

ACADEMIC REGULATIONS

Effective from the Academic Year 2022-23 onwards



MR22 Regulations



**For
B.Tech. - Four Year Degree Programme**

MALLA REDDY ENGINEERING COLLEGE (Autonomous)

(An UGC Autonomous Institution, Approved by AICTE and Affiliated to JNTUH, Hyderabad)
Recognized under section 2(f) & 12 (B) of UGC Act 1956, Accredited 3rd time by NAAC with 'A++' Grade, NIRF Rank Band 201-250, ARIIA Band Performer, NBA Tier-I Accredited (B.Tech.- CE, EEE, ME, ECE & CSE, M.Tech. - SE, EPS, TE)
Maisammaguda (H), Dhulapally (Post Via Kompally), Medchal - Malkajgiri District, Secunderabad- 500100.
Telangana State. e-mail: principal@mrec.ac.in, Website: www.mrec.ac.in

1. **Malla Reddy Engineering College (MREC)** offers **Four Year (Eight Semesters) Bachelor of Technology (B.Tech.)** with Choice Based Credit System (CBCS) in the following Branches of Engineering.

S. No.	Branch Code	Branch	Intake
1	01	Civil Engineering (CE)	60
2	02	Electrical and Electronics Engineering (EEE)	60
3	03	Mechanical Engineering (ME)	60
4	04	Electronics and Communication Engineering (ECE)	180
5	05	Computer Science and Engineering (CSE)	240
6	12	Information Technology (IT)	60
7	62	Computer Science and Engineering (Cyber Security)	180
8	66	Computer Science and Engineering (AI &ML)	180
9	67	Computer Science and Engineering (Data Science)	180
10	69	Computer Science and Engineering (IOT)	60
11	73	Artificial Intelligence and Machine Learning (AI&ML)	60
12	25	Mining Engineering (Min.E)	60

2. Eligibility for Admission

Admission to the B.Tech. programme shall be made either on the basis of the merit rank obtained by the qualifying candidate in entrance test conducted by the Telangana State Government (TSEAMCET) or on the basis of any other order of merit approved by the University, subject to reservations as prescribed by the Government of Telangana from time to time.

The medium of instructions for the entire B.Tech. programme will be ENGLISH.

3. B.Tech. Programme Structure & Duration of Study

A student after securing admission shall pursue 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. Further 2 years of extension is allowed for appearing examinations, failing which student shall forfeit seat in B.Tech. Course. The total credits for the entire B.Tech. programme is 160 as prescribed by AICTE. Each student shall secure 160 credits (with CGPA ≥ 5) required for the completion of the B.Tech. programme and award of the B.Tech. degree*.

UGC/ AICTE specified Definitions/ Descriptions are adopted appropriately for various terms and abbreviations used in these Academic Regulations/ Norms, which are as listed below.

Semester Scheme:

Each B.Tech. programme is of 4 academic years (8 Semesters), with the academic year being divided into two semesters of 22 weeks (≥ 90 instructional days) each, having '**Continuous Internal Evaluation (CIE)**' and '**Semester End Examination (SEE)**' under Choice Based Credit System (CBCS) and Credit Based Semester System (CBSS) as indicated by UGC. The Curriculum/ Course Structure is defined based on the model curriculum defined by AICTE.

Credit Courses:

All Subjects/ Courses are to be registered by a student in a semester to earn credits. Credits shall be assigned to each Subject/ Course in a 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 of Lecture (L) / Tutorials (T).
- One Credit - for two hours/ Week/ Semester of Practical's (P).

Courses like Environmental Sciences, Induction Programme, Gender Sensitization and students activities like Internship, Sports/Yoga/NSS and courses relevant to emerging technologies are identified as Mandatory/Audit courses. These courses will not carry any credits.

Subject/ Course Classification:

All subjects/ courses offered for the B.Tech. Programmes are broadly classified as follows.

- (a) **Foundation Courses (FC)**
- (b) **Core Courses (CC)**
- (c) **Elective Courses (EC)**
- (d) **Mandatory Courses (MC)**
- (e) **Audit Courses (AC)**

- **Foundation Courses (FC)** are further categorized as:
 - (i) Humanities and Social Sciences including Management courses (HSMC)
 - (ii) Basic Science Courses (BSC)
 - (iii) Engineering Science Courses (ESC).
- **Core Courses (CC) and Elective Courses (EC)** are categorized as
 - (i) Professional Core Courses (PCC)
 - (ii) Professional Elective Courses (PEC)
 - (iii) Open Elective Courses (OEC)
 - (iv) Project (PROJ)
- **Mandatory Courses (MC - Non-credit with evaluation).**
- **Audit Courses (AC – Non- credit without evaluation).**

Course Nomenclature:

The curriculum nomenclature or course structure grouping for each of the B.Tech. Programmes, is as listed below (along with AICTE specified range of total credits).

Sl. No.	Classification		Course Work – Subject Area	Distribution of credits	AICTE Suggested Breakup of Credits (Total 160)
	AICTE	UGC			
1	HSMC	Foundation Courses	Humanities and Social sciences including Management courses.	11	12
2	BSC		Basic Sciences (BSC) including Mathematics, Physics, Chemistry and Biology.	21	25
3	ESC		Engineering Science Courses (ESC) including Engineering Workshop, Engineering Graphics, Basics of Electrical and Electronics / Mechanical / Computer Engineering.	39	24
4	PCC	Core Courses	Professional core Courses are relevant to the chosen specialization/branch; [May be split into Hard (no choice) and Soft (with choice)], if required.	47	48
5	PEC	Professional Electives	Professional electives are relevant to the chosen specialization/ branch.	18	18

6	OEC	Open Electives	Open electives are the courses from other technical and/or emerging subject areas.	9	18
7	PROJ	Project	Mini Project, Project and Seminar	15	15
8	MC	Mandatory Courses	These courses are non-credit courses with evaluation.	-	-
9	AC	Audit Courses	These courses are non-credit courses without evaluation.	-	-
Total credits for B.Tech. Programme					160

Course Registration

A 'Faculty Advisor or Counselor' shall be assigned to each student, who will advise him on the B.Tech. Programme, its Course Structure and Curriculum, Choice/Option for Subjects/Courses, based on his competence, progress, pre-requisites and interest.

The students have to submit registration form (Online/Offline) to the Academic section of the college within 15 days from the commencement of class work for the first semester. The registration forms for the *subsequent semester* shall be completed before the commencement of SEEs (Semester End Examinations) of the *current semester*.

A Student has to submit the registration form through the Head of Department (a copy of it being retained with Head of Department).

A Student may be permitted to register for the Subjects/ Course of CHOICE with a typical deviation of ± 3 credits of the semester, based on his PROGRESS and SGPA/CGPA and completion of the 'PRE-REQUISITES' as indicated for various Subjects/ Courses in the department course structure and syllabus contents. It needs specific approval and signature of the Faculty Advisor/Counselor and Head of the Department, 'within a period of 15 days' from the beginning of the current semester.

If the student submits ambiguous choices or multiple options or erroneous entries during ON-LINE registration for the Subject(s) / Course(s) under a given specified Course/ Group/ Category as listed in the course structure, only the first mentioned Subject/ Course in that category will be taken into consideration.

Subject/ Course options exercised through registration forms will be treated as final and cannot be changed, nor can they be inter-changed; further, alternate choices will also not be considered. However, if the Subject/ Course that has already been listed for registration (by the Head of Department) in a semester could not be offered due to any unforeseen or unexpected reasons, then the student shall be allowed to have alternate choice - either for a new Subject (subject to offering of such a Subject), or for another existing subject (subject to availability of seats), which may be considered. Such alternate arrangements will be made by the Head of the Department, with due notification and time-framed schedule, within the FIRST WEEK from the commencement of Class-work for that semester. Such changes are to be intimated to Chief Controller of Examinations/Principal immediately.

Open Electives: A student has to complete 3 Open Electives during the period of B.Tech. Programme. 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.

Professional Electives: A student has to complete 6 Professional Electives during the period of B.Tech. Programme. Students have to choose professional electives from III year I semester onwards from the list of professional electives offered by their departments.

For Audit Courses, a '**Satisfactory Participation Certificate**' from the authorities concerned for the relevant semester is essential. No Marks or Credits shall be awarded for these activities.

For Mandatory Courses, a '**Satisfactory / Not Satisfactory**' grade is awarded based on the performance in both CIE and SEE.

Subjects/ Courses to be offered

A typical Section (or Class) strength for each semester shall be 60.

A Subject/ Course may be offered to the students, only if a minimum of **40 students** opt for the same. The maximum strength of a section is limited to 72.

More than one teacher may offer the same subject (Lab / Practical may be included with the corresponding theory subject in the same semester) in any semester. However, selection choice for students will be based on 'First Come First Serve' basis and 'CGPA Criterion'(i.e., the first focus shall be on early On-Line Entry from the student for registration in that semester and the second focus, if needed, will be on CGPA of the student).

If more entries for registration of a subject come into picture, then the concerned Head of the Department shall take necessary actions, whether to offer such a Subject/ Course for TWO (or multiple) SECTIONS or NOT.

Attendance Requirements:

A student shall be eligible to appear for the Semester End Examinations, if he / she acquire a minimum of 75% of attendance in aggregate of all the Subjects/ Courses (including Non-Credit Courses) for that semester.

Condoning of shortage of attendance in aggregate up to 10% ($\geq 65\%$ and $< 75\%$) in each semester may be granted by the College Academic Committee (CAC) on genuine and **valid grounds** based on the student's representation with supporting evidence.

A stipulated fee prescribed by the CAC, shall be payable towards condoning of shortage of attendance.

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

Students whose attendance is $< 65\%$ are not eligible to register for Semester End Examinations, 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 he got detained, by seeking re-admission for that semester as and when offered; in case 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.

If any student fulfills the attendance requirement in the present semester shall not be eligible for readmission into the same semester.

Academic Requirements: The following Academic Requirements have to be satisfied, in addition to the attendance requirements mentioned in item No.6.

A student shall be deemed to have satisfied the Academic requirements and earned the credits allotted to each Subject/ Course, if he / she secures not less than 35% marks in the Semester End Examination and with a minimum of 40% of the total marks allocated for the course; in terms of Letter Grades, this implies securing ‘P’ Grade or above in that Subject/ Course. If the student secured ‘F’ grade in any subject he/she can apply for recounting / revaluation by paying prescribed fee. If the student is not satisfied after the results declaration of recounting / revaluation he/she can apply for challenge valuation with the prescribed fee. College appoints a faculty member; student can bring another faculty member who taught the respective subject at least once (proof should be provided). The faculty member should be from any autonomous college affiliated to JNTUH or JNTUH constituent colleges.

A student shall be deemed to have satisfied the Academic Requirements and earned the credits allotted to Mini Project/Seminar/ Project, if he/ she secure not less than 40% of the total marks to be awarded for each. The student would be treated as failed, if he/ she (i) does not submit a report on his/ her Mini Project / Seminar / Project or does not make a presentation of the same before the Evaluation Committee as per schedule or (ii) secures less than 40% of marks in Mini Project/ Seminar/ Project evaluations.

He/ She may reappear once for each of the above evaluations, when they are scheduled again; if he/ she fails in such ‘one-reappearance’ evaluation also, he/ she has to reappear for the same in the next subsequent semester, as and when it is scheduled.

Promotion Rules: Every student has to fulfil the Attendance and Academic requirements by securing the required credits against registered credits as shown below:

S. No.	Promotion	Conditions to be fulfilled
1.	First year first semester (I Semester) to first year second semester (II Semester)	<ul style="list-style-type: none"> Regular course of study of first year first semester (I Semester)
2.	First year second semester (II Semester) to second year first semester (III Semester)	<ul style="list-style-type: none"> Regular course of study of first year second semester (II Semester). Must have secured at least 50% credits up to first year second semester (II Semester) from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.
3.	Second year first semester (III Semester) to second year second semester (IV Semester)	<ul style="list-style-type: none"> Regular course of study of second year first semester (III Semester)

4.	Second year second semester (IV Semester) to third year first semester (V Semester)	<ul style="list-style-type: none"> • Regular course of study of second year second semester (IV Semester). • Must have secured at least 60% credits up to second year second semester (IV Semester) from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.
5.	Third year first semester (V Semester) to third year second semester (VI Semester)	<ul style="list-style-type: none"> • Regular course of study of third year first semester (V Semester).
6.	Third year second semester (VI Semester) to fourth year first semester (VII Semester)	<ul style="list-style-type: none"> • Regular course of study of third year second semester (VI Semester). • Must have secured at least 60% credits up to third year second semester (VI Semester) from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.
7.	Fourth year first semester (VII Semester) to fourth year second semester (VIII Semester)	<ul style="list-style-type: none"> • Regular course of study of fourth year first semester (VII Semester).

A Student shall register for all subjects covering 160 credits as specified and listed (with the relevant Course/ Subject Classifications as mentioned) in the Course Structure, fulfils all the Attendance and Academic requirements for 160 credits securing a minimum of 'P' Grade (Pass Grade) or above in each subject and earn 160 credits securing SGPA ≥ 5.0 (in each semester) and CGPA (at the end of each successive semester) ≥ 5.0 , to successfully complete the B.Tech. Programme.

If a student registers for some more '**Extra Subjects**' (in the parent Department or other Departments/ Branches of Engineering) other than those listed subjects totaling to 160 credits as specified in the Course Structure of his/ her 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 taken into account while calculating the SGPA and CGPA. For such extra subjects registered, Letter Grade alone will be indicated in the Grade Card, as a performance measure, subject to completion of the Attendance and Academic Requirements as stated in items No.6 and 7.1 to 7.5.

When a student is detained due to shortage of attendance in any semester, he/ she may be re-admitted when the same semester is offered in the next academic year for fulfillment of academic requirements. The academic regulations under which student has been readmitted shall be applicable. However, no Grade Allotments or SGPA/ CGPA calculations will be done for that entire semester in which he/ she got detained.

When a student is detained due to lack of credits in any year, shall be promoted to the next academic year only after acquiring the required academic credits. The academic regulations under which student has been readmitted shall be applicable to him.

A student eligible to appear in the Semester End Examination in any Subject/ Course, but absent from it or failed (thereby failing to secure 'P' Grade or above) may reappear for that Subject/ Course at the supplementary examination as and when conducted. In such cases, his / her 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 his/ her performance in that subject.

8.0 Evaluation, Distribution and Weightage of Marks

8.1.1 The performance of a student in each semester shall be evaluated subject - wise (irrespective of credits assigned) for 100 marks for Theory, Practical's, Seminar, Drawing / Design, Mini Project, Project and Minor Courses etc.. The Theory / Practical courses are evaluated with two components. 1. Continuous Internal Evaluation (CIE), 2. Semester End Examination (SEE). The distribution of 30 Marks for CIE and 70 Marks for SEE decided in the Academic Council.

Theory Courses:

Continuous Internal Evaluation (CIE):

CIE shall be carried out for all courses of B.Tech. Programme twice in a semester (2 Midterm examinations) with the help of objective evaluation, subjective evaluation and regular assignments. Each mid-term examination shall consist of objective test with a duration of 20 minutes, subjective paper shall be conducted with a duration of 90 minutes and one assignment. The composition of objective test, subjective test and assignment shall be evaluated for 40%, 50% and 10% of the allocated internal marks.

Mid - Term Examination – UG				
Part	Type of Questions	No. of Questions	Marks per Question	Total
Part - A	Multiple – Choice Questions	20	1	20
Part - B	Internal choice questions (Module-wise)	5	5	25
Mid Term Exam Total				45
Assignment				5
Grand Total				50

*The CIE will be conducted for 50 marks and scaled to 30 marks.

The first mid-term examination shall be conducted for the first 50% of the syllabus, and the second mid-term examination shall be conducted for the remaining 50% of the syllabus. First Assignment should be submitted before the conduct of the first mid-term examinations, and the Second Assignment should be submitted before the conduct of the second midterm examinations.

The weightage for the midterm examination shall be given as average of both mid-term examination. The student shall appear for both midterm examinations, in case of any specific

reason the student appears only one midterm examination, 50% weightage of that examination shall be considered.

Semester End Examination (SEE):

Semester End Examination (SEE) shall be conducted for all courses of B.Tech. Programmes at the end of the Semester. Duration of the examination is 3 hours. The paper setting and evaluation of all courses carried out by external examiners. The examiners will be selected by the Chief Controller of Examinations/Principal, from the panel of examiners submitted by the head of the respective department.

Semester End Examination - UG			
Type of Questions	No. of Questions	Marks per Question	Total
Internal choice questions (Module-wise)	5	14	70

Practical Courses:

Continuous Internal Evaluation (CIE):

CIE marks shall be awarded with a distribution of 40% for day-to-day performance and timely submission of lab records, 40% for internal lab exam (average of the two exams) and 20% for viva-voce. The CIE will be conducted for 50 marks and scaled to 30 marks.

Semester End Examination (SEE):

SEE marks shall be awarded with a distribution of 20% for design/procedure/schematic diagram of the given experiment, 40% for conduction of experiment, 20% for results and 20% for viva-voce. For conducting SEE (with duration of 3hours), one internal examiner and one external examiner will be appointed by the Chief Controller of Examinations/Principal of the college. The external examiner should be selected from the outside college among the autonomous/reputed institutions from a panel of three examiners submitted by the concerned Head of the Department.

Engineering Drawing:

CIE: There will be 30% of total marks for CIE shall be awarded with a distribution of 40% of the CIE marks for day to day performance and timely submission of drawing sheets and remaining 60% of CIE marks for midterm examinations.

The distribution of marks for CIE is given below

CIE for Engineering Drawing				
Part	Type of Questions	No. of Questions	Marks per Question	Total
Part - A	Day – to – Day Work			20
Mid – Term Examination				
Part - B	Internal choice questions (Module-wise)	5	6	30
Total				50

*The CIE will be conducted for 50 marks and scaled to 30 marks.

The distribution of marks for SEE is given below

SEE for Engineering Drawing			
Type of Questions	No. of Questions	Marks per Question	Total
Internal choice questions (Module-wise)	5	14	70

Machine Drawing:

CIE: There will be 30% of total marks for CIE shall be awarded with a distribution of 40% of the CIE marks for day to day performance and timely submission of drawing sheets and remaining 60% of CIE marks for midterm examinations.

The distribution of marks for CIE is given below

CIE for Machine Drawing			
Type of Questions	No. of Questions	Marks per Question	Total
Day to Day Work			20
I Mid Term Examination			
Part Drawing (4 out of 6)	4	7.5	30
II Mid Term Examination			
Assembly Drawing (1 out of 2)	1	30	30
Total			50

*The CIE will be conducted for 50 marks and scaled to 30 marks.

The distribution of marks for SEE is given below

SEE for Machine Drawing			
Type of Questions	No. of Questions	Marks per Question	Total
Part A - Part Drawing (2 out of 4)	2	15	30
Part B - Assembly Drawing (Compulsory Question)	1	40	40
Total			70

Projects:**Internship-III/Mini Project:**

There shall be an Internship-III/Mini Project, for which the students will register after the completion of III year II semester (VI Semester) end examinations and pursue it during summer vacation. The evaluation of Mini project will be done at the end of IV Year I semester (VII semester). It shall be evaluated internally for 100 marks. The committee consisting Project Coordinator, Supervisor of the project and one senior faculty of the department will evaluate the Internship-III/Mini Project and award appropriate Grade, based on the report submitted to the department and presentation provided by the student in front of the committee.

Project:

Major Project has to be carried out during the VIII semester, as per the instructions of the project supervisor assigned by the Head of the Department for 200 marks. Out of total 200 marks allotted for the major project, 60 marks shall be for CIE (Continuous Internal Evaluation) and 140 marks for the SEE (Semester End Viva-voce Examination). CIE marks shall be awarded by a Departmental Committee consisting of Project coordinator, Supervisor of Major Project and a senior Faculty member, from two reviews (average). Review - I will be conducted within a month from the commencement of class work (problem definition, objective, literature survey and brief description - each 10 marks) and Review - II will be conducted before second mid examination (progress of work, results, discussion and presentation - each 10 marks). The Major Project Viva-voce (SEE) shall be conducted by a committee comprising of an External

Examiner, Head of the Department and Project Supervisor. In SEE of 140 marks, 70 marks for working model / simulation / data collection, 35 marks for report preparation and 35 marks for presentation and viva - voce. The external examiner should be selected by Chief Controller of Examinations from outside the college among the autonomous / reputed institutions from a panel of three examiners submitted by the concerned Head of the Department / Board of Studies (BOS) Chairman.

