosetting plastics, Preparation, Properties and engineering applications of PVC, Bakelite and Teflon. Fiber reinforced plastics (FRP)-Applications.
Conducting polymers: Characteristics and classification of conducting polymers with examples. Mechanism of conduction in trans-polyacetylene. Applications of conducting polymers.
Biodegradable polymers: Concept and advantages- Polyvinyl alcohol and its applications.

UNIT – IV
Energy Sources:
Introduction, 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. Biodiesel-transesterification and advantages.

UNIT - V:
Smart materials and their engineering applications
Introduction- Classification of smart materials, chromic materials- photo, electric, and thermochromic materials.Workingprinciple and applications ofshape memory alloys- Nitinol,

piezoelectric materials- Rochelle salt,thermoresponsive materials- PNIPAM, self-healing materials- Sulphur-Selenium alloy magnetostrictive material- ALFENOL, GALFENOL electrostrictive materials- PMN, polyurethane.

Suggested Text Books:
1. Engineering Chemistry by P.C.Jain and M. Jain, Dhanpatrai Publishing Company,2010
2. Engineering Chemistry by Rama Devi, Venkata Ramana Reddy and Rath, Cengage learning, 2016
3. Engineering Analysis of Smart Material Systems by Donald J. Leo, Wiley, 2007.
4. Text book of Engineering Chemistry by Jaya Shree Anireddy, Wiley Publications.
5. Bahadur Sastry N V, Principles of Polymer Science, 2002, Narosa Publishing Co, New Delhi.
6. Engineering Chemistry by Shashi Chawla, Dhanpatrai and Company (P) Ltd. Delhi (2011)

REFERENCE BOOKS:
1. Engineering Chemistry by Shikha Agarwal, Cambridge University Press, Delhi(2015)

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

2403ES01: COMPUTER AIDED ENGINEERING GRAPHICS

B.TECH I YEAR I SEMESTER   **L T P C**
                                                                          1 0 4 3

Course Objectives:

1. To impart conceptual knowledge about AutoCAD software in creating, editing and manipulating 2D engineering drawings.
2. To inculcate the required skills to apply engineering drawing principles effectively for accurately sketching conics and cycloids.
3. To enhance visualization skills for better interpreting the position of points and lines, enabling accurate representation of their orthographic projections.
4. To familiarize drafting skills for constructing orthographic views of planes and solids in diverse orientation.
5. To develop the competency in creating isometric views from orthographic views and vice-versa.

Course Outcomes:

Upon the completion of the course, the students should be able to:

1. Demonstrate proficiency in using AutoCAD software to create, edit, and manipulate 2D engineering drawings.
2. Apply the concepts of engineering drawing for sketching conic sections and cycloids.
3. Analyze position of points and lines for representing their orthographic projections.
4. Sketch orthographic projections of planes and solids to analyze their different orientations
5. Evaluate the given orthographic projections for developing isometric view and vice versa.

UNIT-I:

Introduction to AutoCAD Software:

Menu Bar, Ribbon – Draw and Modify Toolbar, Dimension etc., Drawing Area - Background, Crosshairs, Coordinate System, Dialog boxes and windows, Shortcut menus, The Command Line, The Status Bar, Different methods of zoom as used in CAD, Select and erase objects - Basic geometrical constructions using AutoCAD commands.

Introduction to Engineering Drawing: Principles of Engineering drawing and their significance, Conventions.

Engineering Curves: Construction of Ellipse, Parabola, Hyperbola - General method and Special methods

Cycloidal Curves - Cycloid, Epicycloid and Hypocycloid.

UNIT-II:

Orthographic Projections, Projections of Points & Straight Lines:

Principles of Orthographic Projections – Conventions; Projections of points; Projections of lines –Line parallel to one plane and both the planes, line inclined to one plane and parallel to other plane, Line inclined to both the planes;

UNIT-III:

Projections of Planes:

Projections of Planes - Surface parallel to one plane and perpendicular to other plane, Surface Inclined to one plane and perpendicular to other plane, Surface inclined to both the planes.

UNIT-IV:

Projections of Regular Solids:

Projections of Regular Solids - Prisms, Pyramids, Cylinder and Cone – Axis parallel to one plane and perpendicular to other plane, Axis inclined to one plane and parallel to other plane, Axis inclined to both the planes.

UNIT-V:

Isometric Projections:

Principles of Isometric projection – Isometric Scale, Isometric Views, Conventions;

Isometric Views of lines, Planes, Simple and Compound solids.

Conversion of Isometric View to Orthographic Views and Vice-versa, Conventions.

Introduction to Solid Modeling: Creation of simple solid models relevant to the domain.

TEXT BOOKS:

1. Engineering Drawing, N.D. Bhatt – N.D. Bhatt & V.M Panchal, 48th Edition, 2005 Charotar Publishing House, Gujarat.
2. Engineering Drawing / Basant Agarwal and MC Agarwal / McGraw Hill

REFERENCES:

1. Engineering drawing – P.J. Shah .S.Chand Publishers.
2. Engineering Drawing- Johle/Tata Macgraw Hill Book Publisher.
3. Computer Aided Engineering Drawing – S. Trymbaka Murthy, - I.K. International Publishing House Pvt. Ltd., New Delhi, 3rd revised edition-2006.
4. "Computer Aided Engineering Drawing"by Dr. M H Annaiah, Dr C N Chandrappa and

Dr B SudheerPremkumar Fifth edition, New Age International Publishers.
5. Engineering Drawing by K.VenuGopal&V.Prabu Raja New Age Publications

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

2400HS01: ENGLISH FOR SKILL ENHANCEMENT

B.TECH I YEAR I SEMESTER   **L T P C**

                                                                            2 0 0 2

COURSE OBJECTIVES

This course will enable the students to:

- Improve the language proficiency of students in English with an emphasis on Vocabulary, Grammar, Reading and Writing skills

- Develop study skills and communication skills in various professional situations.

- Study engineering subjects more effectively and critically using the theoretical and practical components of the syllabus.

COURSE OUTCOMES:

Students will be able to:

- Understand the importance of vocabulary and sentence structures.

