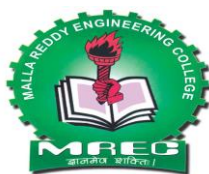# ACADEMIC REGULATIONS, COURSE STRUCTURE AND DETAILED SYLLABUS

Effective from the Academic Year 2021-22 onwards

Department of CSE with Cyber Security

For

B.Tech. - Four Year Degree Programme
(MR21 Regulations)

Department of CSE with Cyber Security
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 by NAAC with 'A' Grade (II Cycle) and NBA
Maisammaguda, Dhulapally (Post ViaKompally), Secunderabad - 500 100.
Website: www.mrec.ac.in   E-mail: principal@mrec.ac.in

MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)
MR21 – ACADEMIC REGULATIONS (CBCS)
for B.Tech. (REGULAR) DEGREE PROGRAMME

Applicable for the students of B.Tech. (Regular) programme admitted from the Academic Year *2021-22* onwards

The B.Tech. Degree of Jawaharlal Nehru Technological University Hyderabad, Hyderabad shall be conferred on candidates who are admitted to the programme and who fulfill all the requirements for the award of the Degree.

VISION

To be a premier center of professional education and research, offering quality programs in a socio-economic and ethical ambience.

MISSION

- To impart knowledge of advanced technologies using state-of-the-art infrastructural facilities.

- To inculcate innovation and best practices in education, training and research.

- To meet changing socio-economic needs in an ethical ambience.

DEPARTMENT VISION

- To attain global standards in Computer Science and Engineering education, training and research to meet the growing needs of the industry with socio-economic and ethical considerations.

DEPARTMENT MISSION

- To impart quality education and research to undergraduate and postgraduate students in Computer Science and Engineering.

- To encourage innovation and best practices in Computer Science and Engineering utilizing state-of-the-art facilities.

- To develop entrepreneurial spirit and knowledge of emerging technologies based on ethical values and social relevance.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEO 1: To impart with a sound knowledge in scientific and engineering technologies necessary to formulate, analyze, design and implement solutions to computer technology related problems.

PEO2: To carry out research in frontier areas of computer science and engineering with the capacity to learn independently throughout life to develop new technologies.

PEO3: To train to exhibit technical, communication and project management skills in their profession and follow ethical practices.

PEO4: To posses leadership and team working skills to become a visionary and an inspirational leader and entrepreneur.

PROGRAMME SPECIFIC OUTCOMES (PSOs)

PSO1: Understand the problem and apply design and analysis tools to find solution in the domains of Structural, thermal and Fluid Mechanics.

PSO2: Engage professionally in industries or as an entrepreneur by applying Manufacturing concepts.

PSO3: Systemize the Engineering and manufacturing practices using TQM concepts and Optimization techniques.

PROGRAMME OUTCOMES (POs)

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

1. **Malla Reddy Engineering College (Autonomous) (MREC-A)** 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	06	Information Technology (IT)	60
7	07	Computer Science and Engineering (Cyber Security)	180
8	08	Computer Science and Engineering (Data Science)	180
9	09	Computer Science and Engineering (AI &ML)	180
10	12	Computer Science and Engineering (IOT)	60
11	25	Mining Engineering (Min.E)	60
12		Artificial Intelligence and Machine Learning	60

2. Eligibility for Admission

2.1 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.

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

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

3.1 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*.

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

3.2.1 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.

3.2.2 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 ofPractical'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.

3.2.3 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).
  -

3.2.4 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	These courses are non-credit courses	-	-

		Courses	without evaluation.		
		Total credits for B.Tech. Programme			**160**

4.0 Course Registration

4.1 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.

4.2 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*.

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

4.4 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.

4.5 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.

4.6 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.

4.7 **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.

4.8 **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.

4.9 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.

4.10 For Mandatory Courses, a '**Satisfactory / Not Satisfactory' grade** is awarded based on the

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performance in both CIE and SEE.

5.0 Subjects/ Courses to be offered

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

5.2 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.

5.3 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).

5.4 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.

6.0 Attendance Requirements:

6.1 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.

6.2 Condoning of shortage of attendance in aggregate up to 10%($>= 65\%$ 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.

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

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

6.5 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.

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

7.0 Academic Requirements:

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

7.1 A student 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.

7.2 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.