The topics for mini project and seminar shall be different from one another.

The student is deemed to be failed, if he/ she (i) does not submit a report on Project, 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, he has to reappear for the same in the next subsequent semester, as and when it is scheduled.

Seminar:

For Seminar presentation, the student shall collect the information on a specialized topic, prepare a report and submit to the department at the time of seminar presentation. The seminar presentation (along with the report) shall be evaluated by a committee consisting of Seminar coordinator and two senior faculty members with appropriate grade. The seminar report shall be evaluated internally for 100 marks. There shall be no semester end examination for the seminar.

Non-Credit Courses:

Mandatory Courses:

For Mandatory Courses offered in any semester, a 'Satisfactory/ Not Satisfactory' shall be awarded to the student based on the performance in both CIE and SEE.

Audit Courses:

For Audit Courses offered in any Semester, the student must submit a '**Participation Certificate**' from the concerned authorities. Internship program is also conducted under the category of Audit Courses. The student needs to submit a detailed report to the department after internship program. No marks or Letter Grade shall be allotted for these activities.

Grading Procedure

Grades will be awarded to indicate the performance of each student in each theory subject, or Lab/ Practical or Seminar or Project or Mini-Project or Minor Course etc., based on the % of marks obtained in CIE + SEE both taken together as specified in Item No. 8 and a corresponding Letter Grade shall be given.

As a measure of the student's performance, a 10-point Absolute Grading System using the following Letter Grades (UGC Guidelines) and corresponding percentage of marks shall be followed.

% of Marks	Grade Points	Letter Grade
≥90	10	(Out Standing)
≥80 to < 90	9	A ⁺ (Excellent)
≥70 to < 80	8	A (Very Good)
≥60 to < 70	7	B ⁺ (Good)
≥50 to < 60	6	B (Average)
≥40 to < 50	5	C(Pass)
< 40	0	F (Fail)
Absent	0	Ab

A student obtaining 'F' Grade in any subject shall be considered 'Failed' and will be required to reappear as 'Supplementary Candidate' in the Semester End Examination (SEE) as and when conducted. In such cases, his / her Internal Marks (CIE Marks) in those subject(s) will remain same as those he / she obtained earlier.

A Letter Grade does not imply any specific % of marks.

In general, a student shall not be permitted to repeat any Subject/ Course (s) only for the sake of 'Grade Improvement' or 'SGPA / CGPA Improvement'. However, he / she has to repeat all the Subjects/ Courses pertaining to that semester, when he / she is detained (as listed in Items Nos.7.7 &7.8).

A student earns Grade Point (GP) in each Subject/ Course, on the basis of the Letter Grade obtained by him in that Subject/ Course (excluding Mandatory non-credit Courses). Then the corresponding 'Credit Points' (CP) are computed by multiplying the Grade Point with credits for that particular Subject/ Course.

Credit Points (CP) = Grade Point (GP) x Credits ...For a Course

The Student passes the Subject/ Course only when he / she gets GP ≥ 5('C' Grade or above).

The Semester Grade Point Average (SGPA) is calculated by dividing the Sum of Credit Points (ΣCP) 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

$$SGPA = \frac{\sum_{i=1}^N C_i G_i}{\sum_{i=1}^N C_i} \dots \text{for each semester}$$

where 'i' is the subject indicator index (takes into account all subjects in a semester), 'N' is the number of subjects registered for the semester (as specifically required and listed under the Course Structure of the parent department) is the number of credits allotted to the ith subject and represents the Grade Points (GP)corresponding to the Letter Grade awarded for that ith subject.

The Cumulative Grade Point Average (CGPA) is a measure of the overall cumulative performance of a student over 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 II semester onwards, at the end of each semester, as per the formula.

$$CGPA = \frac{\sum_{j=1}^M C_j G_j}{\sum_{j=1}^M C_j} \dots \text{for all 'S' semesters registered}$$

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

where 'M' is the total number of subjects (as specifically required and listed under the course structure of the parent department) the student has registered from the 1stsemester onwards up to and inclusive of the semester 'S' (obviously M > N), 'j' is the subject indicator index (takes in to account all subjects from '1' to 'S' semesters) is the number of credits allotted to the jth subject, and represents the Grade Points (GP) corresponding to the Letter Grade awarded for that jth subject. After registration and completion of I Year I Semester however, 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	Letter Grade	Grade Points	Credit Points
Course 1	3	A	8	3 x 8 = 24
Course 2	3	O	10	3 x 10 = 30
Course 3	3	C	5	3 x 5 = 15

Course 4	3	B	6	$3 \times 6 = 18$
Course 5	3	A+	9	$3 \times 9 = 27$
Course 6	1.5	B	6	$1.5 \times 6 = 09$
Course 7	1.5	A	8	$1.5 \times 8 = 12$
Course 8	2	A	8	$2 \times 8 = 16$
	Total = 20			Total Credit Points = 151

$$SGPA = 151/20 = 7.55$$

ILLUSTRATION OF CALCULATION OF CGPA:

Semester	Credits	SGPA	Credits X SGPA
Semester I	21	7	$21 \times 7 = 147$
Semester II	19	6	$19 \times 6 = 114$
Semester III	22	6.5	$22 \times 6.5 = 143$
Semester IV	20	6	$20 \times 6 = 120$
Semester V	22	5.75	$22 \times 5.75 = 126.5$
Semester VI	18	7.25	$18 \times 7.25 = 130.5$
Semester VII	18	8	$18 \times 8 = 144$
Semester VIII	20	8.5	$20 \times 8.5 = 170$
	160		1095

$$CGPA = 1095/160 = 6.84$$

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

For calculations listed in Item Nos.9.6 to 9.10, 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. However, Mandatory Courses will not be taken into consideration.

Passing Standards:

A student shall be declared successful or 'passed' in a semester, only when he / she gets a $SGPA \geq 5.00$ (at the end of that particular semester); and a student shall be declared successful or 'passed' in the entire B.Tech Programme, only when he / she gets a $CGPA \geq 5.00$; subject to the condition that he / she secures a $GP \geq 5$ ('C' Grade or above) in every registered Subject/ Course in each semester (during the entire B.Tech Programme) for the award of degree, as required.

In spite of securing 'P' Grade or above in some (or all)Subjects/ Courses in any semester, if a student receives a $SGPA < 5.00$ and/ or $CGPA < 5.00$ at the end of such a semester, then he / she 'may be allowed' (on the 'specific recommendations' of the Head of the Department and subsequent approval from the Principal) (i) to go into the next subsequent semester (subject to fulfilling all other attendance and academic requirements as listed under Item Nos. 7&8);(ii) to 'improve his / her SGPA of such a semester (and hence CGPA) to 5.00 or above', by reappearing for one or more (as per student's choice) of the same course(s) in which he / she has secured 'P' Grade(s) in that semester, at the Supplementary Examinations to be held in the next subsequent semester(s). In such cases, his / her Internal Marks (CIE Marks) in those subject(s) will remain same as those he / she obtained earlier. In these considerations, the

newly secured Letter Grades will be recorded and taken into account for calculation of SGPA and CGPA, only if there is an improvement.

A student shall be declared successful in any Non-Credit Course, if he / she secures a 'Participation Certificate' for that Audit Course and "Satisfactory Grade' for Mandatory Course.

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.

10 Declaration of Results

Computation of SGPA and CGPA are done using the procedure listed in items 9.6 to 9.10.

For final % of marks equivalent to the computed final CGPA, the following formula may be used ...

$$\% \text{ of Marks} = (\text{final CGPA} - 0.5) \times 10$$

11 Award of Degree

A student who register for all the specified courses as listed in the Course Structure, satisfies all the course requirements, passes all the examinations prescribed in the entire B.Tech. Programme within the specified period (refer 4.1) and secures the required 160 Credits (with CGPA ≥ 5.0) 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.

A student who qualifies for the award of the degree as listed in Item 11.1, shall be placed in one of the following classes:

Class Awarded	CGPA
First Class with Distinction	≥ 8.00
First Class	≥ 6.50 and < 8.00
Second Class	≥ 5.50 and < 6.50
Pass Class	≥ 5.00 and < 5.50

A student with final CGPA (at the end of the B.Tech. Programme) < 5.00 will not be eligible for the award of the degree.

Students will be eligible for the award of '**Gold Medal**', if he/she should have passed all the subjects/courses in first appearance within the first academic years (or eight sequential semesters) from the date of commencement of first year first semester and should have secure CGPA ≥ 8.00 at the end of eight sequential semesters.

A student will be eligible to get under graduate with honours or additional minor engineering if he/she completes an additional 20 credits through MOOCs.

12 Withholding of Results

If the student has not paid fees to college at any stage or has pending dues against his / her name due to any reason whatsoever or if any case of indiscipline is pending against him, the result of the student may be with-held and he / she 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.

13 Transitory Regulations

A. For students detained due to shortage of attendance:

1. A student who has been detained in I year of MR17/MR18 regulations due to lack of attendance, shall be permitted to join I year I Semester of MR21 regulations and he / she is required to complete the study of B.Tech Programme within the stipulated period of eight academic years from the date of first admission in I Year.
2. A student who has been detained in any semester of II, III and IV years of MR17/MR18 regulations for want of attendance shall be permitted to join the corresponding semester of MR21 regulations and is required to complete the study of B.Tech., within the stipulated period of eight academic years from the date of first admission in I Year. The MR21 academic regulations under which a student has been readmitted shall be applicable to that student from that semester. See rule (C) for further transitory regulations.

B. For students detained due to shortage of credits:

- 1 A student of MR17/MR18 regulations, who has been detained due to lack of credits, shall be promoted to the next semester of MR21 regulations only after acquiring the required credits as per the corresponding regulations of his/her first admission. The student is required to complete the B.Tech. Programme within the stipulated period of eight academic years from the year of first admission. The MR21 academic regulations are applicable to a student from the year of readmission onwards. See rule (C) for further Transitory Regulations.

C. For readmitted students in MR20 regulations:

- 1 A student who has failed in any subject under any regulation has to pass those subjects in the same regulations.
- 2 The maximum credits that a student acquires for the award of degree, shall be the sum of the total number of credits secured in all the regulations of his/her study including MR21 regulations. The performance evaluation of the student will be done after the exemption of two subjects if total credits acquired are ≤ 160 , (see item 7.5).
- 3 If a student readmitted to MR21 regulations, has any subject with 80% of syllabus common with his/her previous regulations, that particular subject in MR21 regulations will be substituted by another subject to be suggested by the College Academic Committee (CAC).
Note: If a student readmitted to MR21 regulations, has not studied any subjects/topics in his/her earlier regulations of study which is prerequisite for further subjects in MR21 regulations, the departments concerned shall conduct remedial classes to cover those subjects/topics for the benefit of the students.

14 Student Transfers

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

The students seeking transfer to MALLA REDDY ENGINEERING COLLEGE -MREC from various other Universities/ Institutions have to pass the failed subjects which are equivalent to the subjects of MREC and also pass the subjects of MREC which the students have not studied at the earlier institution. Further, though the students have passed some of the subjects at the earlier institutions, if the same subjects are prescribed in different semesters of MREC, the students have to study those subjects in MREC inspite of the fact that those subjects are repeated.

The transfer students from other Universities / Institutions to MREC who are on rolls will be provided one chance to write internal examinations in the failed subjects and/or subjects not studied as per the clearance letter issued by the JNTUH.

15 Scope

- (i) Where the words “he”, “him”, “his”, occur in the write – up of regulations, they include “she”, “her”, “hers”.
- (ii) Where the words “Subject” or “Subjects”, occur in these regulations, they also imply “Course” or “Courses”.
- (iii) The academic regulations should be read as a whole, for the purpose of any interpretation.
- (iv) In case of any doubt or ambiguity in the interpretation of the above rules, the decision of the College Academic Committee headed by the Principal will be considered as final.

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

w.e.f. the A Y 2022-23

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

5. Promotion Rule:

Sl. No.	Promotion	Conditions to be fulfilled
1	Second year first semester (III Semester) to second year second semester (IV Semester)	Regular course of study of second year first semester (III Semester).
2	Second year second semester (IV Semester) to third year first semester (V Semester).	(i) Regular course of study of second year second semester (IV Semester) (ii) Must have secured at least 60% credits up to second year second semester (IV Semester) from all the relevant regular and supplementary examinations, whether the student takes those
3	Third year first semester (V Semester) to third year second semester (VI Semester)	Regular course of study of third year first semester (V Semester).
4	Third year second semester (VI Semester) to fourth year first semester (VII Semester)	(i) Regular course of study of third year second semester (VI Semester) (ii) Must have secured at least 60% credits up to third year second semester (VI Semester) from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.
5	Fourth year first semester (VII Semester) to fourth year second semester (VIII Semester)	Regular course of study of fourth year first semester (VII Semester)

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

Sl.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 student 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 course of the examination)	Expulsion from the examination hall and cancellation of the performance in that course only.
(b)	Gives assistance or guidance or receives it from any other student 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 course only of all the students 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 that course of the examination (theory or practical) in which the candidate is appearing.	Expulsion from the examination hall and cancellation of the performance in that course and all other courses the student has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the courses of that semester. The hall ticket of the candidate shall be cancelled.
3	Impersonates any other candidate in connection with the examination.	The student who has impersonated shall be expelled from examination hall. The candidate is also debarred and forfeits the seat. The performance of the original student who has been impersonated, shall be cancelled in all the courses of the examination (including practical's and project work) already appeared and shall not be allowed to appear for

		examinations of the remaining courses of that semester. The candidate is also debarred for two consecutive semesters from class work and all SEE. The continuation of the programme 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 course and all the other courses the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the courses of that semester. The student is also debarred for two consecutive semesters from class work and all SEE. The continuation of the programme by the candidate is subject to the academic regulations in connection with forfeiture of seat.
5	Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.	Cancellation of the performance in that course.
6	Refuses to obey the orders of the Chief Controller of Examinations (CCE) / Controller of Examinations (CE) / Assistant Controller of Examinations (ACE) / 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	In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that course and all other courses the candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the courses of that semester. The students also are debarred and forfeit their seats. In case of outsiders, they will be handed over to the police and a

	relations whether by words, either spoken or written or by signs or by visible representation, assaults the officer-in-charge, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which result in damage to or destruction of property in the examination hall or any part of the College campus or engages in any other act 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	police cases 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 course and all the other courses the student has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the courses of that semester. The candidate is also debarred for two consecutive semesters from class work and all SEE. The continuation of the programme by the student 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 course and all other courses the student has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the courses of that semester. The candidate is also debarred and forfeits the seat.
9	If student of the college, who is not a student for the particular examination or any person not connected with the	Expulsion from the examination hall and cancellation of the performance in that course and all other courses

	college indulges in any malpractice or improper conduct mentioned in clause 6 to 8.	the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the courses of that semester. 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 course and all other courses the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the courses of that semester.
11	Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.	Cancellation of the performance in that course and all other courses the student has appeared including practical examinations and project work of that SEE.
12	If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the CCE for further action toward suitable punishment.	

Note: The student(s) found indulging in malpractices during the CIE also will be punished based on the recommendations of the College Academic Committee.

Malpractices identified by squad or special invigilators

1. Punishments to the students as per the above guidelines.

MALLA REDDY ENGINEERING COLLEGE
COURSE STRUCTURE – B.Tech. CSE- Cyber Security
(MR22 Regulations - Effective from Academic Year 2022 – 23 onwards)

SEMESTER – I							
S. No	Category	Course Code	Name of the Subject	Contact hours/week			Credits
				L	T	P	
1.	BSC	C0B01	Linear Algebra and Numerical Methods	3	1	-	4
2.	BSC	C0B17	Engineering Chemistry	3	1	-	4
3.	ESC	C0501	Programming for Problem Solving	3	-	-	3
4.	ESC	C0301	Engineering Graphics	2	-	2	3
5.	BSC	C0B09	Semiconductor Physics	3	1	-	4
6.	ESC	C0502	Programming for Problem Solving Lab	-	1	2	1.5
7.	BSC	C0B11	Applied Physics Lab	-	-	2	1
8.	BSC	C0B18	Engineering Chemistry Lab	-	-	2	1
Total				15	4	8	21.5
Total Contact Hours				27			

SEMESTER – II							
S. No	Category	Course Code	Name of the Subject	Contact hours/week			Credits
				L	T	P	
1.	HSMC	C0H01	English	3	-	-	3
2.	ESC	C0201	Basic Electrical and Electronics Engineering	3	-	-	3
3.	BSC	C0B02	Probability and Statistics	3	-	-	3
4.	ESC	C0504	Python Programming	3	1	-	4
5.	ESC	C0506	Python Programming Lab	-	1	2	2
6.	HSMC	C0H02	English Language and Communication Skills Lab	-	-	3	1
7.	ESC	C0202	Basic Electrical and Electronics Engineering Lab	-	-	2	1
8.	ESC	C1201	Engineering and IT Workshop	-	-	2	1.5
Total				12	2	9	18.5
Total Contact Hours				23			

III SEMESTER							
S. No	Category	Course Code	Course Title	Contact hours/week			Credits
				L	T	P	
1	PCC	C0507	Discrete Mathematics	3	-	-	3
2	PCC	C0509	Computer Organization and Architecture	3	-	-	3
3	PCC	C0510	Data Structures	3	-	-	3
4	PCC	C0511	Object Oriented Programming through Java	3	-	-	3
5	PCC	C0516	Operating Systems	3	-	-	3
6	PCC	C0512	Data Structures Lab	-	-	3	1.5
7	PCC	C0513	Object Oriented Programming through Java Lab	-	-	3	1.5
8	PCC	C0520	Operating Systems Lab	-	1	2	1
9	MC	C00M1	Gender Sensitization	-	-	2	-
Total				17	1	10	19
Total Contact Hours:				28			

IV SEMESTER							
S. No	Category	Course Code	Course Title	Contact hours/week			Credits
				L	T	P	
1	BSC	C0B23	Number Theory	3	-	-	3
2	PCC	C6201	Computer Networks	3	-	-	3
3	PCC	C0515	Database Management Systems	3	-	-	3
4	PCC	C1203	Web Technologies	3	-	-	3
5	Professional Elective –I						
	PEC-I	C0517	Mobile Application Development	3	-	-	3
		C0518	Free and Open-Source Technologies				
C6601		Fundamentals of Artificial Intelligence					
6	PCC	C0519	Database Management Systems Lab	-	-	2	1
7	PCC	C6205	Web Technologies Lab	-	-	2	1
8	PCC	C6202	Computer Networks Lab	-	-	2	1
9	PCC	C62P1	Real-time Research Project/ Societal Related Project	-	-	2	2
10	PCC	C0522	Node JS/ React JS/ Django Lab			2	1
11	MC	C00M2	Environmental Science	2	-	-	-
Total				17	-	12	21
Total Contact Hours:				29			

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. I Semester		
Code: C0B01	Linear Algebra and Numerical Methods (Common For CSE, IT, CSE(AI&ML,DS,CS,IOT), B.Tech(AI&ML)	L	T	P
Credits: 4		3	1	-

Prerequisites: NIL

Course Objectives:

1. To learn types of matrices, Concept of rank of a matrix and applying the concept of rank to know the consistency of linear equations and to find all possible solutions, if exist.
2. To learn concept of Eigen values and Eigen vectors of a matrix, diagonalization of a matrix, Cayley Hamilton theorem and reduce a quadratic form into a canonical form through a linear transformation.
3. To learn various methods to find roots of an equation.
4. To learn Concept of finite differences and to estimate the value for the given data using interpolation.
5. To learn Solving ordinary differential equations and evaluation of integrals using numerical techniques.

MODULE I: Matrix Algebra

[12 PERIODS]

VECTOR SPACE, BASIS, LINEAR DEPENDENCE AND INDEPENDENCE (ONLY DEFINITIONS)

Matrices: Types of Matrices, Symmetric; Hermitian; Skew-symmetric; 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; solving system of Homogeneous and Non-Homogeneous linear equations, LU – Decomposition Method.

MODULE II: Eigen Values and Eigen Vectors

[12 Periods]

Eigen values , Eigen vectors and their properties; Diagonalization of a matrix; Cayley-Hamilton Theorem (without proof); Finding inverse and power of a matrix by Cayley-Hamilton Theorem.