- Choose appropriate vocabulary and sentence structures for their oral and written Communication.

- Demonstrate their understanding of the rules of functional grammar.

- Develop comprehension skills from the known and unknown passages.

- Take an active part in drafting paragraphs, letters, essays, abstracts, précis and reports in various contexts.

- 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 -The Use of Prefixes and Suffixes – Acquaintance with Prefixes and Suffixes from Foreign Languages to form Derivatives - Synonyms and Antonyms

Grammar: Identifying Common Errors in Writing with Reference to Articles and Prepositions.

Reading: Reading and Its Importance- Techniques for Effective Reading.

Writing: Sentence Structures -Use of Phrases and Clauses in Sentences- Transformation of Sentences: Simple-Complex-Compound and vice-versa. **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 Misspelt - **Homophones, Homonyms and Homographs**

Grammar: Identifying Common Errors in Writing with Reference to Noun-pronoun Agreement and Subject-verb Agreement.

Reading: Sub-Skills of Reading – Skimming and Scanning – Exercises for Practice; Book Review

Writing: Nature and Style of Writing- Defining /Describing People, Objects, Places and Events– Classifying- Providing Examples or Evidence

UNIT – III

Chapter entitled **'Lessons from Online Learning' by F. Haider Alvi, Deborah Hurst et al** from **"English: Language, Context and Culture"** published by Orient Black Swan, Hyderabad.

Vocabulary: Words Often Confused - Words from Foreign Languages and their Use in English.

Grammar: Identifying Common Errors in Writing with Reference to Misplaced Modifiers and Tenses.

Reading: Sub-Skills of 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 **'Art and Literature' by Abdul Kalam** from "**English: Language, Context and Culture"** published by Orient Black Swan, Hyderabad.

Vocabulary: Standard Abbreviations in English

Grammar: Redundancies and Clichés in Oral and Written Communication.

Reading: Survey, Question, Read, Recite and Review (**SQ3R Method**) - Exercises for Practice

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

UNIT – V

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

Vocabulary: Technical Vocabulary and their Usage; One Word Substitution; Phrasal Verbs.

Grammar: Common Errors in English (Covering all the other aspects of grammar which were not covered in the previous units)

Reading: Reading Comprehension-Exercises for Practice

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

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

REFERENCE BOOKS:
- English for Engineers P.(2018) Cambridge university Press
- Kumar, S and Lata, P. (2018). Communication Skills. Oxford University Press.
- Zinsser, William. (2001). On Writing Well. Harper Resource Book.
- Hamp-Lyons, L. (2006). Study Writing. Cambridge University Press.
- Exercises in Spoken English. Parts I –III. CIEFL, Hyderabad. Oxford University Press.
- Sudarshana, N.P. and Savitha, C. (2018). English for Engineers. Cambridge University Press
- Effective Academic Writing by Liss and Davis (OUP)
- Richards, Jack C. (2022) Interchange Series. Introduction, 1,2,3. Cambridge University Press

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

2400BS62: ENGINEERING CHEMISTRY LAB

B.TECH I YEAR I SEMESTER   **L T P C**
                                                                                      0 0 2 1

COURSE OBJECTIVES

The course consists of experiments related to the principles of chemistry required for engineering student. The student will able to learn:

- Estimation of hardness and chloride content in water to check its suitability for drinking purpose.
- Students are able to perform estimations of acids and bases using conductometry, potentiometry and pH metry methods.
- To measure the physical properties like adsorption, surface tension and viscosity.
- To synthesize polymers like polyaniline and urea-formaldehyde resin.
- To summarize the data and find the applicability to real world scenario.

COURSE OUTCOMES

- To record the amount of hardness and chloride content in water and interpret the significance of its presence in water.
- Able to perform methods such as conductometry, potentiometry and pH metry in order to find out the concentrations of equivalence points of acids.
- To report and predict the significance of properties like viscosity and surface tension.
- Able to learn how to synthesize polymers.
- Apply the skills gained to solve societal issues real world scenario.

List of Experiments

Volumetric Analysis:

1. Determination of total hardness of water by complexometric method using EDTA.
2. Determination of chloride content of water by Argentometry.
3. **Conductometry:** Estimation of an HCl by Conductometric titrations.
4. **Potentiometry:** Estimation of Fe^{2+} by Potentiometry using $KMnO_4$.

5. **pH Metry:** Estimation of HCl by pH metry.

Lubricants:

6. Determination of viscosity of castor oil and ground nut oil by using Ostwald's viscometer.

7. Determination of acid value of lubricant oil

8. Determination of surface tension of a give liquid using stalagmometer.

Preparations:

9. Synthesis of polyaniline.

10. Synthesis of urea-formaldehyde resin.

Virtual lab experiments:

11. Batteries for electrical vehicles.

12. Functioning of solar cell and its applications.

13. Smart materials for Biomedical applications.

Text books:

1. Laboratory Manual on Engineering Chemistry, S. K. Bhasin and Sudha Rani, Dhanpat Rai Publications.

2. College Practical Chemistry V. K. Ahluwalia, Sunitha Dhingra, Adargh Gulati, University Press Pvt. Ltd.

3. Practical Chemistry, Dr. O. P. Pandey, D. N. Bajpai, and Dr. S. Giri, S. Chand.

4. Lab manual for Engineering chemistry by B. Rama devi and P. Aparna, S Chand Publications, New Delhi (2022)

References:

1. Senior practical physical chemistry, B.D. Khosla, A. Gulati and V. Garg (R. Chand & Co., Delhi)

2. An introduction to practical chemistry, K.K. Sharma and D. S. Sharma (Vikas publishing, N. Delhi)

3. Text book on Experiments and calculations in Engineering chemistry – S.S. Dara.

4. https://www.electronics-notes.com/articles/electronic_components/battery-technology/li-ion-   lithium-ion-technology.php.