7.3 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)	• 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)	• 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)	• 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)	• 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)	• 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)	• 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)	• Regular course of study of fourth year first semester (VII Semester).

7.4 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.

7.5 After securing the necessary 160 credits as specified for the successful completion of the B.Tech Programme, the student can avail exemption of two subjects up to 6 credits, that is, one open elective and one professional elective subject or two professional elective/open electives subjects for optional drop out from these 160 credits earned; resulting in 154 credits for B.Tech Programmeperformance evaluation, i.e., the performance of the student in these 154 credits shall alone be taken into account for the calculation of the final CGPA (at the end of B.Tech Programme, which takes the SGPA of the IV year II semester into account) and shall be indicated in the grade card of IV year II semester. However, the performance of student in the earlier individual semesters, with the corresponding SGPA and CGPA for which grade cards have already been given will not be altered.

7.6 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 to7.5.

7.7 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.

7.8 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.

7.9 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, Practicals, 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.

8.2 Theory Courses:

8.2.1 Continuous Internal Evaluation (CIE):

CIE shall be carried out for all courses of B.Tech Programmetwice 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.

8.2.2 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

8.3 Practical Courses:

8.3.1 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.

8.3.2 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.

8.4   Engineering Graphics:

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 Graphics				
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 Graphics			
Type of Questions	No. of Questions	Marks per Question	Total

Internal choice questions (Module-wise)	5	14	70

8.5 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

8.6 Projects:

8.6.1 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 Projectand award appropriate Grade, based on the report submitted to the department and presentation provided by the student in front of the committee.

8.6.2 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.

8.6.3 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.

8.7 Non-Credit Courses:

8.7.1 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.

8.7.2 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.

9.0 Grading Procedure

9.1 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.

9.2 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

9.3 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.

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

9.5 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).

9.6 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

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

9.8 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

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

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 ithsubject and represents the Grade Points (GP)corresponding to the Letter Grade awarded for that ithsubject.

9.9 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.

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

(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 jthsubject, and represents the Grade Points (GP) corresponding to the Letter Grade awarded for that jthsubject. 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 x 6 = 18
Course 5	3	A+	9	3 x 9 = 27
Course 6	1.5	B	6	1.5 x 6 = 09
Course 7	1.5	A	8	1.5 x 8 = 12
Course 8	2	A	8	2 x 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 X 7 = 147
Semester II	19	6	19 X 6 = 114
Semester III	22	6.5	22 X 6.5 = 143
Semester IV	20	6	20 X6 = 120
Semester V	22	5.75	22 X 5.75 = 126.5
Semester VI	18	7.25	18 X 7.25 = 130.5
Semester VII	18	8	18 X 8 = 144
Semester VIII	20	8.5	20 X 8.5 = 170
	160		1095

CGPA = 1095/160 = 6.84

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

9.11 For calculations listed in 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.

9.12 Passing Standards:

9.12.2 A student shall be declared successful or 'passed' in a semester, only when he / she gets a SGPA ≥ 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 ≥ 5.00; subject to the condition that he / she secures a GP ≥ 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.

9.12.3 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.

9.12.4 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.

9.13 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

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

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

% of Marks = (final CGPA – 0.5) x 10

11   Award of Degree

11.1 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 $\geq$ 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.

11.2 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

11.3 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.

11.4 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 $\geq$ 8.00 at the end of eight sequential semesters.

11.5 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 MR15 (2016 admitted)/ MR17/MR18 regulations due to lack of attendance, shall be permitted to join I year I Semester of MR20 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 MR15/MR17/MR18 regulations for want of attendance shall be permitted to join the corresponding semester of MR20 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 MR20 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 MR15/MR 17/MR18 regulations, who has been detained due to lack of credits, shall be promoted to the next semester of MR20 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 MR20 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 MR20 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 MR20 regulations, has any subject with 80% of syllabus common with his/her previous regulations, that particular subject in MR20 regulations will be substituted by another subject to be suggested by the College Academic Committee (CAC).

Note: If a student readmitted to MR20 regulations, has not studied any subjects/topics in his/her earlier regulations of study which is prerequisite for further subjects in MR20 regulations, the departments concerned shall conduct remedial classes to cover those

subjects/topics for the benefit of the students.