Quadratic forms: Nature, rank, index and signature of the Quadratic Form, Linear Transformation and Orthogonal Transformation, Reduction of Quadratic form to canonical forms by Orthogonal Transformation Method. Singular Value Decomposition.

MODULE III: : Algebraic & Transcendental equations

[12 Periods]

(A) Solution of Algebraic and Transcendental Equations: Introduction-Errors, types of errors. Bisection Method, Method of False Position, Newton-Raphson Method.

(B) The Iteration Method ,Ramanujan’s method to find smallest root of Equation. Jacobi’s Iteration method for solving system of linear equations. Gauss seidel Iteration method for solving system of linear equations.

MODULE IV: Interpolation

[12 Periods]

Introduction- Errors in Polynomial Interpolation – Finite differences- Forward Differences-Backward differences-Central differences - Symbolic relations and separation of symbols. Differences of a

polynomial-Newton's formulae for interpolation; Central difference interpolation Formulae – Gauss Central Difference Formulae ; Interpolation with unevenly spaced points-Lagrange's Interpolation formula.

MODULE V: Numerical solution of Ordinary Differential Equations and Numerical Integration [12 Periods]

Numerical Integration: Trapezoidal Rule, Simpson's $1/3^{\text{rd}}$ Rule, Simpson's $3/8$ Rule.

Numerical solution of Ordinary Differential Equations : Introduction-Solution of Ordinary Differential Equation by Taylor's series method - Picard's Method of successive Approximations - Euler's Method-Modified Euler's Method – Runge-Kutta Methods.

TEXT BOOKS

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
3. D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005.
4. M . K Jain, S R K Iyengar, R.K Jain, Numerical Methods for Scientific and Engineering Computation, New age International publishers.
5. S.S.Sastry, Introductory Methods of Numerical Analysis, 5th Edition, PHI Learning Private Limited
6. Richard Bellman, Introduction to matrix Analysis, Siam, second Edition.

REFERENCES

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
2. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
3. V. Krishnamurthy, V.P. Mainra and J.L. Arora, An introduction to Linear Algebra, Affiliated East–West press, Reprint 2005.
4. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.

E – RESOURCES

1. https://www.youtube.com/watch?v=sSjB7ccnM_I (Matrices – System of linear Equations)
2. <https://www.youtube.com/watch?v=h5urBuE4Xhg> (Eigen values and Eigen vectors)
3. https://www.youtube.com/watch?v=9y_HcckJ96o (Quadratic forms)
4. https://www.youtube.com/watch?v=3j0c_FhOt5U (Bisection Method)
5. <https://www.youtube.com/watch?v=6vs-pymcsqk> (Regula Falsi Method and Newton Raphson Method)
6. <https://www.youtube.com/watch?v=1pJYZX-tgi0> (Interpolation)
7. <https://www.youtube.com/watch?v=Atv3IsQsak8&pbjreload=101> (Numerical Solution of ODE)
8. <https://www.youtube.com/watch?v=iviiGB5vxLA> (Numerical Integration)

NPTEL

1. https://www.youtube.com/watch?v=NEpvTe3pFIk&list=PLLy_2iUCG87BLK18eISe4fHKdE2_j2B_T&index=5 (Matrices – System of linear Equations)
2. <https://www.youtube.com/watch?v=wrSJ5re0TAw> (Eigen values and Eigen vectors)
3. <https://www.youtube.com/watch?v=yuE86XeGhEA> (Quadratic forms)
4. <https://www.youtube.com/watch?v=WbmLBRbp0zA> (Bisection Method)
5. <https://www.youtube.com/watch?v=0K6olBTdcSs> (Regula Falsi and Newton Raphson Method)
6. <https://www.youtube.com/watch?v=KSFnfUYcxoI> (Interpolation)
7. <https://www.youtube.com/watch?v=QugqSa3Gl-w&t=2254s> (Numerical Solution of ODE)
8. https://www.youtube.com/watch?v=NihKCpJx2_0&list=PLbMVogVj5nJRILpJJO7KrZa8Tj4_ZAgl (Numerical Solution of ODE)
9. <https://www.youtube.com/watch?v=hizXlwJO1Ck> (Numerical Integration)

Course Outcomes:

1. The student will be able to find rank of a matrix and analyze solutions of system of linear equations.
2. The student will be able to find Eigen values and Eigen vectors of a matrix, diagonalization a matrix, verification of Cayley Hamilton theorem and reduce a quadratic form into a canonical form through a linear transformation.
3. The student will be able to find the root of a given equation by various methods.
4. The student will be able to estimate the value for the given data using interpolation.
5. The student will be able to find the numerical solutions for a given ODE's and evaluations of integrals using numerical techniques.

CO- PO Mapping

CO- PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak												
COS	Programme Outcomes(POs)											
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	2	2	3	3				2			1
CO2	2	2	2	3	2				2			1
CO3	2	2	2	3	2				2			1
CO4	3	2	2	3	3				2			2
CO5	2	2	2	3	3				2			2

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech I Semester		
Code: C0B17	Engineering Chemistry (Common for ALL)	L	T	P
Credits: 4		3	1	-

Course objectives:

The purpose of this course is to emphasize the relevance of fundamentals of chemical sciences in the field of engineering and to provide basic knowledge on atomic- molecular orbital's, electrochemistry, batteries, corrosion and the role of water as an engineering material in domestic-industrial use. They will also impart the knowledge of stereochemistry, understanding the chemical reaction pathway mechanisms and synthesis of drugs. Listing out various types of fuels and understanding the concept of calorific value and combustion.

Module I: Water and its treatment

[10 Periods]

Introduction to water, hardness of water, causes of hardness, expression of hardness, units and types of hardness-Numerical Problems. Alkalinity of water, specifications of potable water (BIS); Estimation of temporary & permanent hardness of water by EDTA method. Boiler troubles - Scale & Sludge, Priming and foaming, caustic embrittlement and boiler corrosion; Treatment of boiler feed water - Internal treatment (colloidal, phosphate, carbonate and calgon conditioning). External treatment - Lime Soda process (cold & hot) and ion exchange process, Numerical Problems. Disinfection of water by chlorination and ozonation. Desalination by Reverse osmosis and its significance.

Module II: Molecular structure and Theories of Bonding:

[10 Periods]

Introduction to Molecular orbital Theory. Linear Combination of Atomic Orbital's (LCAO), significance of bonding and anti-bonding molecular orbital, Conditions for the formation of molecular orbital's. Molecular orbital energy level diagrams of diatomic molecules -, N₂, O₂ and F₂. Introduction to coordination compounds-ligand-coordination number (CN) - spectrochemical series. Salient features of crystal field theory, Crystal field splitting of transition metal complexes in octahedral ([CoF₆]³⁻ and [Co(CN)₆]³⁻) and tetrahedral ([NiCl₄]²⁻ and [Ni(CO)₄]) fields - magnetic properties of complexes. Band structure of solids and effect of doping on conductance.

Module III: Electrochemistry and Corrosion

[17 Periods]

A. Electrochemistry:

Introduction to Electrochemistry-Conductance(Specific and Equivalent) and units. Types of cells-electrolytic & electrochemical cells (Galvanic Cells)-Electrode potential-cell potential (EMF). Electrochemical series and its applications, Nernst equation its applications and numerical problems. Reference electrodes - Calomel Electrode and Glass electrode-determination of pH using glass electrode. Batteries: Primary (dry cells) and secondary (Lead-Acid cell, Ni-Cd cell) - applications of batteries. Fuel cells: Hydrogen - Oxygen fuel cell and its applications.

B. Corrosion:**[7 Periods]**

Causes and effects of corrosion: Theories of corrosion - Chemical & Electrochemical corrosion, Pilling-Bedworth rule, Types of corrosion: Galvanic and Water-line corrosion. Factors affecting rate of corrosion-Nature of metal and Nature of Environment, Corrosion control methods - Cathodic protection (Sacrificial anodic and impressed current cathodic methods). Surface coatings: Methods of metallic coatings - hot dipping (Galvanization), Electroplating (Copper) and Electroless plating (Nickel).

Module IV: Stereochemistry, Reaction mechanism & synthesis of drug molecules and NMR spectroscopy:**[12 Periods]**

Introduction to Isomers - classification of isomers - structural (chain, positional & functional) and stereoisomerism-geometrical (cis-trans & E-Z system) - characteristics of geometrical isomerism, optical isomerism (chirality - optical activity, specific rotation, enantiomers and diastereomers) of tartaric acid and lactic acid. Conformational isomerism of n-Butane. Introduction to bond cleavage (homo & hetero cleavage) - reaction intermediates and their stability. Types of organic reactions - Mechanism of substitution (SN^1 & SN^2) and (E_1 & E_2) reactions with suitable example. Ring opening (Beckmann rearrangement), oxidation and reduction (Cannizzaro reaction), cyclization (Components of Diels-Alder reaction-Mechanism of Diels-Alder reaction with suitable example) reactions. Synthesis of Paracetamol, Aspirin and their applications.

Introduction to Spectroscopy, Basic concepts of nuclear magnetic resonance spectroscopy, chemical shift and spin-spin splitting.

UNIT-V FUELS AND COMBUSTION**[08 PERIODS]**

Fuels: 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.

Combustion: Definition, Calorific value of fuel – HCV, LCV; Calculation of air quantity required for combustion of a fuel. Determination of calorific value by Junkers gas calorimeter-Numerical problems on combustion.

Text Books:

1. P.C.Jain and Monica Jain, "A Text Book of Engineering Chemistry", Dhanpat Rai Publications, New Delhi, 16th Edition 2014.
2. S.S. Dara and S.S. Umare, "A Text Book of Engineering Chemistry", S Chand Publications, New Delhi, 12th Edition 2010.
3. A.Jaya Shree, "Text book of Engineering Chemistry", Wiley, New Delhi, 2018.

Reference Books:

1. B.Rama Devi, Ch.VenkataRamana Reddy and PrasanthaRath, "Text Book of Engineering chemistry", Cengage Learning India Pvt.Ltd, 2016.
2. M.G. Fontana and N. D. Greene, "Corrosion Engineering", McGraw Hill Publications, New York, 3rd Edition, 1996.
3. K. P. C. Volhardt and N. E. Schore, "Organic Chemistry: Structure and Function", 5th Edition, 2006.

Course Outcomes with BLOOM'S

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

	Course Outcome	Bloom's Taxonomy Level
CO1	Understand water treatment, specifically hardness of water and purification of water by various methods.	Understand(L2)
CO2	Analyze microscopic chemistry in terms of atomic and molecular orbital's splitting and band theory related to conductivity	Analyze(L4)
CO3	Apply knowledge of electrochemical cell concept with respect to fuel cells, batteries, theories of corrosion. Applications of corrosion control methods.	Apply(L3)
CO4	Acquire basic knowledge on the concepts of stereochemistry, chemical reaction mechanisms that are used in the synthesis of drug molecules, interpretation of NMR in organic molecules and their uses in medical field.	Analyze (L4)
CO5	Acquire the knowledge of various fuels and identify a better fuel source of less pollution.	Analyze (L4)

CO- PO Mapping															
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COs	Programme Outcomes(POs)												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	1	2	2										
CO2	2	1		2	1										
CO3	3	3	2	2	1		2								
CO4	3	1	1	1	2	1	3								
CO5	3	3	3	1			3								

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. I Semester		
Code: C0501	Programming for Problem Solving (Common for CE, EEE, ME, ECE, CSE, CSE (Cyber Security), CSE (AI and ML), CSE (DS), CSE (IOT), AI, IT and Mi.E)	L	T	P
Credits: 3		3	-	-

Prerequisites: NIL

Course Objectives:

- Understand the basic terminology, write, compile and debug programs in computer programming
- Implement different control statements for solving problems.
- Understand the concept of structured program and arrays.
- Implement the idea of strings and pointers.
- Analyse the usage of structures and different file operations.

MODULE I: Fundamentals and Introduction to ‘C’ Language [10 Periods]

Introduction Fundamentals– Computer Systems, Computing Environments, Computer Languages, Creating and running programs, Software Development Method, Algorithms, Pseudo code, flow charts, applying the software development method.

Introduction to ‘C’ Language: – Background, C-tokens- Keywords, Identifiers, Basic data types, Variables, Constants, Preprocessor directives-include, define, Managing Input / Output functions - formatted input / output functions, Operators. Expressions, Precedence and Associativity, Expression Evaluation, Type conversions, Simple C Programming examples.

MODULEII: Conditional Statements and Repetition Statements [09 Periods]

Conditional Statements: Simple if statement, if-else statement, if-elseif- ladder, nested if- else, Dangling else problem, switch statements.

Repetition statements – while, for, do-while statements, nested looping, other statements related to looping – break, continue, goto, Simple C Programming examples.

MODULE III: Designing Structured Programs and Arrays [10 Periods]

Designing Structured Programs-Introduction to function, Advantages, user defined functions, inter function communication-call by value, Storage classes-auto, register, static, extern, scope rules, type qualifiers, recursion – recursive functions-Towers of Hanoi problem.

Arrays: Basic Concepts, Types of arrays, applications- Selection sort, Bubble sort, Insertion sort, Linear search and Binary search methods, arrays and functions.

MODULE IV: Strings and Pointers**[09 Periods]**

Strings: Concepts, String Input / Output functions, arrays of strings, string manipulation functions, string conversion, C program examples.

Pointers – Basic Concepts, Pointers for inter function communication-call by reference, pointers to pointers, Pointer arithmetic, array of pointers, pointers to array, applications, pointers to void, pointers to functions, Dynamic memory allocation functions.

MODULE V: Structures and File Handling**[10 Periods]**

Structures – Declaration, definition and initialization of structures, accessing structure elements, nested structures, arrays of structures, structures and functions, pointers to structures, self-referential structures, unions, difference between structures and union, typedef, bit fields, enumerated types, C programming examples.

Files – Basic Concept of a file, file input / output operations, text files and binary files, file status functions (error handling), Random file access functions, command –line arguments.
C program examples.

TEXTBOOKS

1. Computer Fundamentals and Programming in C, P. Dey, M Ghosh, Second edition, Oxford University Press.
2. Problem Solving and Program Design in C, J.R. Hanly and E.B. Koffman, Eighth Edition, Pearson Education.
3. The C Programming Language, B.W. Kernighan and Dennis M. Ritchie, PHI/Pearson Education

REFERENCES

1. C Programming & Data Structures, B.A. Forouzan and R.F. Gilberg, Third Edition, Cengage Learning
2. C for Engineers and Scientists, H. Cheng, Mc. Graw-Hill International Edition
3. C Programming & Data Structures, P. Dey, M Ghosh R Thereja, Oxford University Press

E-RESOURCES

1. <http://oxford.universitypress.ac.in/eBooks/> Programming in C.
2. <https://www.journals.elsevier.com/science-of-computer-programming>
3. <http://www.ejournalofsciences.org>
4. http://onlinecourses.nptel.ac.in/iiitk_cs-101
5. <http://onlinevideolecture.com/ebooks/?subject=C-Programming>

Course Outcomes:

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

1. Write algorithms and to draw flowcharts for solving problems and translate the algorithms/flowcharts to programs (in C language).
2. Apply different types of control structures to code and test a given logic in C programming language.
3. Decompose a problem into functions and to develop modular reusable code and Use arrays to formulate algorithms and programs for Searching and sorting problems.
4. Develop programs that make use of concepts such as strings, pointers.
5. Analyze structures, file operations and command line arguments.

CO- PO, PSO Mapping															
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COs	Programme Outcomes (POs)												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2										1	3	2	2
CO2	3	2	1									1	3	2	1
CO3	3	3	1									1	3	2	1
CO4	3	1										2	3	2	1
CO5	3	3	1									2	3	2	1

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. I Semester		
Code: C0301	ENGINEERING GRAPHICS (Common for All)	L	T	P
Credits: 3		2	-	2

PREREQUISITES: NIL

Course Objectives:

To develop in students, graphic skills for communication of concepts and ideas of engineering products.

MODULE I:

Introduction to Engineering Drawing, Principles of Engineering Graphics and their significance, Lettering.

Geometrical Constructions: Regular polygons only. Conic Sections: Ellipse, Parabola, Hyperbola—General method only Cycloidal Curves and Involute, tangents & normal for the curves.

Scales: Plane Scale, Diagonal scale, Vernier Scale.

MODULE II:

Orthographic Projections: Principles of Orthographic Projections – Conventions – First and Third Angle projections.

Projection of Points: Projection of points including all four quadrants.

Projection of Lines: Projection of Lines - parallel, perpendicular, inclined to reference planes and Traces.

MODULE III:

Projection of Planes: Axis inclined to both the reference plane.

Projection of Solids: Projections of regular solids like cube, prism, pyramid, cylinder and cone by rotating object method. Axis inclined to both the reference plane.

MODULE IV:

Section of Solids: Sectioning of single solid with the cutting plane inclined to one plane and perpendicular to the other - true shape of section.

Development of Surfaces: Development of lateral surfaces of Right Regular Solids – Prism, Cylinder, Pyramid and Cone.

MODULE V:

Isometric Projections: Principles of Isometric Projection – Isometric Scale, Isometric Views—Conventions –Plane Figures, Simple Solids.

Transformation of Projections: Conversion of Isometric Views to Orthographic Views and

vice versa–simple objects.

TEXT BOOKS

1. K.L.Narayana, S. Bheemanjaneyulu “Engineering Drawing with Auto CAD-2016” New Age International Publishers, 1st Edition, 2018.
2. N.D. Bhat, “Engineering Drawing”, Charotar Publishing House, 53rd Edition, 2014.

REFERENCES

1. K.L.Narayana, P.Kannaiah, “Engineering Drawing”, SciTech Publishers. 2nd Edition, 2017
2. K.Venugopal, “Engineering Drawing”, New Age International Publishers, 3rd Edition, 2014.
3. K. V. Natarajan, “A text book of Engineering Graphics”, Dhanalakshmi Publishers, 2015.
4. M.S. Kumar, “Engineering Graphics”, D.D. Publications, 2011.
5. Trymbaka Murthy, “Computer Aided Engineering Drawing”, I.K. international Publishing House, 3rd Edition, 2011.

E - RESOURCES

1. <http://nptel.ac.in/courses/112103019/>
2. <https://www.slideshare.net/search/slideshow?searchfrom=header&q=engineering+drawing>
3. <https://www.wiziq.com/tutorials/engineering-drawing>
4. <http://freevidelectures.com/Course/3420/Engineering-Drawing>
5. <http://www.worldcat.org/title/journal-of-engineering-graphics/oclc/1781711>
6. [http://road.issn.org/issn/2344-4681-journal-of-industrial-design-and-engineering-graphics-nit-jalandhar-\(EG-MECI102\)](http://road.issn.org/issn/2344-4681-journal-of-industrial-design-and-engineering-graphics-nit-jalandhar-(EG-MECI102))

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. I/I Semester		
Code: C0B09	Semiconductor Physics	L	T	P
Credits: 4		3	1	-
Common for Sem-I :- AI & ML, CSE (AI & ML), CSE (CS), CSE (IoT) and CSE (DS). Sem-II :- CSE and IT				

Prerequisites: Fundamentals of Physics

Course Objectives:

1. To outline the dual nature of matter
2. To elaborate the significance of the Kronig-Penney model in classifying the materials
3. To illustrate the working of p-n junction diode, photodiode, LED and solar cell
4. To compare the working of Ruby laser, He-Ne laser and semiconductor laser, besides illustrating the working principle of optical fibre and elaborate its applications.
5. To explain various logic gates.

Module–I:QuantumMechanics

[8 Periods]

Introduction, Plank’s theory of black body radiation, deduction of Wien's displacement law and Ralygien’s law; Louis de Broglie's concept of matter waves; Davisson and Germer experiment; G.P. Thomson Experiment; Heisenberg's uncertainty principle and its application (electron cannot exist inside the nucleus); Schrodinger’s time-independent wave equation, Physical significance and properties of wave function; Particle in a one-dimensional infinite potential well.

Module – II: Band theory of solids

[8 Periods]

Introduction, Postulates and drawbacks of Classical and Quantum free electron theory, Fermi Dirac distribution function; Density of energy states; Bloch theorem; Qualitative treatment of Kronig - Penney model; E Vs k relationship; Origin of energy bands; Classification of materials into Conductors, Semiconductors and insulators; Concept of Effective mass.