5. https://www.gamry.com/application-notes/physechem/dssc-dye-sensitized-solar   cells.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

2400HS61: ENGLISH LANGUAGE AND COMMUNICATION SKILLS LABORATORY

B.TECH I YEAR I SEMESTER   **L T P C**
                                                               0 0 3 1.5

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:
The course will
- Facilitate computer-assisted multi-media instruction enabling individualized and independent language learning
- Sensitize the students to the nuances of English speech sounds, word accent, intonation and rhythm
- Bring about a consistent accent and intelligibility in students' pronunciation of English by providing an opportunity for practice in speaking
- Improve the fluency of students in spoken English and neutralize the impact of dialects.
- Train students to use language appropriately for public speaking, group discussions and presentations.

COURSE OUTCOMES:
Students will be able to:
- Understand the nuances of English language through audio- visual experience and group activities
- Neutralise their accent for intelligibility
- 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

- To develop their listening skills so that they may appreciate the role in the LSRW skills approach to language and improve their pronunciation

> ➤ To equip students with necessary training in listening, so that they can comprehend the speech of people of different backgrounds and regions

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

- ⧫ Listening for general content
- ⧫ Listening for specific information
- ⧫ Intensive Listening
- ⧫ Inference Listening

SPEAKING SKILLS

Objectives

- ⧫ To involve students in spoken language activities in various contexts
- ⧫ 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

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– Weak Forms and Strong Forms – 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
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 Detail& Specific Details.
Practice: Listening Comprehension Tests - Testing Exercises
ICS Lab:
Understand: Public Speaking – Exposure to Structured Talks - Non-verbal Communication
                   Presentation Skills.
Practice: **Viva Voce;** Making a Short Speech – Extempore- Making a Presentation:

Exercise – V
CALL Lab:
Understand : **Blog Writing**
Practice: Writing a Blog
ICS Lab:
Understand: Group Discussion-Purpose; Do's & Don'ts, Parts of a GD-Roles in a GD.
Practice: Group Discussion

Source of Material (Master Copy):
  ⬥   Exercises in Spoken English. Part 1,2,3. CIEFL and Oxford University Press

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:

(2022). English Language Communication Skills – Lab Manual cum Workbook. Cengage Learning India Pvt. Ltd.

Shobha, KN & Rayen, J. Lourdes. (2019). Communicative English – A workbook. Cambridge University Press

Kumar, Sanjay & Lata, Pushp. (2019). Communication Skills: A Workbook. Oxford University Press

Board of Editors. (2016). ELCS Lab Manual: A Workbook for CALL and ICS Lab Activities. Orient Black Swan Pvt. Ltd.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
2405ES61: PROGRAMMING FOR PROBLEM SOLVING LAB
B.TECH I YEAR I SEMESTER   **L T P C**
                                                                          0   0 5 2.5

Course Objectives: The students will learn the following:

- To develop programs to solve basic problems by understanding basic concepts in C like operators, control statements etc.
- To develop modular, reusable and readable C Programs using the concepts like functions, arrays etc.
- Learn Syntax and Semantics and create Functions in Python.
- Handle Strings and Files in Python.
- Understand Lists, Dictionaries and Regular expressions in Python.
- Implement Object Oriented Programming concepts in Python.

Course Outcomes: The candidate is expected to be able to:

- formulate the algorithms for simple problems
- translate given algorithms to a working and correct program
- represent and manipulate data with arrays, strings and structures
- Student able to understand the basic concepts scripting and the contributions of scripting language
- Ability to explore python especially the object-oriented concepts, and the built in objects of Python.
- Ability to create practical and contemporary applications such as TCP/IP network programming, Web applications, discrete event simulations

WEEK 1:
1. Write a simple program that prints the results of all the operators available in C (including pre/ post increment, bitwise and/or/not, etc.). Read required operand values from standard input
2. Write a program for find the max and min from the three numbers.

WEEK 2:
1. Write program that declares Class awarded for a given percentage of marks, where mark <40%= Failed, 40% to <60% = Second class, 60% to <70%=First class, >= 70% = Distinction. Read percentage from standard input.
2. Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement)
3. Write a program that prints a multiplication table for a given number and the number of

rows in the table.

For example, for a number 5 and rows = 3, the output should
be: 5 x 1 = 5

    5 x 2=10

5 x 3=15

WEEK 3:

1. Write a C program to find the sum of individual digits of a positive integer and test given number is palindrome.
2. A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.
3. Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
4. Write a C program to read in two numbers, x and n, and then compute the sum of this Geometric progression:$1+x+x^2+x^3+$…….. $+x^n$. For example: if n is 3 and x is5,then the program computes 1+5+25+125.

WEEK 4:

1. Write a C program to find the minimum, maximum and average in an array of integers
2. Write a C program that uses functions to perform the following:
   a. Addition of Two Matrices
   b. Multiplication of Two Matrices
3. Write C programs that use both recursive and non-recursive functions
   a. To find the factorial of a given integer.
   b. To find the GCD (greatest common divisor) of two given integers.
4. Write a program through pointer variable to sum of n elements from array.

WEEK 5:

1. Write a C program to determine if the given string is a palindrome or not (Spelled same in both directions with or without a meaning like madam, civic, noon, abcba,etc.)
2. Write a C program to insert a sub-string in to a given main string from a given position.
3. Write a C program to count the lines, words and characters in a giventext.

WEEK 6:

1. Write a C program to store information of 5 students usingstructures.
2. Write a C program to access members of union?
3. Write a C program to display the contents of a file to standard output device.
4. Write a C program which copies one file to another, replacing all lowercase characters with their uppercase equivalents.