14   Student Transfers

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

14.2 The students seeking transfer to MALLA REDDY ENGINEERING COLLEGE (Autonomous)-MREC(A) from various other Universities/ Institutions have to pass the failed subjects which are equivalent to the subjects of MREC(A) and also pass the subjects of MREC(A) 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(A), the students have to study those subjects in MREC(A) inspite of the fact that those subjects are repeated.

14.3 The transfer students from other Universities / Institutions to MREC(A) 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 2021-22

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. **Out of the 120 credits secured, the student can avail exemption up to 6 credits**, that is, one open elective subject and one professional elective subject or two professional elective subjects resulting in 114 credits for B.Tech. Programme performance evaluation**.**

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).

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MALPRACTICES RULES

DISCIPLINARY ACTION FOR IMPROPER CONDUCT IN EXAMINATIONS

</div>

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 relations whether by words, either spoken or written or by signs or by visible representation, assaults the officer-incharge, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which result in damage to or destruction of property in the examination hall or any part of the College campus or engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination	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 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	Expulsion from the examination hall and cancellation of the performance

	examination hall.	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 college indulges in any malpractice or improper conduct mentioned in clause 6 to 8.	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. 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. Department of CSE with Cyber Security Programme.
(MR21 Regulations - Effective from Academic Year 2021 – 22 onwards)

			SEMESTER – I				
S. No	Category	Course Code	Name of the Subject	Contact hours/week			Credits
				L	T	P	
1.	BSC	B0B01	Linear Algebra and Numerical Methods	3	1	-	4
2.	BSC	B0B17	Engineering Chemistry	3	1	-	4
3.	ESC	B0501	Programming for Problem Solving	3	-	-	3
4.	ESC	B0301	Engineering Graphics	2	-	2	3
5.	BSC	B0B09	Semiconductor Physics	3	1	-	4
6.	ESC	B0502	Programming for Problem Solving Lab	-	1	2	1.5
7.	BSC	B0B11	Applied Physics Lab	-	-	2	1
8.	BSC	B0B18	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	B0H01	English	3	-	-	3
2.	ESC	B0201	Basic Electrical and Electronics Engineering	3	-	-	3
3.	BSC	B0B02	Probability and Statistics	3	-	-	3
4.	ESC	B0504	Python Programming	3	1	-	4
5.	ESC	B0506	Python Programming Lab	-	1	2	2
6.	HSMC	B0H02	English Language and Communication Skills Lab	-	-	2	1
7.	ESC	B0202	Basic Electrical and Electronics Engineering Lab	-	-	2	1
8.	ESC	B1201	Engineering and IT Workshop	-	-	2	1.5
			Total	12	2	8	18.5
			Total Contact Hours	22			

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MR21 III SEMESTER

S. No	Category	Course Code	Course Title	L	T	P	Credits
1	PCC	B0507	Discrete Mathematics	3	-	-	3
2	PCC	B0508	Computer Organization and Architecture	3	-	-	3
3	PCC	B0509	Data Structures	3	-	-	3
4	PCC	B0510	Object Oriented Programming	3	-	-	3
5	PCC	B0511	Operating Systems	3	-	-	3
6	PCC	B0512	Data Structures Lab	-	-	3	1.5
7	PCC	B0513	Object Oriented Programming Lab	-	-	3	1.5
8	PCC	B0514	Operating Systems Lab	-	1	2	2
9	MC	B00M1	Gender Sensitization	-	-	2	-
			Total	17	1	10	20
			Total Contact Hours:		28		

MR21 IV SEMESTER

S. No	Category	Course Code	Course Title	L	T	P	Credits
1	BSC	B0B23	Number Theory	3	-	-	3
2	PCC	B6201	Computer Networks	3	-	-	3
3	PCC	B0515	Database Management Systems	3	-	-	3
4	PCC	B1202	Web Technology	3	-	-	3
		Professional Elective –I					
5	PEC-I	B0517	Mobile Application Development	3	-	-	3
		B0518	Free and Open-Source Technologies				
		B6601	Fundamentals of Artificial Intelligence				
6	PCC	B0520	Database Management Systems Lab	-	1	2	2
7	PCC	B1206	Web Technologies Lab	-	-	3	1.5
8	PCC	B6202	Computer Networks Lab	-	-	3	1.5
9	MC	B00M2	Environmental Science	3	-	-	-
			Total	17	1	11	20
			Total Contact Hours:		29		