Module –III: Semiconductor Physics

[13 Periods]

- A:** Introduction, Intrinsic and Extrinsic Semiconductors; Expression for carrier concentration in intrinsic and extrinsic semiconductors; Variation of Fermi energy level in Intrinsic and extrinsic semiconductors with respect to temperature and doping concentration.
- B:** Direct and indirect bandgap semiconductors; Carrier generation and Recombination; Drift and Diffusion mechanisms; Equation of Continuity; P-N Junction diode, Energy band diagram, V-I Characteristics; Construction and Working of Photodiode, LED & Solar cell and their applications.

Module – IV

[12 Periods]

LASER: Introduction, Characteristics of LASER; Absorption, Spontaneous and Stimulated emission; Einstein’s coefficients; Population inversion; Pumping mechanisms; Basic components of a LASER system; Types of Lasers: Ruby LASER, He-Ne LASER, Semiconductor diode

LASER (Homo junction and hetero junction); Applications of LASER - Computers, Medical, Military.

Optical Fibers: Introduction to Optical fibers; Total Internal Reflection; Acceptance angle and acceptance cone, Numerical aperture; types of optical fibers; Losses in optical fibers - absorption losses, scattering losses and bending losses; Applications of optical fibers - Communications, Level Sensor, LASER angioplasty.

Module – V: Introduction to Digital Electronics

[9 Periods]

Different types of number systems, Binary logic; Boolean algebra - Basic theorems and properties of Boolean algebra; Boolean functions; logic gates – construction and working of AND, OR, NOT, NAND, NOR and XOR using discrete components.

Integrated circuits: Levels of integration - SSI, MSI, LSI and VLSI; basic IC logic gates - AND, OR, NOT, NAND, NOR and XOR.

Course Outcomes:

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

1. Explain the dual nature of the matter and evaluate the energy of a particle trapped in 1D infinite potential well.
2. Classify the materials into conductors, semiconductors and insulators based on the outcomes of Kronig - Penney model.
3. Analyze the working of semiconductor devices like PN junction diode, Photodiode, LED and Solar cell.
4. Compare and contrast Ruby, He-Ne, Semiconductor Lasers and discover the working principle of optical fibers besides and elucidating their applications.
5. Describe the Boolean algebra and examine various logic gates.

Text Books:

1. K Vijaya Kumar, S Chandralingam, “Modern Engineering Physics” Volume I & II, S. Chand, 1st Edition, 2017.
2. Jasprit Singh, “Semiconductor Optoelectronics: Physics and Technology”, McGraw-Hill, 1995.
3. Morris Mano, "Digital Design", Prentice - Hall, 1995.

Reference Books:

1. P K Palanisamy, “Engineering Physics”, SciTech Publication, 4th Edition, 2014.
2. B K Pandey and S. Chaturvedi, “Engineering Physics” Cengage Learning India Revised Edition, 2014.
3. P Horowitz and W. Hill, “The Art of Electronics” Cambridge University Press, 3rd edition, 2015.
4. D K Bhattacharya, Poonam Tandon, “Engineering Physics”, Oxford University Press, 1st Edition, 2015.
5. P Bhattacharya, “Semiconductor Optoelectronic Devices”, Prenticehall of India, 1997

e-RESOURCES

1. https://www.researchgate.net/publication/259574083_Lecture_Notes_on_Engineering_Physics
2. https://www.researchgate.net/publication/292607115_Applied_Physics
3. <https://www.livescience.com/33816-quantum-mechanics-explanation.html>

Journals :

1. <http://www.springer.com/physics/theoretical%2C+mathematical+%26+computational+physics/journal/40094>
2. <http://www.springer.com/physics/journal/340>

NPTEL VIDEOS:

1. <http://nptel.ac.in/courses/113104012/>
2. <https://www.youtube.com/watch?v=9seDKvbaoHU&list=PLzJaFd3A7DZse2tQ2qUFChSiCj7jBidO0&index=29>
<https://www.youtube.com/watch?v=4a0FbQdH3dY>

CO- PO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak												
COS	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	1									
CO2	3	1	2									
CO3	3	2	2									
CO4	3	2	2									
CO5	2	2	1									

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. I Semester		
Code: C0502	Programming for Problem Solving Lab (Common for CE, EEE, ME, ECE, CSE, CSE (Cyber Security), CSE (AI and ML), CSE (DS), CSE (IOT), AI, IT and Mi.E)	L	T	P
Credits: 1.5		-	1	2

Prerequisites: NIL

Course Objectives:

1. Understand the various steps in Program development
2. Identify syntax and semantics of C Programming Language
3. Illustrate the usage of structured programming approach in solving problems.
4. Develop programs that make use of arrays, strings and pointers in C language
5. Analyse structures and different file operations

Software Requirements: C

List of Programs:

1.
 - a. Practice various Internal and External DOS Commands.
 - b. Write sample examples of C programs to implement basic operations.
2.
 - a. Write a C program to find smallest and largest of given three numbers.
 - b. Write a C program to find the roots of a quadratic equation.
 - c. Write a C program to check whether given character is alphabet, digit or special symbol
3.
 - a. Write a C program to find the sum of individual digits of a positive integer.
 - b. Write a C program to generate the first 'n' terms of the sequence.
[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.]
4.
 - a. Write a C program to find whether the given number is palindrome, perfect, Armstrong or strong.
 - b. Write a C program to generate all the prime numbers between n1 and n2, where n1 and n2 are values supplied by the user.
5. 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.
6.
 - a. Write a C program to find both the largest and smallest number in a list of integers.
 - b. Write a C program that uses non-recursive function to search for a Key value in a given list of integers using linear search.
 - c. Write a C program that uses recursive and non -function to search for a Key value in a given sorted list of integers using Binary search.

7.
 - a. Write a C program that implements the Bubble sort method to sort a given array of integers in ascending order.
 - b. Write a C program that implements the Selection sort method to sort a given list of names in ascending order.
8. Write a C program to perform the following:
 - a. Addition of Two Matrices
 - b. Multiplication of Two Matrices.
9. Write a C program that uses functions to perform the following operations:
 - a. To insert a sub-string into given main string from a given position.
 - b. To delete n characters from a given position in a given string.
 - c. To find substring in a given string
10.
 - a. Write a C program to determine if the given string is a palindrome or not
 - b. Write a C program to count the lines, words and characters in a given text.
- 11.11.
 - a. Write a C program to swap two numbers, which implement call by value and call by reference.
 - b. Write a C program to display the below student details using structures

Roll Number	Name	Gender	Branch	Attendance percentage
501	John	Male	CSE	77.3
502	Alice	Male	ECE	80.5
503	Sam	Female	IT	90.7

- c. Write a C program to find grade of a student using structures.
- 12.12.
 - a. Write a C program which copies one file to another
 - b. Write a C program to find sum of two numbers using command line arguments
- 13.13.
 - a. Develop a mini project which implement the Library Management System
 - b. Develop a mini project which implement the Student Record System

TEXT BOOKS:

- a. Computer Fundamentals and Programming in C, P. Dey, M Ghosh, Second edition, Oxford University Press
- b. Problem Solving and Program Design in C, J.R. Hanly and E.B. Koffman, Eighth Edition, Pearson Education.
- c. The C Programming Language, B.W. Kernighan and Dennis M.Ritchie, PHI/Pearson Education

REFERENCES:

- a. C Programming & Data Structures, B.A. Forouzan and R.F. Gilberg, Third Edition, Cengage Learning
- b. C for Engineers and Scientists, H. Cheng, Mc. Graw-Hill International Edition
- c. C Programming & Data Structures, P. Dey, M Ghosh R Thereja, Oxford University Press

Course Outcomes:

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

1. Make use various programming constructs and to develop C programs
2. Implement different Operations on arrays, strings, functions, pointers in C programming language.
3. Analyze structures, unions and file in C language to develop Programs.

CO- PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COS	Programme Outcomes (POs)												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2										1	3	2	
CO2	3	2	1									1	3	3	1
CO3	2	3	1									1	3	2	1

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. I/I Semester		
Code: C0B11	Applied Physics Lab (Common for AI&ML, CSE (AI & ML), CSE (Cyb. Sec.), CSE (IoT), CSE (Data Science) ,CSE and IT)	L	T	P
Credits: 1		-	-	2

Course objectives:

The main objective of this course is to provide the necessary exposure to the practical aspects, which is an essential component for learning science.

List of Experiments:

- 1 Planck's constant**
To determine Planck's constant using Photo electric effect.
- 2 Energy band –gap of a semiconductor**
To determine the energy band gap of a semiconductor.
- 3 V-I and P-I characteristics of light emitting diode**
Plot V-I and P-I characteristics of light emitting diode.
- 4 Laser diode**
To study the Characteristics of Laser diode.
- 5 Solar Cell**
To study the V-I Characteristics of solar cell.
- 6 LCR Circuit**
To determination of resonant frequency, bandwidth and quality factor of RLC circuit.
- 7 Numerical Aperture of an Optical fiber**
To determine the Numerical aperture of the given fiber.
- 8 Bending Loss of a Fiber**
To determine the bending loss of the given fiber.
- 9 Light Dependent Resistance (LDR)**
To determine the characteristics of a LDR.
- 10 Stewart and Gee's experiment**
Determination of Magnetic field along the axis of current carrying circular coil.
- 11 B-H Curve**
To study the magnetization of ferromagnetic material in presence of magnetic field.
- 12 Sonometer**
To verify the frequency of AC Supply.
- 13. Construction of fundamental logic gates using discrete components and verification of truth tables**
- 14. Verification of truth tables of fundamental logic gates using ICs**
- 15. Construction of fundamental logic gates using universal logic gates.**

Course Outcomes:

At the end of the course, students will able to

1. Develop skills to impart practical knowledge in real time solution.
2. Understand principle, concept, working, application and comparison of results with theoretical calculations.
3. Design new instruments with practical knowledge.
4. Understand measurement technology.
5. Use new instruments and real time applications in engineering studies.

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. I Semester		
Code: C0B18	Engineering Chemistry Lab (Common for ALL)	L	T	P
Credits: 1		-	-	2

Course objectives:

To provide the students with practical knowledge of quantitative analysis of materials by classical and instrumental methods for developing experimental skills in building technical competence.

List of Experiments:

1. Calibration of Volumetric apparatus.
2. Estimation of Total Hardness of water by EDTA Method.
3. Estimation of an acid by P^Hmetry.
4. Estimation of alkalinity of water.
5. Estimation of strength of an acid by Conductometry.
6. Estimation of strength of an acid by Potentiometry.
7. Estimation of Mn⁺² ion in KMnO₄ by Colorimetry.
8. Determination of viscosity of given liquids by Ostwald's viscometer.
9. Determination of surface tension of given sample using stalagmometer.
10. Estimation of iron (II) by dichrometry.
11. Determination of rate constant of hydrolysis of methyl acetate.
12. Preparation of Aspirin.

Course outcomes:

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

1. Acquire knowledge about the chemistry lab, kind of experiments that can be performed and the precautions to perform four types of titrations & understand the principle involved in the applications of the method.
2. Learn and apply basic technique used in chemistry laboratory for estimation hardness & alkalinity of water.
3. Understand about mineral analytic technique for estimation of ions/metal ions in minerals.
4. Apply instrumental techniques such as colorimetry, conductometry & potentiometry.
5. Learn to determine physical properties like free chlorides in water, viscosity & surface tension.

CO- PO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak																
COs	Programme Outcomes(POs)												PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	
CO1	3	2	1	1												
CO2	2	1	2													
CO3	2	2		1												
CO4	2	2	1													
CO5	2	1	2													

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. I / II Semester		
Code: C0H01	ENGLISH	L	T	P
Credits: 3	(Common for CE, EEE, ME, ECE, CSE, CSE (Cyber Security), CSE (AI and ML), CSE (DS), CSE (IOT), AI& ML, IT and Mi.E)	3	-	-

Course Objectives:

The objective of this course is to improve the English Language and Literary competence of the students. The course provides requisite insights into grammar, vocabulary, prose, and short stories. Further, it also helps in developing the skills of Reading and Writing. The course also equips students to study their academic subjects more effectively using the theoretical and practical components of the English language and literature.

MODULE – I

- Speech** : “Go Kiss the World” by Subroto Bagchi
Poem : “Leisure” by W. H. Davies
Vocabulary : Formation of Words, Roots, Prefixes, Suffixes
Grammar : Articles and Prepositions
Reading : Skimming and Scanning
Writing : Introduction to Writing Skills, Characteristics of Effective Writing

MODULE – II

- Short story** : “Gift of Magi” by O’ Henry
Poem : “No Man is an Island” by John Donne
Vocabulary : One Word Substitutions; Synonyms and Antonyms
Grammar : Degrees of Comparison, Active and Passive Voice
Reading : Intensive Reading and Extensive Reading
Writing : Paragraph Writing- Cohesive devices; Jumbled Sentences; Punctuation

MODULE – III

- Essay** : “Lucidity, Simplicity, Euphony” by W. Somerset Maugham
Poem : “We wear the Mask” by Paul Laurence Dunbar
Grammar : Tense and Aspect
Vocabulary : Homonyms, Homophones, Homographs
Reading : Reading for Topic and Theme
Writing : Letter Writing

MODULE – IV

- Short story** : “The Night Train at Deoli” by Ruskin Bond
Poem : “Gift of India” by Sarojini Naidu
Grammar : Question Tags; Concord
Vocabulary : Idiomatic Expressions; Phrasal Verbs
Reading : Reading for Interpretation
Writing : Essay Writing, Describing, Defining and Classifying

MODULE – V

- Essay** : “Toasted English” by R. K. Narayan
Poem : “If” by Rudyard Kipling
Grammar : Direct and Indirect Speech, Misplaced Modifiers
Vocabulary : Redundancies and Clichés
Reading : Reading for Specific Purposes, Reading Comprehension practice
Writing : Paraphrasing & Summarizing,

Prescribed Textbook:

Reference Books:

1. Azar, Betty and [Stacy A. Hagen](#). *Understanding and Using English Grammar*. 4th edition, Foundation Books, 2009.
2. Chaudhuri, Santanu S. *Learn English: A Fun Book of Functional Language, Grammar and Vocabulary*. Tata McGraw Hill Education, New Delhi, 2013.
3. Eastwood, John. [Oxford Guide to English Grammar](#). 4th edition, Oxford University Press, 1994.
4. Field, Marion. *Improve Your Written English*. 5th Edition. How to Books, UK, 2009.
5. Leech, Geoffrey and Svartvik, J. *A Communicative Grammar of English*. 3rd edition, Routledge, 2013.

Related Websites:

1. <http://www.slideshare.net/aszardini/word-formationroot-words-prefixes-and-suffixes>
2. <http://www.scribd.com/doc/37085980/Circulars-Circular-Letters-Notices-Memo#scribd>.
3. <http://www.zsme.tarnow.pl/jezykiobce/wp-content/uploads/2013/11/writing-letters1.pdf>.

Course Outcomes:

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

1. Use written and spoken English considerably well for academic purposes.
2. Communicate in English accurately and fluently.
3. Employ extensive and intensive reading skills.
4. Gain confidence in writing for academic and real life situations.
5. Use standard grammar, punctuation, and spelling in technical documents.

CO-PO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COS	PO1 PO2		Programme Outcomes(POs)										PSO1	PSO2	PSO3
			PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12			
CO1					1					2		2			
CO2										1		2			
CO3		1		1						2		2			
CO4					1	1			1	2		2			
CO5				1	1				1	2		2			

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. II Semester		
Code: C0201	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING (Common for all branches)	L	T	P
Credits: 3		3	-	-

Prerequisites: Nil

Course Objectives: To introduce the concept of electrical circuits and its components. To introduce the characteristics of various electronic devices. To impart the knowledge of various configurations, characteristics and applications of electrical & electronic components.

MODULE I: DC Circuits

9 Periods

Electrical circuit elements (R, L and C), voltage and current sources, Kirchhoff's current and voltage laws - Series, parallel, series-parallel, star-to-delta and delta-to-star transformation- analysis of simple circuits with dc excitation. Superposition, Thevenin's and Maximum Power Transfer Theorems with DC excitation.

MODULE II: AC Circuits

9 Periods

Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor. Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel).

MODULE III: Introduction to Electrical Machines

10 Periods

- A: DC Machines :** Construction & Principle of Operation of DC Generators – E.M.F Equation. Principle of operation DC Motors – Back E.M.F. - Torque equation – Brake Test -Characteristics.
- B: AC Machines:** Construction and Principle of operation of Transformer- EMF Equation. Construction and Principle of Operation of 3 Phase Induction Motors - Brake test on 3-Phase Induction Motor – Applications.

MODULE IV: P-N Junction Diode

10 Periods

P-N Junction Diode: Diode equation, Energy Band diagram, Volt-Ampere characteristics, Temperature dependence, Ideal versus practical, Static and dynamic resistances, Equivalent circuit, Diffusion and Transition Capacitances. Zener diode operation, Zener diode as voltage regulator.

Rectifiers : P-N junction as a rectifier - Half Wave Rectifier, Ripple Factor - Full Wave Rectifier, Bridge Rectifier.

Filters : Filters – Inductor Filters, Capacitor Filters, L- section Filters, π - section Filters.

MODULE V: Bipolar Junction Transistor (BJT):

10 Periods

Bipolar Junction Transistor (BJT): Construction, Principle of Operation, Symbol, Amplifying Action, Common Emitter, Common Base and Common Collector configurations and Input-Output Characteristics, Comparison of CE, CB and CC configurations

Junction Field Effect Transistor and MOSFET: Construction, Principle of Operation, Symbol, Pinch-Off Voltage, Volt-Ampere Characteristic, Comparison of BJT and FET.

Text Books

1. M.Surya Kalavathi, Ramana Pilla, Ch. Srinivasa Rao, Gulinindala Suresh, “ **Basic Electrical and Electronics Engineering**”, S.Chand and Company Limited, New Delhi, 1st Edition, 2017.
2. R.L.Boylestad and Louis Nashlesky, “**Electronic Devices & Circuit Theory**”, Pearson Education, 2007.

References

1. V.K. Mehtha and Rohit Mehta, “Principles of Electrical Engineering and Electronics”, S.Chand & Co., 2009.
2. Jacob Milliman, Christos C .Halkias, Satyabrata Jit (2011), “Electronic Devices and Circuits”, 3rd edition, Tata McGraw Hill, New Delhi.
3. Thomas L. Floyd and R. P. Jain, “Digital Fundamentals”, Pearson Education, 2009.
4. David A. Bell, “Electronic Devices and Circuits”, Oxford University Press, 2008.
5. Nagrath I.J. and D. P. Kothari, “Basic Electrical Engineering”, Tata McGraw Hill, 2001.
6. Mittle N., “Basic Electrical Engineering”, Tata McGraw Hill Education, New Delhi, 2nd Edition, 2005.

E - Resources

1. <https://www.electrical4u.com/ohms-law-equation-formula-and-limitation-of-ohms-law/>
2. <https://www.eeweb.com/passives>
3. <http://nptel.ac.in/courses/108108076/>
4. <http://nptel.ac.in/downloads/108105053/>

Course Outcomes:

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

1. Apply KCL, KVL and network theorems to analyse DC circuit.
2. Analyze the single-phase AC Circuits, the representation of alternating quantities and determining the power and power factor in these circuits.
3. Comprehend the construction and Operation of DC and AC machines.
4. Understand the operation of PN Junction diode and its application in rectifier circuits.
5. Compare the different configurations of BJT and draw the V-I characteristics of BJT, JFET and MOSFET.

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. II Semester		
Code:C0B02	Probability and Statistics (Common For CSE, IT, CSE(AI&ML,DS,CS,IOT), B.Tech(AI&ML)	L	T	P
Credits: 3		3	-	-

Prerequisites: NIL

Course Objectives:

1. Define event, outcome, trial, simple event, sample space and calculate the probability that an event will occur.
2. To learn the random variables and its distributions.
3. Statistical analyses are very often concerned with the difference between means.
4. Investigate the variability in sample statistics from sample to sample
5. Identify the direction and strength of a linear correlation between two factors.

MODULE I: Probability:

[10 Periods]

Introduction to Probability ;Events, sample space, mutually exclusive events. Exhaustive events. Addition theorem for 2& n events and their related problems, conditional probability ,multiplication theorem, Dependent and Independent events, Boole's inequality, Baye's Theorem.