WEEK 7:
1. Python program to print "Hello Python"
2. Write a program that computes and prints the result of $512 - 282 /47 \cdot 48 + 5$ .It is roughly .1017
3. Ask the user to enter a number. Print out the square of the number but use the sep optional argument to print it out in a full sentence that ends in a period. Sample output is shown below. Enter a number: 5
   The square of 5 is 25.
4. Ask the user to enter a number x. Use the sep optional argument to print out x, 2x, 3x, 4x, and 5x, each separated by three dashes, like below.
   Enter a number: 7
   7---14---21---28---35

WEEK 8:
1. Write a program that asks the user to enter a length in centimetres. If the user enters a negative length, the program should tell the user that the entry is invalid. Otherwise, the program should convert the length to inches and print out the result. There are 2.54 centimetres in an inch.
2. Write a program that asks the user how many credits they have taken. If they have taken 23 or less, print that the student is a freshman. If they have taken between 24 and 53, print that they are a sophomore. The range for juniors is 54 to 83, and for seniors it is 84 and over.
3. A year is a leap year if it is divisible by 4, except that years divisible by 100 are not leap years unless they are also divisible by 400. Write a program that asks the user for a year and prints out whether it is a leap year or not
4. A number is called a perfect number if it is equal to the sum of all of its divisors, not including the number itself. For instance, 6 is a perfect number because the divisors of 6 are 1, 2, 3, 6 and $6 = 1 + 2 + 3$.

WEEK 9:
1. Write a program that computes the factorial of a number. The factorial, n!, of a number n is the product of all the integers between 1 and n, including n.
   For Example: $5! = 1 \cdot 2 \cdot 3 \cdot 4 \cdot 5 = 120$
2. The Fibonacci numbers are the sequence below, where the first two numbers are 1, and each number thereafter is the sum of the two preceding numbers. Write a program that asks the user how many Fibonacci numbers to print and then prints that many.
   1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89 . . .
3. Write a program that asks the user to enter a string. The program should then print the following:
   (a) The total number of characters in the string
   (b) The string repeated 10 times

(c) The first character of the string (remember that string indices start at 0)

(d) The first three characters of the string

(e) The last three characters of the string

(f) The string backwards

(g) The seventh character of the string if the string is long enough and a message otherwise

(h) The string with its first and last characters removed

(i) The string in all caps

(j) The string with every a replaced with an e

(k) The string with every letter replaced by a space.

WEEK 10:

1. Write a program that asks the user to enter a string. The program should create a new string called new string from the user's string such that the second character is changed to an asterisk and three exclamation points are attached to the end of the string. Finally, print new string. Typical output is shown below:

   Enter your string: Qbert

   Q*ert!!!

2. A website requires the users to input username and password to register. Write a program to check the validity of password input by users.

   Following are the criteria for checking the password:

   1. At least 1 letter between [a-z]
   2. At least 1 number between [0-9]
   3. At least 1 letter between [A-Z]
   4. At least 1 character from [$#@]
   5. Minimum length of transaction password: 6
   6. Maximum length of transaction password: 12

   Your program should accept a sequence of comma separated passwords and will check them according to the above criteria. Passwords that match the criteria are to be printed, each separated by a comma.

   Example If the following passwords are given as input to the program:

   Then, the output of the program should be:

   ABd1234@1

3. Write a program that accepts sequence of lines as input and prints the lines after making all characters in the sentence capitalized

   Suppose the following input is supplied to the program:

   Hello world

   Practice makes perfect

   Then, the output should be:

HELLO WORLD

PRACTICE MAKES PERFECT

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

2400MC02: FRENCH LANGUAGE

B.TECH I YEAR I SEMESTER   **L T P C**
                                                                           2 0 0 0

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:
- To inculcate the basic knowledge of the French language.
- To hone the basic sentence constructions in day to day expressions for communication intheir vocation.

Course Outcomes
- The students will be able to communicate in French at A1level.
- The student will have an advantage in the competitive job market.
- This course benefits the graduates when pursuing study *opportunities* in the countrieswhere French is the official language.

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 – talkabout sports and recreation - express the frequency Writing: A letter to a friend
Grammar - The expression of time – Their verbs in the present - The verbs do, go, take, come, -Adverbs - Reflexive verbs
Vocabulary - The days and months of theyear-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 – thefuture 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 (Course book) By Livid Language
5. Ã L' Aventure: An Introduction to French Language and Francophone Cultures by Evelyne Charvier-Berman, Anne C. Cummings.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

2400BS02: NUMERICAL TECHNIQUES & VECTOR CALCULUS

B.TECH I YEAR II SEMESTER   **L T P C**
3 1 0 4

Course Objectives: To learn

- Apply numerical techniques to find the root of algebraic and transcendental equations

- Apply concept of finite differences and estimate the value for the given data using interpolation.

- Evaluation differentiation and integration by numerical methods.

- The physical quantities involved in engineering field related to vector valued functions.

- Evaluation of multiple integrals and the basic properties of vector valued functions and their applications to line, surface and volume integrals

Course Outcomes: After learning the contents of this course, the student must be able to

- Find the root of polynomial and transcendental equations and solve linear equations by numerical methods.
- Estimate the value for the given data using interpolation.
- Evaluate numerical differentiation and integration whenever analytical methods are not applicable.
- Find the directional derivatives, Irrotational and Solenoidal function and angle between the surfaces.
- Evaluate multiple integrals, line, surface and volume integrals.

UNIT-I: **9 L**

Numerical Solution of Algebraic &Transcendental Equations: Introduction, Bisection Method, Regula Falsi Method,Iteration Method and Newton-Raphson Method. Solving linear system of equations by Jacobi's and Gauss Seidel Iteration method.

UNIT-II: **10 L**

Interpolation: Finite differences: forward differences, backward differences, central differences, symbolic relations and separation of symbols, Interpolation using Newton's forward and backward difference formulae. Central difference interpolation: Gauss's forward and backward formulae, Lagrange's method of interpolation.

UNIT-III: **9 L**

Numerical Differentiation & Integration: Numerical differentiation: Taylor's series, Picard's method, Euler and modified Euler's methods, Runge-Kutta method of fourth order for first order ODE. Numerical integration: Trapezoidal rule and Simpson's 1/3rd and 3/8th rules.

UNIT – IV: **10 L**

Vector Differentiation: Scalar and Vector point functions. Gradient, Divergence and Curl, Directional derivatives, angle between the surfaces, Tangent plane and Normal line. Solenoidal and Irrotational vector, Scalar potential functions, Laplacian operator.