MODULE II: Random variables:

[14 Periods]

Random variables, Discrete and continuous Random variables, Probability mass function, Probability density function, probability distribution functions, Expectation, Discrete Probability distributions. Bernoulli, Binomial, Poisson, Geometric distributions of their mean and variance, moment generating function–related problems. Continuous probability distributions: Normal distribution, Uniform distribution, exponential distribution their mean and variance, moment generating function, Central Limit theorem(Without proof).

MODULE III: Sampling Distributions:

[14 Periods]

(A) Definitions of population-sampling-statistic, parameter. Types of sampling, expected values of Sample mean and variance, sampling distribution, Standard error, Sampling distribution of means and sampling distribution of variance. Parameter estimations – likelihood estimate, point estimation and interval estimation

(B) Testing of hypothesis: Null hypothesis, Alternate hypothesis, type I, & type II errors – critical region, confidence interval, and Level of significance. One sided test, two-sided test.

Large sample tests:

- (i) Test of significance for single mean
- (i) Test of significance for difference of means
- (ii) Test of significance for single proportion
- (iii) Test of significance for difference of proportions
- (iv) Test of significance for standard deviations

MODULE IV: Small sample tests:**[12 Periods]**

Student t-distribution, its properties and its assumptions, Test of significance difference between sample mean and population mean; difference between means of two small samples, Snedecor's, F-distribution and its properties. Test of equality of two population variances, Chi-square distribution, its properties, Chi-square test of goodness of fit, Independence of attributes.

MODULE V: Correlation, Regression:**[10 Periods]**

Scatterplot, Correlation, Coefficient of correlation, the rank correlation. Regression, Regression Coefficient, The lines of regression: simple regression. Multiple regression for three variables.

TEXT BOOKS

1. Walpole, Probability & Statistics, for Engineers & Scientists, 8th Edition, Pearson Education.
2. Paul A Mayer Introductory Probability and Statistical Applications, John Wiley Publications.
3. Monte Geometry, "Applied Statistics and Probability for Engineers", 6th Edition, Wiley Publications.

REFERENCES

1. P. G. Hole, S. C. Port and C. J. Stone, Introduction to Probability Theory, Universal Book Stall, 2003(Reprint).
2. S. Ross, A First Course in Probability, 6th Ed., Pearson Education India, 2002.
3. W. Feller, An Introduction to Probability Theory and its Applications, Vol. 1, 3rd Ed., Wiley, 1968.

E – RESOURCES**a) Concerned Website links:**

1. <http://www.csie.ntu.edu.tw/~sdlin/download/Probability%20&%20Statistics.pdf>(Probability & Statistics for Engineers & Scientists text book)
2. http://www.stat.pitt.edu/stoffer/tsa4/intro_prob.pdf (Random variables and its distributions)
3. <http://users.wfu.edu/Cottrell/ecn215/sampling.pdf> (Notes on Sampling and hypothesis testing)

b) Concerned Journals/ Magazines links:

1. <http://www.pnas.org/content/93/9/3772.full.pdf> (Hypothesis testing and earthquake prediction)
2. <http://nsuworks.nova.edu/cgi/viewcontent.cgi?article=2373&context=tqr>(Sampling Theory)
3. <https://sci-hub.cc/10.1111/j.1540-6261.1996.tb05219.x> (probability Distributions)

c) NPTEL Videos:

1. <http://nptel.ac.in/courses/117105085/> (Introduction to theory of probability)
2. <http://nptel.ac.in/courses/117105085/9> (Mean and variance of random variables)
3. <http://nptel.ac.in/courses/111105041/33> (Testing of hypothesis)

Course Outcomes:

1. The students will understand and appreciate the role of P&S in data analytics and big data analysis.
2. Students would be able to find the Probability in certain realistic situation
3. Students would be able to identify distribution in certain realistic situation. It is mainly useful for circuit as well as non-circuit branches of engineering. Also able to differentiate among many random variables Involved in the probability models. It is quite useful for all branches of engineering.
4. The student would be able to calculate mean and proportions (large and small sample) and to make Important decisions from few samples which are taken out of unmanageably huge populations.
5. Students will understand how to forecast the future observations.

CO- PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3		3		2	2			1	1
CO2	3	3	3		2			2	1	1	1	
CO3	3	2	3		2	1	1	1			1	
CO4	3	2	2	2	2	2		3	1	1	3	
CO5	3	3	2	1	3	1	2	2	1	1	3	1

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. II Semester		
Code: C0504	Python Programming (Common for CSE, IT, CSE (Cyber Security), CSE (AI and ML), CSE (Data Science), CSE (IoT) and AI)	L	T	P
Credits: 4		3	1	-

Course Objectives: This course will enable students to

1. Learn syntax and semantics along with the basic data structures of Python
2. Handle modules, files and exceptions in Python.
3. Understand regular expressions and multithreaded programming in Python.
4. Implement Object Oriented Programming concepts in Python.
5. Build GUI programming and web programming in Python.

MODULE - I

[10 Periods]

Python Basics, Getting started, Python Objects, Numbers, Sequences: Strings, Lists, Tuples, Set and Dictionary. Conditionals and Loop Structures

MODULE - II

[9 Periods]

Modules: Modules and Files, Namespaces, Importing Modules, Importing Module Attributes, Module Built-in Functions, Packages, Other Features of Modules

Files: File Objects, File Built-in Function, File Built-in Methods, File Built-in Attributes, Standard Files, Command-line Arguments, File System, File Execution, Persistent Storage Modules.

Exceptions: Exceptions in Python, Detecting and Handling Exceptions, Context Management, Exceptions as Strings, Raising Exceptions, Assertions, Standard Exceptions, Creating Exceptions, Why Exceptions, Why Exceptions at All? Exceptions and the sys Module.

MODULE - III

[10 Periods]

Regular Expression (RE): Introduction, Special Symbols and Characters, REs and Python.

Multithreaded Programming: Introduction, Threads and Processes, Python, Threads, and the Global Interpreter Lock, Thread Module, Threading Module, Related Modules.

MODULE – IV

[10 Periods]

Classes and Object-Oriented Programming (OOP): OOP, Classes, Class Attributes, Instances, Instance Attributes, Binding and Method Invocation, Composition, Subclassing and Derivation, Inheritance, Built-in Functions for Classes, Instances, and Other Objects, Types vs. Classes/Instances, Customizing Classes with Special Methods, Privacy, Delegation and Wrapping

MODULE - V

[9 Periods]

GUI Programming: Introduction, Tkinter and Python Programming, Brief Tour of Other GUIs, Related Modules and Other GUIs.

Web Programming: Introduction, Web Surfing with Python, Creating Simple Web Clients, Advanced Web Clients, CGI-Helping Servers Process Client Data, Building CGI Application Advanced CGI, Web (HTTP) Servers

TEXT BOOKS

1. Wesley J. Chun, Core Python Programming, Second Edition, Prentice Hall, 2007.
2. Kenneth A. Lambert, Fundamentals of Python: First Programs, Cengage Learning, 2011.

REFERENCE BOOKS

1. Allen B. Downey, “Think Python, How to think like a Computer Scientist”, First Edition, O’reilly Publishing, 2018.
2. Vamsi Kurama, “Python Programming: A Modern Approach”, Pearson India, 2017.
3. Mark Lutz, “Learning Python”, Fifth Edition, O’rielly Publishers, 2013.

E-RESOURCES

1. “Learn Python - Free Interactive Python Tutorial”, <https://www.learnpython.org/>
2. “Free Python Tutorial - Python For Beginner,” <https://www.udemy.com/share/101EfoBUcccV1SQHw>
3. “Basics of Python for Data Science”, <https://olympus.greatlearning.in/courses/11265>
4. “Beginners Guide / Programmers - Python Wiki”, <https://wiki.python.org/moin/BeginnersGuide/Programmers>
5. “Introduction to Python”, <https://www.datacamp.com/courses/intro-to-python-for-data-science>

Course Outcomes

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

1. Learn syntax and semantics along with the basic data structures of Python
2. Apply different operation on Files by using modules and implement exceptions in Python.
3. Identify the use regular expressions and multithreaded programming in Python
4. Implement Object Oriented Programming concepts to build programs in Python.
5. Identify different GUI Components to Design web applications in Python.

CO- PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COs	Programme Outcomes (POs)											PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2											2	3	2	
CO2	3	2	1									1	3	2	1
CO3	3	3	1									2	3	3	2
CO4	3	1										2	3	2	1
CO5	3	3	1									2	3	3	2

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. II Semester		
Code: C0506	Python Programming Lab (Common for CSE, IT, CSE (Cyber Security), CSE (AI and ML), CSE (Data Science) and CSE (IoT))	L	T	P
Credits: 2		-	1	2

Prerequisites: NIL

Course Objectives:

This course enables the students to develop various applications using python.

Software Requirements: Python

List of Programs:

- 1
 - a) Write a program to purposefully raise Indentation Error and correct it.
 - b) Write a program to compute distance between two points taking input from the user (Pythagorean Theorem).
 - c) Write a program add.py that takes 2 numbers as command line arguments and prints its sum.
- 2
 - a) Write a Program for checking whether the given number is a even number or not.
 - b) Using for loop, write a program that prints out the decimal equivalents of 1/2, 1/3, 1/4, . . . , 1/10.
 - c) Write a program using for loop that loops over a sequence. What is sequence?
 - d) Write a program using a while loop that asks the user for a number, and prints a countdown from that number to zero.
- 3
 - a) Find the sum of all the primes below two million.
 - b) Each new term in the Fibonacci sequence is generated by adding the previous two terms. By starting with 1 and 2, the first 10 terms will be: 1, 2, 3, 5, 8, 13, 21, 34, 55, 89
 - c) By considering the terms in the Fibonacci sequence whose values do not exceed four million, find the sum of the even-valued terms.
 - d) Write a program to count the numbers of characters in the given string and store them in a dictionary data structure
 - e) Write a program to use split and join methods in the given string and trace a birthday with a dictionary data structure.
- 4
 - a) Write a program to combine two lists into a dictionary.
 - b) Write a program to count frequency of characters in a given file. Can you use character frequency to tell whether the given file is a Python program file, C program file or a text file?
- 5
 - a) Write a program to print each line of a file in reverse order.
 - b) Write a program to compute the number of characters, words and lines in a file.
- 6
 - a) Write a function ball _collide that takes two balls as parameters and computes if they are colliding. Your function should return a Boolean representing whether or not the balls are colliding.
Hint: Represent a ball on a plane as a tuple of (x, y, r), r being the radius. If (distance between two balls centers) <= (sum of their radii) then (they are colliding)
 - b) Find mean, median, mode for the given set of numbers in a list.
- 7
 - a) Write a function nearly_ equal to test whether two strings are nearly equal. Two strings a and b are nearly equal when a can be generated by a single mutation on b.
 - b) Write a function dups to find all duplicates in the list.
 - c) Write a function unique to find all the unique elements of a list.

- 8 a) Write a function `cumulative_product` to compute cumulative product of a list of numbers.
- b) Write a function `reverse` to reverse a list. Without using the `reverse` function.
- 9 Create a Regular Expression and implement the following
 - a) Recognize the following strings: “bat,” “bit,” “but,” “hat,” “hit,” or “hut.”
 - b) Match any pair of words separated by a single space, i.e., first and last names.
 - c) Match any word and single letter separated by a comma and single space, as in last name, first initial.
- 10 Write a python program to implement multithreading scenarios.
- 11 Write a python program to simulate the banking operations using Class.
- 12 Write a python program to demonstrate the Queue / Stack operations using Class.

TEXT BOOKS

1. Wesley J. Chun, Core Python Programming, Second Edition, Prentice Hall, 2007.
2. Kenneth A. Lambert, Fundamentals of Python: First Programs, Cengage Learning, 2011.

REFERENCE BOOKS

1. Allen B. Downey, “Think Python, How to think like a Computer Scientist”, First Edition, O’reilly Publishing, 2018.
2. Vamsi Kurama, “Python Programming: A Modern Approach”, Pearson India, 2017.
3. Mark Lutz, “Learning Python”, Fifth Edition, O’rielly Publishers, 2013.

Course Outcomes

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

1. Apply core Python scripting elements such as variables and flow control structures
2. Implement data structures like lists, tuple, dictionary and sequence in Python.
3. Build Python programs by using OOPs concepts and apply different file operations.

CO- PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COs	Programme Outcomes (POs)												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1										2	3	2	1
CO2	3	2	1									1	3	2	1
CO3	3	2	1									2	3	2	1

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. I / II Semester		
Code: C0H02	English Language and Communication Skills Lab (Common for CE, EEE, ME, ECE, CSE, CSE(CS), CSE (AI and ML), CSE (DS), CSE (IOT), AI&ML , IT and Mi.E)	L	T	P
Credits: 1		-	-	3

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

Course Objectives:

The course aims to develop students' intelligibility in their pronunciation of English - speech Sounds, word accent, intonation and rhythm. It also helps to improve the fluency in spoken English and make them aware of nuances of major skills, namely, listening and speaking skills. It also trains students to understand nuances of both verbal and non-verbal communication During all activities. The course enables the learners to develop their confidence levels so as to Participate in discussions, debates and public speaking. Listening Skills:

Objectives:

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

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

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

Speaking Skills:

Objectives:

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

Syllabus: English Language and Communication Skills Lab has two parts:

a. Computer Assisted Language Learning (CALL) Lab

b. Interactive Communication Skills (ICS) Lab

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

Module - I:

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

ICS Lab: Ice-Breaking activity and JAM session; Listening: listening for sounds in context, for ideas; Speaking: ideation and translation of ideas into sentences.

Module - II:

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

ICS Lab: Situational Dialogues – Role-Play- Expressions in Various Situations – Self-introduction and Introducing others – Greetings – Apologies – Requests – Social and Professional Etiquette - Telephone Etiquette; Listening: listening for specific purposes, for details; Speaking: speaking in the above situations with clarity, connectivity, maintaining voice characters.

Module - III:

CALL Lab: Word accent and Listening Comprehension-reading aloud meaningfully.

ICS Lab: Descriptions- Narrations- Giving Directions and guidelines; Listening: listening for intelligible English; Speaking: formal and informal conversations, register.

Module - IV:

CALL Lab: Intonation and Common errors in Pronunciation- reading aloud (evaluating through recording).

ICS Lab: Extempore- Public Speaking, Oral Presentation Skills; Listening: note taking and listening for speaker's tone/attitude; Speaking: organizing, connecting ideas and sentences, short forms in spoken English, errors in spoken English

Module - V:

CALL Lab: Reduction of Mother Tongue Interference and Conversation Practice

ICS Lab: Information Transfer, Debate

Minimum requirement of infrastructural facilities for EL Lab:

1. Computer Assisted Language Learning (CALL) Lab:

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

System Requirement (Hardware component):

Computer network with Lan with minimum 60 multimedia systems with the following specifications:

- a) P – IV Processor
- b) Speed – 2.8 GHZ
- c) RAM – 512 MB Minimum
- d) Hard Disk – 80 GB
- e) Headphones of High quality

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

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

Prescribed Lab Manual:

Rani, Sudha. *English Language Communication Skills Laboratory*. 5th edition, Pearson Publication, 2014.

Reference Books:

1. Roach, Peter. *English Phonetics and Phonology*. 4th edition, Cambridge University Press, 2009.
2. Hughes, John and Mallett, Andrew. *Successful Presentations DVD and Student's Book Pack*. Oxford University Press, 2013.
3. Hancock, Mark. *English Pronunciation in Use (Intermediate)*. 2nd edition, Cambridge University Press, 2009.
4. Karia, Akash. *Public Speaking Mastery: Speak Like a Winner*. Kindle edition, 2013.
5. Lucas, Stephen. *The Art of Public Speaking*. 11th edition, Tata McGraw Hill, 2011.

Websites:

1. <http://www.mindtools.com/CommSkill/ActiveListening.htm>
2. <http://www.slideshare.net/alisonkis/dialogue-and-roleplay-activity>
3. [http://www.hse.ru/pubs/lib/data/access/ram/ticket/2/14309868938d576a532b71360b7354268380727a22/An%20article%20for%20Monika%20\(2010\).pdf](http://www.hse.ru/pubs/lib/data/access/ram/ticket/2/14309868938d576a532b71360b7354268380727a22/An%20article%20for%20Monika%20(2010).pdf)

Course Outcomes:

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

1. Understand the nuances of language through audio- visual experience and group activities.
2. Hone the accent for intelligibility
3. Realize the importance of listening skills and speaking skills and their application in real life situations.
4. Recognize significance of non-verbal communication and develop confidence to face audience and shed inhibitions.
5. Speak with clarity and confidence; thereby enhance employability skills of the students.

CO-PO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COS	Programme Outcomes(POs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		1				1		1	2	2		1			
CO2										1		1			
CO3							1		1	2		2			
CO4								1	1	2		2			
CO5										2		2			

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. II Semester		
Code: C1201	Engineering and IT Workshop (Common for CSE, CSE(CyberSecurity), CSE (AI and ML), CSE (DS), CSE (IOT), AI, and IT))	L	T	P
Credits: 1.5		-	-	2

Pre requisites: NIL

Course Objectives:

- To understand the usage of hand tools, acquire the skills in model / pattern making and familiarize with various work materials and tools.
- The IT Workshop is a training lab course to get training on PC Hardware, Internet & World Wide Web, and Productivity tools for documentation, Spreadsheet computations, and Presentation.
- To introduce to a personal computer and its basic peripherals, the process of assembling a personal computer, installation of system software like MS Windows, Linux and the required device drivers, hardware and software level troubleshooting process.
- To introduce connecting the PC on to the internet from home and workplace and effectively usage of the internet, Usage of web browsers, email, newsgroups and discussion forums. To get knowledge in awareness of cyber hygiene, i.e., protecting the personal computer from getting infected with the viruses, worms and other cyber-attacks.
- To introduce the usage of Productivity tools in crafting professional word documents, excel spreadsheets and power point presentations using open office tools and LaTeX.

Engineering Workshop:

Problem 1: Trades for Exercises

At least two exercises from each trade

1. House-wiring
2. Soldering

Problem 2: Trades for Demonstration & Exposure

1. Carpentry
2. Wood working lathe

PC Hardware:

The students should work on working PC to disassemble and assemble to working condition and install operating system like Linux or any other on the same PC. Students are suggested to work similar tasks in the Laptop scenario wherever possible.

Problem 3:

Every student should identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor. Every student should disassemble and assemble the PC back to working condition.

Problem 4:

Every student should individually install operating system like Linux or MS windows on the personal computer. The system should be configured as dual boot with both windows and Linux.

Problem 5:

Hardware Troubleshooting: Students have to be given a PC which does not boot due to improper assembly or defective peripherals. They should identify the problem and fix it to get the computer back to working condition.

Problem 6:

Software Troubleshooting: Students have to be given a malfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition. Internet & World Wide Web.

Productivity tools: LaTeX and Word Word Orientation: An overview of LaTeX and Microsoft (MS) office / equivalent (FOSS) tool word should be learned: Importance of LaTeX and MS office / equivalent (FOSS) tool Word as word Processors, Details of the three tasks and features that should be covered in each, using LaTeX and word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter.

Problem 7:

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

Problem 8:

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

Problem 9:

Creating a Newsletter: Features to be covered: - Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs in word.

Problem 10:

Spreadsheet Orientation: Accessing, overview of toolbars, saving spreadsheet files, Using help and resources. Creating a Scheduler: -Gridlines, Format Cells, Summation, auto fill, Formatting Text

Problem 11:

Calculating GPA -. Features to be covered: -Cell Referencing, Formulae in spreadsheet –average, std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function, Sorting, Conditional formatting.