UNIT – V: **10 L**

Multiple Integrals &Vector Integration: Evaluation of Double Integrals (Cartesian); Change of order of integration (only Cartesian form); Evaluation of Triple Integrals. Line, Surface and Volume Integrals.

TEXTBOOKS:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 44th Edition, 2017.
2. R. K. Jain and S.R.K. Iyengar, Advanced Engineering Mathematics, Narosa Publications, 5th Edition, 2016.
3. M . K Jain, S R K Iyengar, R.K Jain, Numerical Methods for Scientific and Engineering Computation, New age International publishers.

REFERENCE BOOKS:

1.Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons, 9th Edition, 2013.

2.Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 38th Reprint, 2022.

3.G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, Pearson, 9thEdition, Reprint, 2002.

4.N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

2405ES02: DATA STRUCTURES AND ALGORITHMS

B.TECH I YEAR II SEMESTER   **L T P C**
                                                                          3 0 0 3

Course Objectives:
- To impart the basic concepts of data structures and algorithms.
- To understand concepts about searching and sorting techniques
- To understand basic concepts about stacks, queues, lists trees and graphs.
- To enable them to write algorithms for solving problems with the help of fundamental data Structures

Course Outcomes:
At the end of the course the students are able to:
- For a given Algorithm student will able to analyze the algorithms to determine time& computation complexity and justify the correctness.
- For a given Search problem (Linear Search and Binary Search) student will able to implement it. For a given problem of Stacks, Queues and linked list student will able to implement it and analyze the same to determine the time and computation complexity.
- Student will able to write an algorithm Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, Heap Sort and compare their performance in term of Space and Time complexity. Student will able to implement Graph search and traversal algorithms and determine the time and computation complexity.

UNIT-I
Introduction: Basic Terminologies: Elementary Data Organizations. Data Structure Operations: insertion, deletion, traversal etc. Analysis of an Algorithm, Asymptotic Notations, Time-Space trade off. **Searching:** Linear Search and Binary Search Techniques implementation using C & Python and their complexity analysis.

UNIT-II
Stacks and Queues using C& Python: **ADT Stack and its operations:** Algorithms and their complexity analysis, Applications of Stacks: Expression Conversion and evaluation – corresponding algorithms and complexity analysis. **ADT Queue:** Types of Queue: Simple Queue, Circular Queue, Priority Queue. Double ended Queue and Operations on each types of Queues and Algorithms. Applications of queues.

UNIT-III
Linked Lists using C&Python: Singly linked lists: Representation in memory, Algorithms of several operations: Traversing, Searching, Insertion into, Deletion from linked list; Linked representation of Stack and Queue. **Doubly Linked List:** operations on it and algorithmic analysis. **Circular Linked List:** all operations on it. Applications of Linked List.

UNIT-IV

Trees using C & Python: Basic Tree Terminologies: Different types of Trees: Binary Tree, Threaded Binary Tree, Binary Search Tree, **AVL Tree:** Tree operations on each of the trees and their algorithms. Applications of Binary Trees, B-Tree, B+ Tree: definitions and its construction algorithm.

UNIT-V

Sorting and Hashing using C & Python: Objective and properties of different sorting algorithms: Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, Heap Sort. Performance and Comparison among all the methods, Hashing-hash function, collision resolution methods. **Graphs:** Basic Terminologies & Representations, Applications of a Graph, Graph traversal algorithms .

TEXTBOOKS:

1. Data structures and algorithms in python by Michael T. Goodrich

2. 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.

4. Core Python Programming -Second Edition,R. Nageswara Rao, Dreamtech **Press**

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
2402ES01: BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

B.TECH I YEAR II SEMESTER   **L T P C**
                                                                                 3 0 0 3

Course Objectives

1. To familiarize the fundamentals, applications of electronic devices & circuits.

2. To acquire the knowledge of various logical operations, basic number systems and logic gates.

3. Emphasis on basic elements in electrical circuits and concepts of DC circuits.

4. To analyze DC Circuits using Network Theorems

5. To analyze AC circuits through AC fundamentals.

6. Construction, operational features of energy conversion devices i.e. DC and AC machines.

Course Outcomes: After going through this course, the student gets a thorough knowledge on

1. Different semiconductor devices, operation of diodes and BJT, their voltage-current characteristics.

2. Number systems, complements of numbers and logic gates.

3. Basic concepts of electrical circuits and networks.

4. Solving the electrical circuits using various network theorems.

5. Constructional details and principle of operation of Electrical Machines.

UNIT I :Semiconductor Devices

Characteristics of PN J unction Diode and Zener Diode. Bipolar Junction Transistor

— CB, CE, CC Configurations and Characteristics. Transistor as a switch

UNIT II :Number Systems and Boolean Algebra

Overview of Number Systems, 1's complement and 2's Complement, BCD codes, Excess-3 codes, Boolean Algebra-Basic Theorems and properties, Minimization of Boolean function using K-Maps up to four variables.

UNIT III :Logic Gates

Logic Gates–NOT, OR, AND, NOR, NAND, XOR, XNOR. Implementation of

Universal Gates with basic gates. Truth Tables and Functionality,

UNIT IV: DC And AC Circuits

Electrical circuit elements (R, L, and C), Ohm's Law and its limitations, KCL & KVL, series, parallel, series-parallel circuits, Thevenin's, Norton's, and Super Position theorem, and Simple numerical problems.

A.C. Fundamentals: Equation of AC Voltage and current, waveform, time period, frequency, amplitude, phase, phase difference, average value, RMS value, form factor, and peak factor, (Simple Numerical problems).

UNIT V : Electrical Machines

Construction and working principle of DC Motor, DC Generator, Single Phase Transformer, Three Phase Induction Motors and Alternator.

TEXT BOOKS:

1. Basic Electrical Engineering - D.P. Kothari and I.J. Nagrath, Tata McGraw Hill.

2. A text book of Electrical Technology Vol- 1, 2 by B.L.Theraja and A K Theraja- S Chand Publications.

3. Electronic Devices and Circuits, S. Salivahanan, N. Suresh Kumar, A. Vallavaraj, Tata McGraw-Hill companies.

4. Switching Theory and Logic Design by A. Anand Kumar, PHI Publications.

REFERENCE BOOKS:

1 Basic Electrical Engineering, T.K. Naga sarkar and M.S. Sukhija, Oxford University Press

2. M. Morris Mano, Digital Design, 3rd Edition, Prentice Hall of India Pvt. Ltd., 2003

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
2400BS05: APPLIED PHYSICS

B.TECH I YEAR II SEMESTER   **L T P C**
                                                                                       3 1 0 4

Course Objectives

- To familiarize students with demonstrating skills in scientific enquiry, problem solving and laboratory techniques.

- To develop demonstrate competency and understanding of the concepts found in quantum mechanics.

- To solve non-traditional problems that potentially draw on knowledge in multiple areas of physics.

- To develop an understanding of fundamentals and properties of engineering materials.

Course Outcomes: Upon graduation:

- Understanding the multiple ideas of quantum mechanics and solids.

- Identify the unique vocabulary associated with electronics and learn basic concepts of semiconductor diodes such as p-n junction diode, zener diode and their characteristics.

- Gain knowledge on classification of various optoelectronic devices, lasers and optical fibers and their applications in science and technology.

- Understanding the broad outline of engineering materials such as dielectric materials and magnetic materials.

UNIT-I :QUANTUM MECHANICS
Introduction to quantum physics, blackbody radiation– Stefan-Boltzmann'slaw, Wein's and Rayleigh-Jean's law, Planck's radiation law (qualitative) – Photo electric effect - Wave-particle duality, de-Broglie's hypothesis - Davisson and Germer experiment –Heisenberg uncertainty principle -Born interpretation of the wave function – Time independent Schrodinger wave equation-particle in one dimensional potential box.

UNIT – II:ELECTRON THEORY OF METALS AND BAND THEORY OF SOLIDS
Electron Theory of Metals: Free electron theory (merits & demerits-qualitative)- quantum free electron theory, expression for electrical conductivity - Fermi-Dirac distribution function.

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Band Theory of Solids: Bloch's theorem -Kronig-Penney model (qualitative) –E-K diagram-effective mass of electron-origin of energy bands- classification of solids.

UNIT - III: SEMICONDUCTORS AND DEVICES

Intrinsic and extrinsic semiconductors –Variation of Fermi level with temperature and doping concentration - Carrier transport: diffusion and drift - Hall effect - direct and indirect band gap semiconductors - construction, principle of operation and characteristics of P-N Junction diode, Zener diode –Luminescence – LED, PIN diode, avalanche photo diode (APD) and solar cells, their structure, materials, working principle and characteristics.

UNIT-IV: LASERS AND FIBER OPTICS

Lasers: Characteristics of Lasers, Interaction of radiation with matter: stimulated absorption, spontaneous and stimulated emission, Einstein's relations, Principle and working of Laser: Population inversion, Pumping mechanisms, Types of Lasers: Ruby laser, He-Ne laser, Semiconductor lasers - Applications of laser.

Fiber Optics: Introduction to Optical fiber, Optical fiber as a dielectric wave guide, Total internal reflection, Acceptance angle, Acceptance cone and Numerical aperture, mode and transmission of signal through Step and Graded index fibers, Losses associated with optical fibers, Applications of optical fibers in communication system – applications of optical fibers in other fields.

UNIT - V: DIELECTRIC AND MAGNETIC MATERIALS

Dielectric Materials: Electric dipole, dipole moment, dielectric constant, polarizability, electric displacement, electric susceptibility, types of polarization: electronic, ionic(quantitative) and orientation polarizations, space-charge (qualitative), Internal fields in a solid, Clausius Mossotti equation, Ferroelectrics, Piezo electrics and Pyro electrics, Applications of dielectrics.

Magnetic Materials: Introduction- origin of magnetic moment - Classification of magnetic materials, dia, para,ferro, anti-ferro and ferri -Hysteresis curve-soft and hard magnetic materials-applications of magnetic materials.

Text Books:

1. Engineering physics, B.K. Pandey, S. Chaturvedi- Cengage learning.

2. Halliday and Resnick, Physics, Wiley.

3. A text book of Engineering Physics, Dr. M. N. Avadhanulu, Dr. P. G. Kshirsagar- S. Chand (11e).

4. Engineering Physics by P.K. Palanisamy, SciTech Publications.

Reference Books:

1. Richard Robinett, Quantum Mechanics

2. J. Singh, Semiconductor Optoelectronics: Physics and Technology, Mc Graw-Hill inc. (1995).

3. Online Course: "Optoelectronic Materials and Devices" by Monica Katiyar and Deepak Guptha on NPTEL

4. "Semiconductor Physics and Devices", Mc Graw Hill, 4th Edition by Donald Neamen

5. Introduction to Solid State Physics by Charles Kittel, Wiley student edition.

6. S.M. Sze, Semiconductor Devices: Physics and Technology, Wiley (2008)

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
2403ES61: ENGINEERING WORKSHOP

B.TECH I YEAR II SEMESTER   **L T P C**
                                                               0 0 3 1.5

Course Objectives:

1. To Study different hand operated power tools, uses and their demonstration.
2. To gain a good basic working knowledge required for the production of various engineering products.
3. To provide hands on experience about use of different engineering materials, tools, equipment's and processes those are common in the engineering field.
4. To develop a right attitude, team working, precision and safety at work place.
5. To study commonly used carpentry joints and to have practical exposure to various welding and joining processes.

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

1. Study and practice on machine tools and their operations.
2. Practice on manufacturing of components using workshop trades including pluming, fitting, carpentry, and foundry, house wiring and welding.
3. Identify and apply suitable tools for different trades of Engineering processes including drilling, material removing, measuring, chiseling.
4. Apply basic electrical engineering knowledge for house wiring practice.
5. Study commonly used carpentry joints.

TRADES FOR EXERCISES:

I. Carpentry
   1. Cross lap joint
   2. Dovetail Joint

II. Fitting
   1. Straight Fitting
   2. V- fitting

III. Tin Smithy
   1. Rectangular Tray
   2. Open Scoop

IV. House Wiring
   1. Two bulbs controlled by one way switch (Series and parallel connection)
   2. One bulb controlled by two-two way switches (Stair case connection).