Problem 12:

Creating Power Point: Student should work on basic power point utilities and tools in Latex and MS Office/equivalent (FOSS) which help them create basic power point presentation. PPT Orientation, Slide Layouts, Inserting Text, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows, Hyperlinks, Inserting Images, Tables and Charts

REFERENCE BOOKS:

1. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
2. LaTeX Companion –Leslie Lamport, PHI/Pearson.
3. Comdex Information Technology course tool kit Vikas Gupta, WILEY Dreamtech

4. IT Essentials PC Hardware and Software Companion Guide Third Edition by David Anfinson and Ken Quamme.–CISCO Press, Pearson Education.
5. PC Hardware and A+ Handbook –Kate J. Chase PHI (Microso

Course Outcomes:

1. Knowledge of carpentry process and methods used in the design and fabrication, installation, maintenance and repair of structures and fixtures (e.g., furniture, cabinets) to accomplish work assignments along with the understanding of house wiring components.
2. Apply knowledge for computer assembling and software installation and ability how to solve the trouble shooting problems and connecting the PC on to effective use of internet.
3. To introduce the usage of Productivity tools in crafting professional word documents, excel spreadsheets and power point presentations using open office tools and LaTeX

CO- PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COs	Programme Outcomes (POs)												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3											2	2	1	
CO2	3	2	2									3	3	2	1
CO3	3	2	2									2	3	2	1

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. II Semester		
Code: C0202	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LAB (Common for all branches)	L	T	P
Credits: 1		-	-	2

Course Objectives:

To get practical knowledge about basic electrical circuits, electronic devices like Diodes, BJT, JFET and also analyze the performance of DC Motors, AC Motors and Transformers.

List of Experiments:

1. Verification of Kirchhoff's Laws.
2. Verification of Maximum Power Transfer Theorem.
3. Determination of Phase Angle for RC series circuit.
4. Brake Test on DC-Shunt Motor. Determination of Performance curves
5. Load Tests on Single Phase Transformer
6. Brake Test on Three Phase Induction Motors. Determination of Performance curves
7. V-I Characteristics of PN junction Diode
8. V-I Characteristics of Zener Diode
9. Half Wave Rectifier and Full Wave rectifier.
10. Input and Output characteristics of BJT with CE configuration
11. Input and Output characteristics of BJT with CB configuration
12. Input and Output Characteristics of JFET.

Course Outcomes:

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

1. Experimentally verify the basic circuit theorems, KCL and KVL
2. Measure power, power factor and phase angle in RC circuits experimentally.
3. Acquire hands on experience of conducting various tests on dc shunt motor, single phase transformers and three phase induction motors and obtaining their performance indices using standard analytical as well as graphical methods
4. Draw the characteristics of different semiconductor devices like PN junction Diode, Zener Diode, BJT and JFET by conducting suitable experiments.
5. Experimentally verify the working of half and full wave rectifier by using PN Junction diodes.

CO- PO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COs	Programme Outcomes (POs)												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3		2		2		1	1	2	1	1	1	3	1	1
CO2	3		2		2		2	1	2	1	1	1	3	1	1
CO3	3	2	2	2	2		2	1	2	1	1	1	3	1	1
CO4	3	1	2		2		1	1	2	1	1	1	3	1	1
CO5	3	1	2		2		2	1	2	1	1	1	3	1	1

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. III Semester		
Code: C0507	Discrete Mathematics	L	T	P
Credits: 3		3	-	-

Prerequisites: NIL

Course Objectives:

This course provides the concepts of mathematical logic demonstrate predicate logic and Binary Relations among different variables, discuss different type of functions and concepts of Algebraic system and its properties. It also evaluates techniques of Combinatorics based on counting methods and analyzes the concepts of Generating functions to solve Recurrence equations.

MODULE I: Mathematical Logic

[10 Periods]

Basic Logics - Statements and notations, Connectives, Well-formed formulas, Truth Tables, tautology.

Implications and Quantifiers - Equivalence implication, Normal forms, Quantifiers, Universal quantifiers.

MODULE II: Predicate Logic and Relations

[10 Periods]

Predicate Logic - Free & Bound variables, Rules of inference, Consistency, proof of contradiction, Proof of automatic Theorem.

Relations - Properties of Binary Relations, equivalence, transitive closure, compatibility and partial ordering relations, Lattices, Hasse diagram.

MODULE III: Functions and Algebraic Structures

[10 Periods]

A: Functions - Inverse Function, Composition of functions, recursive Functions - Lattice and its Properties.

B: Algebraic structures - Algebraic systems Examples and general properties, Semi-groups and monoids, groups, sub-groups, homomorphism, Isomorphism, Lattice as POSET, Boolean algebra.

MODULE IV: Counting Techniques and Theorems

[09 Periods]

Counting Techniques - Basis of counting, Combinations and Permutations with repetitions, Constrained repetitions

Counting Theorems - Binomial Coefficients, Binomial and Multinomial theorems, principles of Inclusion – Exclusion. Pigeon hole principle and its applications.

MODULE V: Generating functions and Recurrence Relation

[09 Periods]

Generating Functions - Generating Functions, Function of Sequences, Calculating Coefficient of generating function.

Recurrence Relations - Recurrence relations, Solving recurrence relation by substitution and Generating functions. Method of Characteristics roots, solution of Non-homogeneous Recurrence Relations.

TEXTBOOKS:

1. J P Tremblay & R Manohar, “Discrete Mathematics with applications to Computer Science”, Tata McGraw Hill.
2. J.L. Mott, A. Kandel, T.P.Baker “Discrete Mathematics for Computer Scientists & Mathematicians”, PHI.

REFERENCES:

1. Kenneth H. Rosen, "Discrete Mathematics and its Applications", TMH, Fifth Edition.
2. Thomas Koshy, "Discrete Mathematics with Applications", Elsevier.
3. Grass Man & Trembley, "Logic and Discrete Mathematics", Pearson Education.
4. C L Liu, D P Nohapatra, “Elements of Discrete Mathematics - A Computer Oriented Approach”, Tata McGraw Hill, Third Edition.

E-RESOURCES:

1. <http://www.cse.iitd.ernet.in/~bagchi/courses/discrete-book/fullbook.pdf>
2. <http://www.medellin.unal.edu.co/~curmat/matdiscretas/doc/Epp.pdf>
3. <http://ndl.iitkgp.ac.in/document/yVCWqd6u7wgye1qwH9xY7xPG734QA9tMJN2ncqS12ZbN7pUSSIWCxSgPOZJEokyWJlxQLYsrFyeITA70W9C8Pg>
4. <http://nptel.ac.in/courses/106106094/>

Course Outcomes:

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

1. **Apply** the concepts of connectives and normal forms in real time applications.
2. **Summarize** predicate logic, relations and their operations.
3. **Describe** functions, algebraic systems, groups and Boolean algebra.
4. **Illustrate** practical applications of basic counting principles, permutations, combinations, and the pigeonhole methodology.
5. **Analyze** techniques of generating functions and recurrence relations.

CO- PO, PSO Mapping															
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COs	Programme Outcomes (POs)												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2				3							2	3		
CO2	3											2	3		
CO3		3										2	3		
CO4	3	3	2	3								2		3	
CO5					3							2		3	

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. III Semester		
Code: C0509	Computer Organization and Architecture (Common for CSE, CSE(DS), CSE (AI and ML), CSE(Cyber Security), CSE(IOT), AIML and IT)	L	T	P
Credits: 3		3	-	-

Prerequisites: No prerequisites

Objectives

1. The purpose of the course is to introduce principles of Digital fundamentals computer organization and the basic architectural concepts.
2. It begins with basic organization, design, and programming of a simple digital computer and introduces simple register transfer language to specify various computer operations.
3. Topics include computer arithmetic, instruction set design, microprogrammed control unit, pipelining and vector processing, memory organization and I/O systems, and multiprocessors.

UNIT – I

[10 Periods]

Digital Computers: Introduction, Block diagram of Digital Computer, Definition of Computer Organization, Computer Design and Computer Architecture. Register Transfer Language and Micro operations: Register Transfer language, Register Transfer, Bus and memory transfers, Arithmetic Micro operations, logic micro operations, shift micro operations, Arithmetic logic shift unit. Basic Computer Organization and Design: Instruction codes, Computer Registers Computer instructions, Timing and Control, Instruction cycle, Memory Reference Instructions, Input – Output and Interrupt.

UNIT – II

[10 Periods]

Micro programmed Control: Control memory, Address sequencing, micro program example, design of control unit. Central Processing Unit: General Register Organization, Instruction Formats, Addressing modes, Data Transfer and Manipulation, Program Control.

UNIT – III

[9 Periods]

Data Representation: Data types, Complements, Fixed Point Representation, Floating Point Representation. Computer Arithmetic: Addition and subtraction, multiplication Algorithms, Division Algorithms, Floating – point Arithmetic operations. Decimal Arithmetic unit, Decimal Arithmetic operations.

UNIT – IV

[10 Periods]

Input-Output Organization: Input-Output Interface, Asynchronous data transfer, Modes of Transfer, Priority Interrupt Direct memory Access. Memory Organization: Memory Hierarchy, Main Memory, Auxiliary memory, Associate Memory, Cache Memory.

UNIT – V

[9 Periods]

Reduced Instruction Set Computer: CISC Characteristics, RISC Characteristics. Pipeline and Vector Processing: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processor. Multi Processors: Characteristics of Multiprocessors, Interconnection Structures, Interprocessor arbitration, Interprocessor communication and synchronization, Cache Coherence.

Textbook:

1. Computer System Architecture, M. Moris Mano, 3rd Edition, Pearson/PHI.

References:

1. Computer Organization, Car Hamacher, ZvonksVranesic, SafeaZaky, 5th Edition, McGraw Hill.
2. Computer Organization and Architecture, William Stallings 6th Edition, Pearson/PHI.
3. Structured Computer Organization, Andrew S. Tanenbaum, 4th Edition, PHI/Pearson.

E-Resources:

1. <https://books.google.co.in/books?isbn=8131700704>
2. http://ndl.iitkgp.ac.in/document/yVCWqd6u7wgye1qwH9xY7Eh9eBOsT1ELoYpKlg_xngrkluevXOJLs1TbxS8q2icgUs3hL4_KAi5So5FgXcVg

3. http://ndl.iitkgp.ac.in/document/yVCWqd6u7wgye1qwH9xY7xAYUzYSIX14zudlsolr-e7wQNrNXLxbgGFxbkoyx1iN3YbHuFrzI2jc_70rWMEwQ
4. <http://nptel.ac.in/courses/106106092/>

Outcomes:

1. Understand the basics of instructions sets and their impact on processor design.
2. Demonstrate an understanding of the design of the functional units of a digital computer system.
3. Evaluate cost performance and design trade-offs in designing and constructing a computer processor including memory.
4. Design a pipeline for consistent execution of instructions with minimum hazards.
5. Recognize and manipulate representations of numbers stored in digital computers.

CO- PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COs	Programme Outcomes (POs)												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2									2			
CO2		2	3									1			
CO3	2	2	3	2	2							2			
CO4	3														
CO5	3														

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. III Semester		
Code: C0510	Data Structures (Common for CSE, CSE (DS), CSE (AI and ML), CSE (Cyber Security), CSE (IOT), AIML and IT)	L	T	P
Credits: 3		3	-	-

Prerequisites: A course on “Programming for Problem Solving “

Course Objectives:

- Exploring basic data structures such as linked list, stacks and queues.
- Introduces a variety of data structures such as dictionaries and hash tables
- To learn non linear data structures i.e. Binary search trees and height balanced trees.
- To understand the graph traversal algorithms and heap sort.
- Introduces the pattern matching and tries algorithms

MODULE-I:

[10 Periods]

Introduction to Data Structures, abstract data types, Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list, Stacks-Operations, array and linked representations of stacks, stack applications, Queues-operations, array and linked representations.

MODULE-II:

[09 Periods]

Dictionaries: linear list representation, skip list representation, operations - insertion, deletion and searching.

Hash table representation: hash functions, collision resolution-separate chaining, open addressing-linear probing, quadratic probing, double hashing, rehashing, extendible hashing.

MODULE-III:

[10 Periods]

Search Trees: Binary Search Trees, Definition, Implementation, Operations- Searching, Insertion and Deletion, AVL Trees, Definition, Height of an AVL Tree, Operations – Insertion, Deletion and Searching, Definition and example of Red –Black, Splay Trees.

MODULE-IV:

[10 Periods]

Graphs: Graph Implementation Methods. Graph Traversal Methods.

Sortings: Max Heap, Min Heap, Heap Sort. External Sorting: Model for external sorting, Merge sort.

MODULE-V:

[09Periods]

Pattern matching and Tries: Pattern matching algorithms-Brute force, the Boyer –Moore algorithm, the Knuth-Morris-Pratt algorithm, Standard Tries, Compressed Tries, Suffix tries.

TEXT BOOKS:

1. Richard F. Gilberg, Behrouz A. Forouzan, “Data Structures: A Pseudo code approach with C ”, Thomson (India), 2nd Edition, 2004.
2. Mark Allen weliss, Data Structures and Algorithms Analysis in C, Pearson Education, Second Edition, 2007

REFERENCES:

1. Horowitz, Ellis, Sahni, Sartaj, Anderson-Freed, Susan, “Fundamentals of Data Structure in C”, University Press (India), 2nd Edition, 2008.
2. A. K. Sharma, “Data structures using C”, Pearson, 2nd Edition, June, 2013.
3. R. Thareja, “Data Structures using C”, Oxford University Press, 2nd Edition, 2014.

E-RESOURCES:

1. <http://gvpcse.azurewebsites.net/pdf/data.pdf>
2. <http://www.sncwgs.ac.in/wp-content/uploads/2015/11/Fundamental-Data-Structures.pdf>
3. <http://www.learnerstv.com/Free-Computer-Science-Video-lectures-ltv247-Page1.htm>
4. <http://ndl.iitkgp.ac.in/document/yVCWqd6u7wgye1qwH9xY7-3lcmoMAppVUMmjlExpIb1zste4YXX1pSpX8a2mLgDzZ-E41CJ6PVmY4S0MqVbxsFQ>
5. <http://nptel.ac.in/courses/106102064/1>

Course Outcomes:

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

1. **Implement** the linear data structures such as linked list, stacks and queues.
2. **Understand** the Dictionaries and Hash table representation.
3. **Analyze** the various non linear data structures with its operations
4. **Develop** the programs by using Graph Traversal and heap sort
5. **Apply** data structure concepts for the implementation of pattern matching and tries.

CO- PO,PSO Mapping															
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COs	Programme Outcomes (POs)												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	2										2	3	
CO2	2	2	3										3	2	
CO3		2	2											2	1
CO4		2	3										2	3	
CO5	2	3	3										2	3	

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. III Semester		
Code: C0511	Object Oriented Programming (Common for CSE, CSE (DS), CSE (AI and ML), CSE (Cyber Security), CSE (IOT) and IT)	L	T	P
Credits: 3		3	-	-

Prerequisites: Computer Programming

Course Objectives:

- To understand the basic object-oriented programming concepts and apply them in problem solving.
- To illustrate inheritance concepts for reusing the program.
- To demonstrate multitasking by using multiple threads and event handling
- To develop data-centric applications using JDBC.
- To understand the basics of java console and GUI based programming

MODULE-I:

[9 Periods]

Object oriented thinking and Java Basics- Need for oop paradigm, summary of oop concepts, coping with complexity, abstraction mechanisms. A way of viewing world – Agents, responsibility, messages, methods, History of Java, Java buzzwords, data types, variables, scope and lifetime of variables, arrays, operators, expressions, control statements, type conversion and casting, simple java program, concepts of classes, objects, constructors, methods, access control, this keyword, garbage collection, overloading methods and constructors, method binding, inheritance, overriding and exceptions, parameter passing, recursion, nested and inner classes, exploring string class.

Module II:

[11 Periods]

Inheritance, Packages and Interfaces – Hierarchical abstractions, Base class object, subclass, subtype, substitutability, forms of inheritance specialization, specification, construction, extension, limitation, combination, benefits of inheritance, costs of inheritance. Member access rules, super uses, using final with inheritance, polymorphism- method overriding, abstract classes, the Object class. Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages, differences between classes and interfaces, defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces. Exploring java.io.

MODULE III:

[10 Periods]

Exception handling and Multithreading- Concepts of exception handling, benefits of exception handling, Termination or resumptive models, exception hierarchy, usage of try, catch, throw, throws and finally, built in exceptions, creating own exception subclasses. String handling, Exploring java.util. Differences between multithreading and multitasking, thread life cycle, creating threads, thread priorities, synchronizing threads, inter thread communication, thread groups, daemon threads. Enumerations, autoboxing, annotations, generics.

MODULE IV:

[09 Periods]

Event Handling: Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes. The AWT class hierarchy, user interface components- labels, button, canvas, scrollbars, text components, check box, checkbox groups, choices, lists panels – scrollpane, dialogs, menubar, graphics, layout manager – layout manager types – border, grid, flow, card and grid bag.

MODULE V:

[09 Periods]

Applets – Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets, passing parameters to applets. Swing – Introduction, limitations of AWT, MVC architecture, components, containers, exploring swing- JApplet, JFrame and JComponent, Icons and Labels, text fields, buttons – The JButton class, Check boxes, Radio buttons, Combo boxes, Tabbed Panes, Scroll Panes, Trees, and Tables.

TEXT BOOKS:

1. Herbert Schildt, “Java The complete reference”, TMH, 8th edition
2. T. Budd, “Understanding OOP with Java”, updated edition, Pearson Education.
3. Joyce Farrell, Cengage, “Object Oriented Programming C++”, 4th Edition, 2013.

REFERENCES:

1. P.J. Deitel and H.M. Deitel, “Java for Programmers”, Pearson education.
2. P. Radha Krishna, “Object Oriented Programming through Java”, Universities Press.
3. S. Malhotra and S. Choudhary, “Programming in Java”, Oxford Univ. Press.
4. Bruce Eckel, “Programming in Java”, Pearson Education.
5. Herbert Schildt, “The Complete Reference, C++”, TMH, 4th edition.

E-RESOURCES:

1. http://ndl.iitkgp.ac.in/document/xttk-4kfhvUwVIXBW-RPf64_TFk2i4LJhgQFPQ WAEt-Zobbm3twyubjRA1YOe9WVwkN2qGcxBwdHaPdi_mMQ
2. [https://ndl.iitkgp.ac.in/result?q={\"t\": \"search\", \"k\": \"object%20oriented%20programming\", \"s\": \[\"type=\\\"video\\\"\"\], \"b\": {\"filters\": \[\]}}](https://ndl.iitkgp.ac.in/result?q={\)
3. <http://www.rehancodes.com/files/oop-using-c++-by-joyce-farrell.pdf>
4. <http://www.nptel.ac.in/courses/106103115/36>

Course Outcomes:

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

- Demonstrate the behavior of programs involving the basic programming constructs like control structures, constructors, string handling and garbage collection.
- Demonstrate the implementation of inheritance (multilevel, hierarchical and multiple) by using extend and implement keywords
- Use multithreading concepts to develop inter process communication.
- Understand the process of graphical user interface design and implementation using AWT or swings.
- Develop applets that interact abundantly with the client environment and deploy on the server.

COs	ProgrammeOutcomes(POs)												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1															
CO2															
CO3															
CO4															
CO5															

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. III Semester		
Code: C0516	Operating Systems (Common for CSE, CSE (Cyber Security), CSE (AI and ML), CSE (DS), CSE (IOT), AI and IT)	L	T	P
Credits: 3		3	-	-

Prerequisites: NIL

Course Objectives:

This course enable the students to interpret main components of operating system and their working, identify the role of Operating System in process scheduling and synchronization, analyze the way of addressing deadlock, understand memory management techniques and I/O systems, describes the way of handling files and security.

MODULE I: Computer System and Operating System Overview [10 Periods]

Basic System and Process Operations - Overview of Computer System hardware, Operating System Objectives and services, Operating System Structure, System Calls, System Programs.

Process Management - Process Description, Process Control Block, Process States, Inter - process Communication.

MODULE II: Scheduling and Concurrency [9 Periods]

CPU Scheduling - Basic Concepts, Scheduling Criteria, Scheduling Algorithms and evaluation, Threads Overview, Threading issues.

Concurrency - Process synchronization, the critical- section problem, Peterson's Solution, synchronization Hardware, semaphores, monitors, classic problems of synchronization.

MODULE III: Deadlocks [10 Periods]

A: Deadlocks - System Model, Deadlock Characterization, Methods for handling Deadlocks, Deadlock Prevention.

B: Detection and Recovery - Deadlock avoidance, Deadlock detection, Recovery from Deadlocks.

MODULE IV: Memory [10 Periods]

Memory Management -Basic concepts, Swapping, Contiguous memory allocation, Paging, Segmentation,Virtualmemory,Demandpaging,Page-replacementalgorithms, Thrashing.