V. Foundry
    1. Single piece pattern
    2. Split-piece pattern

VI. Black Smithy
    1. Round to Square
    2. S - Hook

Trades for Demonstration:
    1. Plumbing
    2. Welding
    3. Machine Shop
    4. Power tools

TEXT BOOKS:

1. Workshop Manual, P. Kannaiah and K. L. Narayana, 3rd Edition, Scitech, 2015
2. Elements of Workshop Technology Vol.1 & 2, S. K. Hajra Choudhury, A. K. Hajra Choudhury and Nirjhar Roy, 13th Edition, Media Promoters & Publishers Pvt. Ltd., 2010.

REFERENCE BOOKS:

1. Workshop Manual / Venkat Reddy/ BSP
2. Workshop Manual / K Venu Gopal / Anuradha

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

2402ES61: BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LAB

B.TECH I YEAR II SEMESTER   **L T P C**

                                                                                      0 0 2 1

COURSE OBJECTIVES:

1. To exhibit the students to the operation of PN junction diode and Zener diode.

2. To acquire the knowledge of various logic gates.

3. To design an electrical system.

4. To analyze a given network by applying various circuit laws and network theorems.

5. To expose the students to the operation of DC machine and transformer.

COURSE OUTCOMES: At the end of the course, students will be able to

 1. Plot the characteristics of PN junction diode and Zener diode.

2. Select suitable gates for particular application

3. Explain the concept of circuit laws and network theorems and apply them to laboratory measurements.

4. Be able to systematically obtain the equations that characterize the performance of an electric circuit as well as solving them.

5. Perform the required tests on transformers and DC motors.

LIST OF EXPERIMENTS

1. PN Junction diode characteristics.

2. Zener diode characteristics.

3. Transistor as a switch

4. Input – Output Characteristics of Transistor in CB Configuration

5. Input – Output Characteristics of Transistor in CE Configuration

6. Input – Output Characteristics of Transistor in CC Configuration

7. Realization of Basic logic gates.

8. Implementation of Universal gates using Basic gates

9. Verification of Ohm's Law

10. Verification of KVL and KCL.

11. Verification of Thevenin's theorem.

12. Verification of Norton's theorem.

13. Verification of Superposition theorem.

14. Calculations and Verification of Impedance and current of RL, RC, and RLC Series Circuits

15. Load test on DC shunt Motor.

16. Measurement of voltage, and current of a single-phase transformer.

TEXT BOOKS:

1. Jacob Millman - Electronic Devices and Circuits, McGraw Hill Education.
2. D.P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 4th Edition, 2019.

REFERENCE BOOKS:
1. Horowitz -Electronic Devices and Circuits, David A. Bell – 5th Edition, Oxford.
2. Chinmoy Saha, Arindam Halder, Debaati Ganguly - Basic Electronics-Principles and Applications, Cambridge, 2018.
3. Robert L. Boylestead, Louis Nashelsky- Electronic Devices and Circuits theory, 11th Edition, 2009, Pearson.
4. P. Ramana, M. Suryakalavathi, G.T.Chandrasheker,"Basic Electrical Engineering", S. Chand, 2nd Edition, 2019.
5. D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009.
6. M. S. Sukhija, T. K. Nagsarkar, "Basic Electrical and Electronics Engineering", Oxford, 1st Edition, 2012.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

2405ES62: DATA STRUCTURES & ALGORITHMS LAB

B.TECH I YEAR II SEMESTER   **L T P C**

                                                                                    0 0 5 2.5

Course Objectives:

- To make the student to implement data structures using python and C programming languages.
- To make the student write ADTS for all data structures.

Course Outcomes:

At the end of the course the students are able to:

- For a given algorithm student will able to analyze the algorithms to determine time & computation complexity and justify the correctness.
- For a given Search problem (Linear Search and Binary Search) student will able to implement it.
- For a given problem of Stacks, Queues and linked list student will able to implement it and analyze the same to determine the time and computation complexity.
- Student will able to write an algorithm Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, Heap Sort and compare their performance in term of Space and Time complexity.

Week 1: Write a C program and Python program to implement the following searching techniques in both recursive and non recursive manner.

i) Linear search   ii) Binary Search.

Week 2: Write a C & Python program to implement the following using List and Dictionary.

    a) Stack   b) Queue

Week 3: Write a C & Python program to implement Linked list data structure and perform the following operations.

a) Insert an element in to a list.   b) Delete an element from list

c) Search for a key element in list   d) count number of nodes in list.

Week 4: Write a C & Python program to implement the following using a singly linked list.

a) Stack   b) Queue

Week 5: Write a C & Python program to implement the Deque (double ended queue)ADT using a List.

Week 6: Write a C& python program to perform the following operations:

a) Insert an element into a binary search tree.

b) Delete an element from a binary search tree.

c) Search for a key element in a binary search tree.

Week 7: Write a C & Python program that uses recursive functions to traverse the given binary search tree in a)Preorder b) inorder and c) postorder.

Week 8: Write a C & Python program to perform the following operations

a) Insertion into aB-tree

b) Deletion from a B-tree

Week 9: Write a C&Python program to construct AVL tree and perform the following operation

a) Insertion into an AVL-tree

Week 10: Write a C & Python program to implement hash table and perform the following operations

a)   Inserting a key-value pair b) Deleting a key-value pair

Week 11: Write a C & Python program for implementing the following sorting methods

a)Mergesort   b) Heapsort

Week 12: Write a C & Python program to implement the following sorting techniques

i)Bubble sort   ii) Selection sort

iv) Quick sort   iv) Insertion sort

Week 13: Write a C & Python program to implement the Graph Traversal Techniques.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
2400BS61: APPLIED PHYSICS LAB

B.TECH I YEAR II SEMESTER   **L T P C**
                                                                0 0 2 1

Course Objectives

- To introduce the spirit of experiments to verify physics concepts such as energy band gap, photoelectric effect, Hall Effect and so on.
- To design, develop, characterized and study properties of materials, help the students to prepare new materials for various engineering applications.
- To perform experiments to estimate the device properties and check their suitability in science and technology.
- To teach and apply knowledge to measure and verify the values of certain constants in physics.