Secondary Storage Structure and I/O Systems - Disk structure; Disk scheduling, Disk management, Swap space Management, RAID structure, Stable storage Implementation, Tertiary Storage Structure, I/O hardware, Application I/O interface, Kernel I/O subsystem.

MODULE V: Files [08 Periods]

File Management - File system-File concepts, Access methods, Directory structure, File system mounting, File sharing and Protection. Implementing file systems-File system structure and implementation, Directory implementation, Allocation methods, Free-space management, Efficiency and performance.

Security - Protection, Security threats, Viruses, Cryptography as a security tool.

TEXT BOOKS:

1. Abraham Silberchatz, Peter B. Galvin, Greg Gagne, “**Operating System Principles**” 7th Edition, John Wiley.
2. Stallings, “**Operating Systems Internal and Design Principles**”, 5th Edition, 2005, Pearson education/PHI

REFERENCES:

1. Andrew S. Tanenbaum, “Modern Operating Systems”, Second Edition, Addison Wesley, 2001.
2. Charles Crowley, “Operating Systems: A Design-Oriented Approach”, Tata McGraw Hill Education”, 1996.
3. D M Dhamdhare, “Operating Systems: A Concept-based Approach”, Second Edition, Tata McGraw-Hill Education, 2007.

4. William Stallings, “Operating Systems: Internals and Design Principles”, Seventh Edition, Prentice Hall, 2011.
5. Pramod Chandra P. Bhat, “An Introduction to Operating Systems, Concepts and Practice”, PHI, 2003

Course outcomes

1. **Determine** the role of Operating System in a computer.
2. **Relate** the methods for providing concurrency, communication and synchronization among concurrent tasks.
3. **Illustrate** the schemes used to address the issues of deadlocks.
4. **Contrast** different memory management techniques.
5. **Examine** various file management strategies and security issues.

CO- PO, PSO Mapping															
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COs	Programme Outcomes (POs)												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3		1									2	1		2
CO2	2	2										2	1		
CO3	2														
CO4	2	2	1										2		
CO5	2	2	1										1		

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. III Semester		
Code: C0512	Data Structures Lab (Common for CSE, CSE (Cyber Security), CSE (AI and ML), CSE (DS), CSE (IOT), AI and IT)	L	T	P
Credits: 1.5		-	-	3

Prerequisites: A Course on “Programming for problem solving”

Objectives:

1. To learn linear data structures such as linked list, stack and queues with its operations
2. Ability to learn programs on binary search tree and graph traversal strategies.
3. To understand the pattern matching and hashing techniques.

Software Requirements: Turbo C

List of Programs:

- 1 Write a program that uses functions to perform the following operations on singly linked list.:
i) Creation ii) Insertion iii) Deletion iv) Traversal
- 2 Write a program that uses functions to perform the following operations on doubly linked list.:
i) Creation ii) Insertion iii) Deletion iv) Traversal
- 3 Write a program that uses functions to perform the following operations on circular linked list.:
i) Creation ii) Insertion iii) Deletion iv) Traversal
- 4 Write a program that implement stack (its operations) using
i) Arrays ii) Pointers
- 5 Write a program that implement Linear Queue (its operations) using
i) Arrays ii) Pointers
- 6 Write a program that implement Deque (its operations) using
i) Arrays ii) Pointers
- 7 Write a program to implement all the functions of a dictionary using hashing.
- 8 Write a program that implement Binary Search Trees to perform the following operations
i) Creation ii) Insertion iii) Deletion iv) Traversal
- 9 Write a program to implement the tree traversal methods using recursion.
- 10 Write a program that implements the following sorting methods to sort a given list of integers in ascending order
i) Heap sort ii) Merge sort
- 11 Write a program to implement the graph traversal methods such as BFS and DFS.
- 12 Write a program to implement the Knuth-Morris- Pratt pattern matching algorithm.

TEXT BOOKS

1. Fundamentals of data structures in C, E.Horowitz, S.Sahni and Susan Anderson Freed, 2nd Edition, Universities Press.
2. Data structures using C, A.S.Tanenbaum, Y. Langsam, and M.J. Augenstein, PHI/pearson education.

REFERENCES

1. Data structures: A Pseudocode Approach with C, R.F.Gilberg And B.A.Forouzan, 2nd Edition, Cengage Learning.
2. Introduction to data structures in C, Ashok Kamthane, 1st Edition, PEARSON.

Outcomes:

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

1. Develop C programs for computing and real life applications using basic data structures like stacks, queues, linked lists, Binary Search Trees.
2. Make use of basic data structures implementing various tree and graph traversal operations and algorithms.
3. Apply the concepts of basic data structures and implement advanced operations AVL Trees, Red –Black Trees, and Splay Trees concepts.

CO- PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COs	Programme Outcomes (POs)												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	2										3	2	
CO2	2	2	3										2	3	
CO3		2	3										2	3	1

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. III Semester		
Code: C0513	Object Oriented Programming Lab (Common for CSE, CSE (Cyber Security), CSE (AI and ML), CSE (DS), CSE (IOT), AI and IT)	L	T	P
Credits: 1.5		-	-	3

Prerequisites: NIL

Course Objectives:

This course will make students able to learn and understand the concepts and features of object-oriented programming and the object-oriented concept like inheritance and will know how to make use of interfaces and package, to acquire the knowledge in Java's exception handling mechanism, multithreading, to explore concepts of Applets and event handling mechanism. This course makes students to gain the knowledge in programming using Layout Manager and swings.

Software Requirements: Java

List of Programs:

1. Write **Java** Programs that implement the following.
 - a) Constructor
 - b) Parameterized constructor
 - c) Method Overloading
 - d) Constructor overloading
2. Write a Java program
 - a) checks whether a given string is a palindrome or not.
 - b) for sorting a given list of names in ascending order.
 - c) that reads a line if integers and then displays each integer and the sum of all integers(use string tokenizer class of java.util).
3. Write Java programs that uses the following keywords...
 - a) this
 - b) super
 - c) static
 - d) final
4. Write a Java program to implement
 - a) Method Overriding.
 - b) dynamic method dispatch.
 - c) multiple inheritance.
 - d) access specifiers.
5. Write a Java program that
 - a) reads a file name from the user, and then displays information about whether the file exists, whether the file is readable, whether the file is writable, the type of file and the length of the file in bytes.
 - b) reads a file and displays the file on the screen, with a line number before each line.
 - c) displays the number of characters, lines and words in a test file.
6. Write a Java program for handling
 - a) Checked exceptions.
 - b) unchecked exceptions.
7. Write a Java program
 - a) Creates three threads. First threads displays "Good Morning "for every one
Second, the second thread displays "Hello" for every two seconds, the third thread Displays "Welcome" for every three seconds.
 - b) that correctly implements producer consumer problem using concept of inter thread communication.
8. Write a Java program which demonstrates the use of following collection classes
 - a) Array List
 - b) Hash Set
 - c) Deque
9. Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +,-,*,/ operations. Add a text field to display the result.
10. Write a Java program for handling
 - a) mouse events.
 - b) key events.

11. Write a Java program that creates a user interface to perform integer divisions. The user enters two numbers in the text fields num1 and num2. The division of num1 and num2 is displayed in the result field when the divide button is clicked. If num1 or num2 were not an integer, the program would throw number format exception. If num2 were zero, the program would throw an arithmetic exception and display the exception in the message dialogue box.
12. Write a Java program that
 - a) Simulates traffic light. The program lets the user select one of three lights: red, yellow or green. When a radio button is selected, the light is turned on and only one light can be on at a time. No light is on when the program starts.
 - b) Allows the user to draw lines rectangles and ovals.

TEXT BOOKS:

1. Herbert Schildt, “**Java The complete reference**”, TMH, 8th edition, 2011.
2. T. Budd, “**Understanding OOP with Java**”, Pearson Education, updated edition, 1998.

REFERENCES:

1. P.J. Deitel and H.M. Deitel, “**Java for Programmers**”, Pearson education.
2. P. Radha Krishna, “**Object Oriented Programming through Java**”, Universities Press.
3. Bruce Eckel,” **Programming in Java**”, Pearson Education.
4. S. Malhotra and S. Choudhary,” **Programming in Java**”, Oxford Univ. Press.

Course Outcomes:

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

1. **Build** simple java progras using the basic concepts of OOP
2. **Create** user defined packages to build real time applications
3. **Develop** applications on files, exceptions, threads and applets.
4. **Construct** GUI based applications.
5. **Design** Interactive applications for use on internet.

CO- PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COs	ProgrammeOutcomes (POs)												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		2	3										3	2	
CO2			3		2								2	3	
CO3		2	2		2									2	

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. III Semester		
Code: C0520	Operating Systems Lab (Common for CSE, CSE (Cyber Security), CSE (AI and ML), CSE (DS), CSE (IOT), AI and IT)	L	T	P
Credits: 1		-	-	2

Prerequisites: A course on “Programming for Problem Solving”, A course on “Computer Organization and Architecture”.

Co-requisite: A course on “Operating Systems”.

Course Objectives:

- To provide an understanding of the design aspects of operating system concepts through simulation
- Introduce basic Unix commands, system call interface for process management, interprocess communication and I/O in Unix

Course Outcomes:

- Simulate and implement operating system concepts such as scheduling, deadlock management, file management and memory management.
- Able to implement C programs using Unix system calls

List of Experiments:

1. Write C programs to simulate the following CPU Scheduling algorithms a) FCFS b) SJF c) RoundRobin d) priority
2. Write programs using the I/O system calls of UNIX/LINUX operating system (open, read, write, close,fcntl, seek, stat, opendir, readdir)
3. Write a C program to simulate Bankers Algorithm for Deadlock Avoidance and Prevention.
4. Write a C program to implement the Producer – Consumer problem using semaphores using UNIX/LINUX system calls.
5. Write C programs to illustrate the following IPC mechanisms a) Pipes b) FIFOs c) Message Queues d) Shared Memory
6. Write C programs to simulate the following memory management techniques a) Paging b) Segmentation
7. Write C programs to simulate Page replacement policies a) FCFS b) LRU c) Optimal

TEXT BOOKS:

1. Operating System Principles- Abraham Silberchatz, Peter B. Galvin, Greg Gagne 7th Edition, John Wiley
2. Advanced programming in the Unix environment, W.R.Stevens, Pearson education.

REFERENCE BOOKS:

1. Operating Systems – Internals and Design Principles, William Stallings, Fifth Edition–2005, Pearson Education/PHI
2. Operating System - A Design Approach-Crowley, TMH.
3. Modern Operating Systems, Andrew S Tanenbaum, 2nd edition, Pearson/PHI
4. UNIX Programming Environment, Kernighan and Pike, PHI/Pearson Education
5. UNIX Internals: The New Frontiers, U. Vahalia, Pearson Education

CO- PO, PSO Mapping															
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COs	Programme Outcomes (POs)											PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	1									2	1		
CO2	2	2										2	2		
CO3	1	2										1	1		

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. IV Semester		
Code: C0B23	Number Theory CSE (Cyber Security)	L	T	P
Credits: 4		3	-	-

Pre-requisite: Basics of Number theory

Course Objectives:

1. To learn linear Diophantine equation and Fundamental theorem of Arithmetic
2. To learn linear congruence and applications of congruence
3. To learn Arithmetic functions
4. To learn primitive roots and determination of integers having primitive roots
5. To learn Quadratic Congruences and Quadratic Reciprocity Law

MODULE-I: Divisibility [12 Periods]

Greatest Common divisor, Least common multiple, linear Diophantine equation
Fundamental theorem of Arithmetic, Some questions regarding primes.

Module -II: Congruences [12 Periods]

Definition, Residue system, tests of divisibility, linear congruences, solving polynomial congruences,
An application of congruences to Diophantine equations.

Module -III: Arithmetic Functions [12 Periods]

The function τ and, The Mobius function, Multiplicative Arithmetic functions, Inversion formula,
Greatest integer function

Module -IV: Primitive Roots [12 Periods]

Exponents, Primitive roots modulo a prime, determination of integers having primitive roots, Indices.

Module -V: Quadratic Congruences and Quadratic Reciprocity Law [12 Periods]

Euler's criterion, Legendre symbol and its properties, Gauss lemma, Quadratic reciprocity law, some
applications of quadratic reciprocity, Jacobi symbol.

Text Books.

1. Burton, David M. Elementary number theory. Second edition. *W. C. Brown Publishers*, Dubuque, IA, 1989.
2. S B Malik Basic Number theory Second revised edition, Vikas publishing house pvt. Ltd.

Reference Books:

1. Baker, Alan. A concise introduction to the theory of numbers. Cambridge University Press, Cambridge, 1984.
2. Silverman, Joseph. A friendly introduction to number theory, 4th edition, Pearson Education, Inc., 2012.

E Resources

a) Concerned Website links

1. https://www.youtube.com/watch?v=19SW3P_PRHQ
2. <https://www.youtube.com/watch?v=qvxKlbdRUyM>

b) Concerned Journals/Magazines links

1. <https://www.journals.elsevier.com/journal-of-number-theory/most-downloaded-articles>

2. [https://www.journals.elsevier.com/journal-of-number-theory#:~:text=this%20field...-The%20Journal%20of%20Number%20Theory%20\(JNT\)%20features%20selected%20research%20articles,original%20research%20in%20this%20field.](https://www.journals.elsevier.com/journal-of-number-theory#:~:text=this%20field...-The%20Journal%20of%20Number%20Theory%20(JNT)%20features%20selected%20research%20articles,original%20research%20in%20this%20field.)

c) NPTEL Videos

1. <https://nptel.ac.in/courses/111/103/111103020/>
2. <https://nptel.ac.in/courses/111/101/111101137/>

Course Outcomes:

At the end of the course Student can able to

1. Understand linear Diophantine equation and Fundamental theorem of Arithmetic
2. Apply linear congruence and applications of congruence
3. Understand Arithmetic functions
4. Find primitive roots and determination of integers having primitive roots
5. Understand Quadratic Congruences, Quadratic Reciprocity Law and applications

CO- PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COs	Programme Outcomes (POs)												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1															
CO2															
CO3															
CO4															
CO5															

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. IV Semester		
Code: C6201	Computer Networks	L	T	P
Credits: 3		3	-	-

Course Objectives:

This course provides students to understand the fundamental concepts of computer networking and communications make use of IEEE standards in the construction of LAN, build the skills of sub netting and super netting, explain the concepts of protocols of Transport Layer, QoS and Congestion control mechanisms and demonstrate different protocols of Application Layer.

MODULE I: Basics of Networking and Physical layer [10 Periods] Basics of Networking - Components – Direction of Data flow – Networks – Components and Categories – Types of Connections – Topologies – Protocols and Standards – ISO / OSI model, TCP/IP model. **Physical layer** - Digital transmission, Multiplexing, Transmission Media, Switching, Circuit Switched Networks, Datagram Networks, Virtual Circuit Networks.

MODULE II: Datalink layer [11 Periods] Functionalities of Data link layer - Introduction, Framing, Error Detection and Correction – Parity– LRC – CRC- Hamming code, Flow and Error Control, Noiseless Channels, Noisy Channels, HDLC, Point to Point Protocols. Random access, Controlled access, Channelization, Collision Free Protocols.

LAN - LAN - Ethernet IEEE 802.3 - IEEE 802.4 - IEEE 802.5 - IEEE 802.11

MODULE III: Network Layer

[09 Periods]

A: Basics of Network Layer - Logical Addressing, Internetworking, Tunneling, Address mapping,

B: Communication Protocols-ICMP, IGMP, Forwarding, Uni cast Routing Protocols, Multicast Routing Protocols.

MODULE IV: Transport Layer [09 Periods] Connection Oriented and Connectionless Protocols -Process to Process Delivery, UDP and TCP protocols, SCTP.

Congestion Control - Data Traffic, Congestion, Congestion Control, QoS, Integrated Services, Differentiated Services, QoS in Switched Networks.

MODULE V: Application layer [09 Periods] DNS –Domain name space, DNS in internet, Electronic mail

Protocols and Network Security - FTP, WWW, HTTP, SNMP, Network Security, Cryptography.

TEXT BOOKS:

1. Behrouz A. Forouzan, “**Data Communications and Networking**”, 4th Edition, TMH, 2006.
2. Andrew S. Tanenbaum, “**Computer Networks**”, 4th Edition, Pearson Education/PHI.

REFERENCES:

1. P.C. Gupta, “**Data communications and computer Networks**”, PHI.
2. S. Keshav, “**An Engineering Approach to Computer Networks**”, 2nd Edition, Pearson Education.
3. W.A. Shay, “**Understanding communications and Networks**”, 3rd Edition, Cengage Learning.
4. James F. Kurose & Keith W. Ross, “**Computer Networking: A Top-Down Approach Featuring the Internet**”, 3rd Edition, Pearson Education.

E-RESOURCES:

1. [https://www.saylor.org/site/wp-content/uploads/2012/02/Computer-Networking- Principles- Bonaventure-1-30-31-OTC1.pdf](https://www.saylor.org/site/wp-content/uploads/2012/02/Computer-Networking-Principles-Bonaventure-1-30-31-OTC1.pdf)
2. <http://ebook-dl.com/downloadbook/230>
3. [https://doi.org/10.1016/0169-7552\(89\)90019-6](https://doi.org/10.1016/0169-7552(89)90019-6)
4. <http://nptel.ac.in/courses/106105081/>

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

1. **Understand** the Layered Architecture of Computer Networks.
2. **Conceptualize** the protocols of Data Link Layer and can build Local area networks.
3. **Apply** Subnet and Supernet concepts in the construction of computer network.
4. **Summarize** the protocols used in Transport Layer, QoS and Congestion control mechanisms.
5. **Analyze** different protocols of Application Layer and various security risks.

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. IV Semester		
Code: C0515	Database Management Systems (Common for CSE, CSE (Cyber Security), CSE (AI and ML), CSE (DS), CSE (IOT) and IT)	L	T	P
Credits: 3		3	-	-

Prerequisites

1. A course on “Data Structures”

The purpose of learning this course is to:

1. To understand the basic concepts and the applications of database systems and Conceive the database design process through ER Model and Relational Model
2. Design Logical Database Schema and mapping it to implementation level schema through Database Language Features
3. Familiarize queries using Structure Query Language (SQL) and PL/SQL and Improvement of the database design using normalization criteria and optimize queries
4. Understand the practical problems of concurrency control and gain knowledge about failures and recovery.
5. Understand with database storage structures and access techniques

MODULE I: Introduction:

[10 Periods]

What is Database Management System, Advantage of DBMS over File Processing System, Introduction and applications of DBMS, Purpose of database system, Views of data, Database system Architecture, Data Independence, The evolution of Data Models, Levels of Data Abstraction in DBMS, Database Users and DBA, Database Languages,

Introduction to Database design: Database Design, Design process, Entity Relation Model, ER diagram, Entities, Attributes, and Entity Sets, Relationships and Relationship Sets, Keys and Constraints, Mapping Cardinality, Extended ER - Generalization, Specialization and Aggregation, ER Diagram Issues, Weak Entity, Conceptual Design with the ER Model.

MODULE II:

[09 Periods]

Introduction to the Relational Model: *Relational Model, Conversion of ER to Relational Table.* Structure Creation, alteration. Integrity constraint over relations, enforcing integrity constraints - Defining Constraints- Primary Key, Foreign Key, Unique, not null, check. introduction to views, destroying/altering tables and views. Transaction Control Commands, Commit, Rollback, Save point.

Relational Algebra – Fundamental Operators and syntax, relational algebra queries, Tuple relational calculus.

MODULE III:

[10 Periods]

SQL Queries: form of basic SQL query, set operations: UNION, INTERSECT, and EXCEPT, Sub Queries, correlated sub queries, Nested Queries, aggregation, IN, ANY, ALL operators, NULL values, complex integrity constraints in SQL.

PL/SQL Concepts- Cursors, Stored Procedure, Functions Triggers and Exceptional Handling.

Schema Refinement and Normal Forms: schema refinement: Pitfalls in Relational database, decomposing bad schema, Functional Dependency – definition, trivial and non-trivial FD, closure of FD set, closure of attributes, irreducible set of FD, Normalization – 1NF, 2NF, 3NF, Decomposition using FD- dependency preservation, BCNF, Multi- valued dependency, 4NF, Join dependency and 5NF.