Course Outcomes: Upon graduation:

- Demonstrate the Understanding of the fundamental concepts or laws in physics by carrying out experimental procedure.
- Analyze the characteristics of optoelectronic devices.
- Report and predict the significance of experiments like energy band gap, Hall coefficient, and dielectric constant and Numerical aperture.
- Understanding the concept of magnetic induction.

List of Experiments

1. Energy gap of a PN junction diode.

To determine the energy band gap of a semiconductor p-n junction diode.

2. Solar cell

To study the V-I characteristics of a give solar cell.

3. Light emitting diode

To study the V-I characteristics of a light emitting diode.

4. Stewart and Gee's experiment

To determine the magnetic induction at the center and at several points on the axis of a circular coil.

5. Hall Effect experiment

To calculate the Hall coefficient and carrier concentration of the sample material.

6. Photoelectric effect

To determine the work function of a given material.

7. LASER diode

To study characteristics of laser diode.

8. Optical Fibre Numerical aperture

To determine the numerical aperture (NA) of the given optical fibre.

9. Optical Fibre bending loss

To determine the loss caused in optical fiber in dB due to macro bending of the fibre.

10. Determination of dielectric constant

To determine the dielectric constant of a capacitor by charging and discharging method.

Reference Books:

1. Practical physics by Dr. Aparna, Dr K.V Rao, V.G.S. Publications.

2. Applied physics practical lab manual – MRECW

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
2400MC01: ENVIRONMENTAL SCIENCE

B.TECH I YEAR II SEMESTER   **L T P C**
                                                                                 2 0 0 0

Course Objectives:
- Understanding the importance of ecological balance for sustainable development.
- Recognize , the significance of natural resources, their classifications. Alternative energy for the sustainability of the environment by appropriate maintance of natural resources.
- Understand the biodiversity & type of biodiversity along with the value &conservation of biodiversity
- Categorize, the type of environmental pollution & various treatment technologies for diminution of environmental pollutants summarize the global environmental issues
- Understand the sustainable development concept & importance of green buildings , EIA, EIS, EMP.

Course Outcomes:
- Understand the scarcity of natural resources and will be able to replace them with alternative energy resources for the sustainability of environmental society & economy
- Recognize the type of biodiversity along the values & conservation biodiversity and know about the bio geographical regions
- Categorize the types of environmental pollution & the various treatment technologies for the diminution of environmental pollutants and contaminants
- Summarize the global environmental issues to create awareness about the international conventions and protocols for extenuating global environmental issues
- Understand the importance of environmental legislation policies, sustainable development and concept of green building

UNIT-I
Ecosystems: Definition, Scope, and Importance of ecosystem. Classification, structure, and function of an ecosystem, Food chains, food webs, and ecological pyramids. Flow of energy, Bio geo chemical cycles, Bioaccumulation, Biomagnifications, ecosystem value, services and carrying capacity, Field visits.

UNIT-II
Natural Resources: Classification of Resources: Living and Non-Living resources, **water resources:** use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. **Mineral resources:** use and exploitation, environmental effects of extracting and using mineral resources, **Land resources:** Forest resources, **Energy**

resources: growing energy needs, renewable and non renewable energy sources, use of alternate energy source, case studies.

UNIT-III

Biodiversity And Biotic Resources: Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values. India as a mega diversity nation, Hot spots of biodiversity. Field visit. Threats to biodiversity: habitat loss, poaching of wild life, man-wild life conflicts; conservation of biodiversity: In-Situ and Ex-situ conservation. National Biodiversity act.

UNIT-IV

Environmental Pollution and Control Technologies: **Environmental Pollution:** Classification of pollution, **Air Pollution:** Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. **Water pollution**: Sources and types of pollution, drinking water quality standards. **Soil Pollution:** Sources and types, Impacts of modern agriculture, degradation of soil. **Noise Pollution:** Sources and Health hazards, standards, **Solid waste:** Municipal Solid Waste management, composition and characteristics of e-Waste and its management. **Pollution control technologies:** Wastewater Treatment methods: Primary, secondary and Tertiary. Overview of air pollution control technologies, Concepts of bioremediation. **Global Environmental Issues and Global Efforts:** Climate change and impacts on human environment. Ozone depletion and Ozone depleting substances(ODS). Deforestation and desertification. International conventions / Protocols: Earth summit, Kyoto protocol, and Montréal Protocol.

UNIT-V

Environmental Policy, Legislation & EIA: Environmental Protection act, Legal aspects Air Act- 1981, Water Act, Forest Act, Wild life Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. EIA: EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water, biological and Socio-economical aspects. Strategies for risk assessment, Concepts of Environmental Management Plan (EMP). **Towards Sustainable Future:** Concept of Sustainable Development Goals, Population and its explosion, Crazy Consumerism, Environmental Education, Urban Sprawl, Human health, Environmental Ethics, Concept of Green Building, Ecological Foot Print, Life Cycle assessment (LCA), Low carbon lifestyle.

TEXTBOOKS:
1. Text book of Environmental Studies for Under graduate Courses by Erach Bharucha for University Grants Commission.
2. Environmental Studies by R. Rajagopalan, Oxford University Press.

REFERENCEBOOKS:

1. Environmental Science: towards a sustainable future by Richard T.Wright. 2008 PHL Learning Private Ltd. New Delhi.
2. Environmental Engineering and science by Gilbert M.Masters and WendellP.Ela. 2008 PHI Learning Pvt.Ltd.
3. Environmental Science by Daniel B.Botkin & Edward A.Keller, Wiley INDIA edition.
4. Environmental Studies by Anubha Kaushik, 4th Edition, New age international publishers.
5. Textbook of Environmental Science and Technology-Dr.M.Anji Reddy 2007, BS Publications.
6. Introduction to Environmental Science by Y.Anjaneyulu, BS. Publications.