MODULE IV: Transaction Management and Concurrency Control:

[10 Periods]

Transaction Concept, Transaction State, Implementation of Atomicity and Durability, Concurrent Executions, Serializability, Recoverability, Implementation of Isolation, Testing for serializability, Lock Based Protocols, Timestamp Based Protocols, Validation- Based Protocols, Multiple Granularity, Recovery and Atomicity, Log-Based Recovery, Recovery with Concurrent Transactions, Deadlock

Data on External Storage, File Organization and Indexing, Cluster Indexes, Primary and Secondary Indexes, Index data Structures, Hash Based Indexing, Tree base Indexing, Comparison of File Organizations, Indexes and Performance Tuning, Intuitions for tree Indexes, Indexed Sequential Access Methods (ISAM), B+ Trees: A Dynamic Index Structure.

TEXT BOOKS:

1. Data base Management Systems, Raghu Rama krishnan, Johannes Gehrke, McGraw Hill Education (India) Private Limited, 6th edition, 2010.
2. Database Systems, 6th edition, R Elmasri, Shamkant,B.Navathe, Pearson Education, 7th edition, 2013

REFERENCES:

1. Data base System Concepts, A. Silberschatz, Henry. F. Korth, S. Sudarshan, McGraw Hill Education(India) Private Limited 1, 6th edition, 2011.
2. Database Systems design, Implementation, and Management, Peter Rob & Carlos Coronel, 7th Edition.
3. SQL The Complete Reference, James R. Groff, Paul N. Weinberg, 3rd Edition,
4. Oracle for Professionals, The X Team, S.Shah and V. Shah, SPD.
5. Database Systems Using Oracle: A Simplified guide to SQL and PL/SQL,Shah,PHI.

E-RESOURCES:

1. <https://kakeboksen.td.org.uit.no/Database%20System%20Concepts%206th%20edition.pdf>
2. <http://agce.sets.edu.in/cse/ebook/DBMS%20BY%20RAGHU%20RAMAKRISHNAN.pdf>
3. <http://aircse.org/journal/ijdms/ijdms.html>
4. <http://www.springer.com/computer/database+management+%26+information+retri+eval?SGWID=0-153-12-114576-0>
5. <http://textofvideo.nptel.iitm.ac.in/video.php?courseId=106106093>
6. <http://www.nptelvideos.in/2012/11/database-management-system.html>

Course Outcomes:

1. Gain knowledge of fundamentals of DBMS, database design and normal forms and apply the fundamentals of data models to model an application’s data requirements using conceptual modeling tools like ER diagrams
2. Apply the method to convert the ER model to a database schema based on the conceptual relational model
3. Apply the knowledge to create, store and retrieve data using Structure Query Language (SQL) and PL/SQL and apply the knowledge to improve database design using various normalization criteria and optimize queries
4. Appreciate the fundamental concepts of transaction processing- concurrency control techniques and recovery procedures.
5. Familiarity with database storage structures and access techniques

CO- PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COs	Programme Outcomes (POs)												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2			3				2		3	3	3	
CO2	3	3	3			3				3		3	3	3	
CO3	3	3	3			2				3		2	3	3	
CO4	3	2	1			1				1		1			
CO5	3	1	1			1						1			

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. IV Semester		
Code: C1202	Web Technologies (Common for CSE, CSE (Cyber Security), CSE (AI and ML), CSE (DS), CSE (IOT) and IT)	L	T	P
Credits: 3		3	-	-

Objectives

1. To introduce PHP language for server side scripting
2. To introduce XML and processing of XML Data with Java
3. To introduce Server side programming with Java Servlets and JSP
4. To introduce Client side scripting with Javascript and AJAX.

MODULE I:

[10 Periods]

Introduction to PHP: Declaring variables, data types, arrays, strings, operators, expressions, control structures, functions, Reading data from web form controls like text boxes, radio buttons, lists etc., Handling File Uploads. Connecting to database (MySQL as reference), executing simple queries, handling results, Handling sessions and cookies.

File Handling in PHP: File operations like opening, closing, reading, writing, appending, deleting etc. on text and binary files, listing directories.

MODULE II:

[09 Periods]

HTML Common tags- List, Tables, images, forms, Frames; Cascading Style sheets;

XML: Introduction to XML, Defining XML tags, their attributes and values, Document Type Definition, XML Schemes, Document Object Model, XHTML Parsing XML Data – DOM and SAX Parsers in java.

MODULE III:

[10 Periods]

Introduction to Servlets: Common Gateway Interface (CGI), Life cycle of a Servlet, deploying a servlet, The Servlet API, Reading Servlet parameters, Reading Initialization parameters, Handling Http Request & Responses, Using Cookies and Sessions, connecting to a database using JDBC.

MODULE IV:

[10 Periods]

Introduction to JSP: The Anatomy of a JSP Page, JSP Processing, Declarations, Directives, Expressions, Code Snippets, implicit objects, Using Beans in JSP Pages, Using Cookies and session for session tracking, connecting to database in JSP.

MODULE V:

[09 Periods]

Client side Scripting: Introduction to Javascript, Javascript language – declaring variables, scope of variables, functions. event handlers (onclick, on submit etc.), Document Object Model, Form validation.

TEXT BOOKS:

1. Web Technologies, Uttam K Roy, Oxford University Press
2. The Complete Reference PHP — Steven Holzner, Tata McGraw-Hill

REFERENCES:

1. Web Programming, building internet applications, Chris Bates, 2nd Edition, Wiley Dreamtech
2. Java Server Pages, Hans Bergsten, SPD O'Reilly,
3. Java Script, D. Flanagan, 6th Edition, O'Reilly Media.
4. Beginning Web Programming-Jon Duckett WROX.
5. Programming world wide web, R.W.Sebesta, 4th Edition, Pearson.
6. Internet and World Wide Web — How to program, Dietel and Nieto, Pearson.

E-RESOURCES:

1. <https://kakeboksen.td.org.uit.no/Database%20System%20Concepts%206th%20edition.pdf>
2. <http://agce.sets.edu.in/cse/ebook/DBMS%20BY%20RAGHU%20RAMAKRISHNAN.pdf>
3. <http://airccse.org/journal/ijdms/ijdms.html>

4. <http://www.springer.com/computer/database+management+%26+information+retrieval?SGWID=0-153-12-114576-0>
5. <http://textofvideo.nptel.iitm.ac.in/video.php?courseId=106106093>
6. <http://www.nptelvideos.in/2012/11/database-management-system.html>

Outcomes

1. Gain knowledge of client side scripting, validation of forms and AJAX programming
2. Have understanding of server side scripting with PHP language
3. Have understanding of what is XML and how to parse and use XML Data with Java
4. To introduce Server side programming with Java Servlets and JSP

CO- PO, PSO Mapping															
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COs	Programme Outcomes (POs)												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2			3				2		3	3	3	
CO2	3	3	3			3				3		3	3	3	
CO3	3	3	3			2				3		2	3	3	
CO4	3	2	1			1				1		1			
CO5	3	1	1			1						1			

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. IV Semester		
Code: C6601	Fundamentals of Artificial Intelligence [Professional Elective - I] (Common for CSE, CSE (Cyber Security), CSE (AI and ML), CSE (DS), CSE (IOT) and IT)	L	T	P
Credits: 3		3	-	-

PRE-REQUISITES

- Basic Programming in Python
- Data Structures

OBJECTIVES

Artificial Intelligence is a major step forward in how computer system adapts, evolves and learns. It has widespread application in almost every industry and is considered to be a big technological shift, similar in scale to past events such as the industrial revolution, the computer age, and the smart phone revolution.

This course will give an opportunity to gain expertise in one of the most fascinating and fastest growing areas of Computer Science through classroom program that covers fascinating and compelling topics related to human intelligence and its applications in industry, defence, healthcare, agriculture and many other areas. This course will give the students a rigorous, advanced and professional graduate-level foundation in Artificial Intelligence.

LEARNING OUTCOMES

After undergoing this course, the students will be able to:

- Build intelligent agents for search and games.
- Solve AI problems through programming with Python.
- Learning optimization and inference algorithms for model learning.
- Design and develop programs for an agent to learn and act in a structured environment.

DETAIL CONTENTS

1. Introduction

[9 Hours]

Concept of AI, history, current status, scope, agents, environments, Problem Formulations, Review of tree and graph structures, State space representation, Search graph and Search tree.

2. Search Algorithms

[10 Hours]

Random search, Search with closed and open list, Depth first and Breadth first search, Heuristic search, Best first search, A* algorithm, Game Search.

3. Probabilistic Reasoning

[10 Hours]

Probability, conditional probability, Bayes Rule, Bayesian Networks- representation, construction and inference, temporal model, hidden Markov model.

4. Markov Decision process

[10 Hours]

MDP formulation, utility theory, utility functions, value iteration, policy iteration and partially observable MDPs.

5. Reinforcement Learning

[9 Hours]

Passive reinforcement learning, direct utility estimation, adaptive dynamic programming, temporal difference learning, active reinforcement learning- Q learning.

LIST OF SUGGESTED BOOKS

1. Stuart Russell and Peter Norvig, "Artificial Intelligence: A Modern Approach", 3rd Edition, Prentice Hall
2. Elaine Rich and Kevin Knight, "Artificial Intelligence", Tata McGraw Hill
3. Trivedi, M.C., "A Classical Approach to Artificial Intelligence", Khanna Publishing House, Delhi.
4. Saroj Kaushik, "Artificial Intelligence", Cengage Learning India, 2011
5. David Poole and Alan Mackworth, "Artificial Intelligence: Foundations for Computational Agents", Cambridge University Press 2010.

WEBSITES FOR REFERENCE<https://nptel.ac.in/courses/106105077><https://nptel.ac.in/courses/106106126><https://aima.cs.berkeley.edu>https://ai.berkeley.edu/project_overview.html (for Practicals)

CO- PO, PSO Mapping															
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COs	Programme Outcomes (POs)												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	-	-												
CO2	-	2	2										1	2	
CO3	2	2	2	3											
CO4	2	2	2	2										2	2
CO5	1	2													

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. IV Semester		
Code: C0519	Database Management Systems Lab (Common for CSE, CSE (Cyber Security), CSE (AI and ML), CSE (DS), CSE (IOT), AI and IT)	L	T	P
Credits: 1		-	-	2

Co-requisites: “Database Management Systems”

Course Objectives:

- Introduce ER data model, database design and normalization
- Learn SQL basics for data definition and data manipulation

Course Outcomes:

- Design database schema for a given application and apply normalization
- Acquire skills in using SQL commands for data definition and data manipulation.
- Develop solutions for database applications using procedures, cursors and triggers

List of Experiments:

1. Concept design with E-R Model
2. Relational Model
3. Normalization
4. Practicing DDL commands
5. Practicing DML commands
6. A. Querying (using ANY, ALL, UNION, INTERSECT, JOIN, Constraints etc.)
B. Nested, Correlated subqueries
7. Queries using Aggregate functions, GROUP BY, HAVING and Creation and dropping of Views.
8. Triggers (Creation of insert trigger, delete trigger, update trigger)
9. Procedures
10. Usage of Cursors

TEXT BOOKS:

1. Database Management Systems, Raghurama Krishnan, Johannes Gehrke, Tata Mc Graw Hill, 3rd Edition
2. Database System Concepts, Silberschatz, Korth, McGraw Hill, V edition.

REFERENCE BOOKS:

1. Database Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7th Edition.
2. Fundamentals of Database Systems, Elmasri Navrate, Pearson Education
3. Introduction to Database Systems, C.J. Date, Pearson Education
4. Oracle for Professionals, The X Team, S. Shah and V. Shah, SPD.
5. Database Systems Using Oracle: A Simplified guide to SQL and PL/SQL, Shah, PHI.
6. Fundamentals of Database Management Systems, M. L. Gillenson, Wiley Student Edition.

CO- PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COs	Programme Outcomes (POs)												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	-	-												
CO2	-	2	2										1	2	
CO3	2	2	2	3										2	2

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. IV Semester		
Code: C1203	Web Technologies Lab (Common for CSE, CSE (Cyber Security), CSE (AI and ML), CSE (DS), CSE (IOT) and IT)	L	T	P
Credits: 1.5		-	-	3

Pre-requisites

A Course on “Objected Oriented Programming”

Software Requirements: JDK, ZAMP

Course Objectives:

1. To provide hands-on experience on web technologies
2. To develop client-server application using web technologies
3. To introduce server side programming with Java servlets and JSP

Experiments:

1. Write a PHP script to print prime numbers between 1-50.
2. Write a PHP script to
 - a. Find the length of a string.
 - b. Count no of words in a string.
3. Write a PHP script to
 - a. Reverse a string.
 - b. Search for a specific string.
4. Write a PHP script to merge two arrays and sort them as numbers, in descending order.
5. Write a PHP script that reads data from one file and write into another file.
6. Develop static pages (using Only HTML) of an online book store. The pages should resemble: www.amazon.com. The website should consist the following pages.
 - a) Home page
 - b) Registration and user Login
 - c) User Profile Page
 - d) Books catalog
 - e) Shopping Cart
 - f) Payment By credit card
 - g) Order Conformation
7. Validate the Registration, user login, user profile and payment by credit card pages using JavaScript.
8. Create and save an XML document on the server, which contains 10 users information.
9. Write a program, which takes User Id as an input and returns the user details by taking the user information from the XML document.
10. Install TOMCAT web server. Convert the static web pages of assignments 2 into dynamic web pages using servlets and cookies. Hint: Users information (user id, password, credit card number) would be stored in web.xml. Each user should have a separate Shopping Cart.
11. Redo the previous task using JSP by converting the static web pages of assignments 2 into dynamic web pages.
12. Create a database with user information and books information. The books catalogue should be dynamically loaded from the database. Follow the MVC architecture while doing the website.

Textbooks:

1. WEB TECHNOLOGIES: A Computer Science Perspective, Jeffrey C. Jackson, Pearson Education

References:

1. Deitel H.M. and Deitel P.J., “Internet and World Wide Web How to program”, Pearson International, 2012, 4th Edition.
2. J2EE: The complete Reference By James Keogh, McGraw-Hill
3. Bai and Ekedhi, The Web Warrior Guide to Web Programming, Thomson
4. Compiler Construction, Loudon, Thomson.
5. Web technologies, Black Book, Dreamtech press.
6. Gopalan N.P. and Akilandeswari J., “Web Technology”, Prentice Hall of India.

Outcomes:

1. Design and develop interactive and dynamic web applications using HTML, CSS, JavaScript andXML
2. Apply client-server principles to develop scalable and enterprise web applications.

CO- PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COs	Programme Outcomes (POs)												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	-	-												
CO2	-	2	2										1	2	
CO3	2	2	2	3										2	2

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. IV Semester		
Code: C6202	COMPUTER NETWORKS LAB	L	T	P
Credits: 1.5		-	-	3

Prerequisites: NIL

Course Objectives:

This course provides students to understand the fundamental concepts of computer networking and communications make use of IEEE standards in the construction of LAN, build the skills of subnetting and supernetting, explain the concepts of protocols of Transport Layer, QoS and Congestion control mechanisms and demonstrate different protocols of Application Layer.

Software Requirements: Turbo C / C++

List of Programs:

1. Implement the data link layer framing methods:
 - a) Character Count
 - b) Character stuffing and destuffing.
 - c) Bit stuffing and destuffing
2. Implement on a data set of characters the three CRC polynomials: CRC-12, CRC-16 and CRC-32.
3. Implement Parity Check using the following techniques
 - a) Single Dimensional Data
 - b) Multi Dimensional Data
4. Implement the Even and Odd parity.
5. Implementation of Data Link Protocols
 - a) Unrestricted Simplex Protocol
 - b) Stop and wait Protocol
 - c) Noisy Channel
6. Implementation of Sliding Window Protocols
 - a) One bit sliding window protocol
 - b) Go Back N sliding window protocol
 - c) Selective Repeat sliding window protocol
7. Write a code simulating ARP /RARP protocols
8. Implementation of Routing Protocols
 - a) Dijkstra's algorithm
 - b) Distance Vector routing protocol
 - c) Link State routing protocol
9. Implement the congestion algorithms
 - a) Token bucket algorithm
 - b) Leaky bucket algorithm
10. Implement DES algorithm.
11. Implement RSA algorithm.
12. Write a program to implement client-server application using TCP

TEXTBOOKS:

1. Behrouz A. Forouzan, “**Data Communications and Networking**”, 4th Edition, TMH, 2006.
2. Andrew S Tanenbaum, “**Computer Networks**”, 4th Edition, Pearson Education/PHI.

REFERENCES:

1. P.C .Gupta, “**Data communications and computer Networks**”, PHI.
2. S.Keshav, “**An Engineering Approach to Computer Networks**”, 2nd Edition, Pearson Education.
3. W.A. Shay, “**Understanding communications and Networks**”, 3rd Edition, Cengage Learning.

Course Outcomes:

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

1. **Implement** the various protocols.
2. **Analyze** various Congestion control mechanisms.
3. **Implement** encryption mechanisms using Symmetric Key and Asymmetric Key algorithms.

CO- PO, PSO Mapping															
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COs	Programme Outcomes(POs)												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2		3		2	2	2						2	2	2
CO2	3	3			2	2	1							2	2
CO3	2			1	2	2	2						2	2	2

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. IV Semester		
Code: C00M2	Environmental Science (Common for CE, EEE, ME, ECE, MiE, CSE, CSE (Cyber Security), CSE (AI and ML), CSE (DS), CSE (IOT) and IT)	L	T	P
Credits: NIL		2	-	-

Pre-Requisites: NIL

Objectives

1. Creating the awareness about environmental problems among students.
2. Imparting basic knowledge about the environment and its allied problems.
3. Developing an attitude of concern for the environment.
4. Motivating students to participate in environment protection and environment improvement.

Outcomes

At the end of the course, it is expected that students will be able to:

1. Identify and analyze environmental problems as well as the risks associated with these problems
2. Understand what it is to be a steward in the environment
3. Studying how to live their lives in a more sustainable manner

UNIT – I: MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES:

Definition, Scope and Importance – Need for Public Awareness.

NATURAL RESOURCES: Renewable and non-renewable resources – Natural resources and associated problems – Forest resources – Use and over – exploitation, deforestation, case studies – Timber extraction – Mining, dams and other effects on forest and tribal people – Water resources – Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams– benefits and problems - Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.

UNIT – II : ECOSYSTEMS:

Concept of an ecosystem. - Structure and function of an ecosystem. - Producers, consumers and decomposers. - Energy flow in the ecosystem - Ecological succession. – Food chains, food webs and ecological pyramids. - Introduction, types, characteristic features, structure and function of the following ecosystem:

- a. Forest ecosystem
- b. Grassland ecosystem
- c. Desert ecosystem
- d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

UNIT – III: BIODIVERSITY AND ITS CONSERVATION:

Introduction - Definition: genetic, species and ecosystem diversity. - Bio-geographical classification of India - Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values - . Biodiversity at global, National and local levels. - . India as a mega-diversity nation - Hot-spots of biodiversity - Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts. - Endangered and endemic species of India – Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT – IV

Environmental Pollution and control:

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. 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: SOCIAL ISSUES AND THE ENVIRONMENT:

From Unsustainable to Sustainable development- Urban problems related to energy -Water conservation, rain water harvesting, watershed management - Resettlement and rehabilitation of people; its problems and concerns. Case Studies -

Environmental ethics:

Issues and possible solutions. -Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies -Wasteland reclamation. –Consumerism and waste products. - Environment Protection Act. -Air (Prevention and Control of Pollution) Act. -Water(Prevention and control of Pollution) Act -Wildlife Protection Act -Forest Conservation Act -Issues involved in enforcement of environmental legislation. -Public awareness.

HUMAN POPULATION AND THE ENVIRONMENT: Population growth, variation among nations. Population explosion - Family Welfare Programme. -Environment and human health. -Human Rights. -Value Education. -HIV/AIDS. -Women and Child Welfare. -Role of information Technology in Environment and human health. –Case Studies.

Textbooks:

1. Textbook of Environmental Studies for Undergraduate Courses by ErachBharucha for University Grants Commission., Universities Press
2. Environmental Studies by R. Rajagopalan, Oxford University Press.

References:

1. Textbook of Environmental Sciences and Technology by M. Anji Reddy, BS Publication.

CO- PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COS	Programme Outcomes (POs)												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	-	-												
CO2	-	2	2										1	2	
CO3	2	2	2	3											
CO4	2	2	2	2										2	2
CO5	1	2													