S.No	Category	Course Code	Course Title	L	T	P	Credits
			V SEMESTER				
1	HSMC	B0H09	Management Fundamentals	3	-	-	3
2	PCC	B6203	Cryptography and network Security	3	-	-	3
3	PCC	**B6208**	Automata and Compiler Design	3	-	-	3
4	PCC	B0525	Software Engineering & Modeling	3	-	-	3
			Professional Elective –II				
5	PEC-II	B6204	Network coding Theory	3	-	-	3
		B0526	Advanced Databases Security				
		B6714	Applied Artificial Intelligence				
		B0528	Semantic Web				
		B0516	**Design and Analysis of Algorithms**				
			Professional Elective –III				
6	PEC-III	B6917	Internet of Things	3	-	-	3
		B0533	**Distributed Systems**				
		B6205	Essentials of Network Security				
		B6705	Advanced Python Programming				
		B0534	Animation Techniques				
7	PCC	B6206	Cryptography and network Security Lab	-	-	3	1.5
8	PCC	**B6218**	Automata and Compiler Design Lab	-	-	3	1.5
9	MC	B00M3	Quantitative Aptitude & Verbal Reasoning – I	2	-	-	-
			Total	**20**	**-**	**6**	**21**
			Total Contact Hours :26				

S.No	Category	Course Code	Course Title	L	T	P	Credits
VI SEMESTER						
1	HSMC	B0H08	Engineering Economics and Accountancy	3	-	-	3
2	PCC	B6209	Ethical Hacking	3	-	-	3
3	PCC	B0536	Data Mining	3	-	-	3
4			**Professional Elective -IV**				
		B6210	Internet Technologies and Services				
		B0523	Mobile Computing				
	PEC-IV	**B0527**	**Cloud Computing**	3	-	-	3
		B1208	Information Retrieval				
		B0554	Software Quality Assurance and Testing				
5			Professional Elective -V				
		B6211	Advanced wireless networks				
		B0537	Natural Language Processing				
	PEC-V	B0545	Block chain Technologies	3	-	-	3
		B6220	**Data Science for Engineers**				
		B6213	IT Security Metrics				
6	HSMC	B0H03	English Communication and Presentation Skills Lab	-	-	2	1
7	PCC	B6214	Ethical Hacking Lab	-	-	2	1
8	PCC	B0544	Data Mining Lab	-	-	3	2
9	MC	B00M4	Quantitative Aptitude and Verbal Reasoning - II	2	-	-	-
			Total	**20**	**-**	**8**	**19**
Total Contact Hours :28						

S. No	Category	Course Code	Course Title	L	T	P	Credits
VII SEMESTER							
1	PCC	B6215	Digital Forensics	3	-	-	4
2	PCC	B1210	Machine Learning	3	-	-	3
3	PCC	B6217	Cyber Security	3	-	-	3
			Professional Elective-VI				
		B6706	R Programming				
		B0550	Deep Learning				
4	PEC-VI	B0551	Social Networking	3	-	-	3
		B0552	**Human Computer Interaction**				
		B1211	Soft computing				
5	OEC-I		**Open Elective-I**				
		A1218	**Software Project Management**	3	-	-	3
6	PCC	B6216	Digital Forensics Lab	-	-	2	2
7	PCC	B1212	Machine Learning Lab	-	-	2	1
8	MC	B00P1	Mini Project / Internship		-	4	2
			Total	15		8	21

Total Contact Hours :25

S.No	Category	Course Code	Course Title	L	T	P	Credits
VIII- SEMESTER							
1	OEC-II		Open Elective-II	3			3
2	OEC-III		Open Elective-III	3	-	-	3
3	PRJ	B00P3	Seminar	-	-	2	1
4	PRJ	B00P2	Major Project	-	-	24	12
		Total		6	-	26	19

Total Contact Hours :32

2021-22 Onwards (MR-21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)		B.Tech. I Semester		
Code: B0B01	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

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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 1/3rd 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, AffiliatedEast–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_2iUCG87BLKl8eISe4fHKdE2_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=PLbMVogVj5nJRILpJJO7KrZa8Ttj4_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

2021-22 Onwards (MR-21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)		B.Tech I Semester	
Code: B0B17	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 ozonization.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 -, N_2,$O_2$and F_2. 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 ($[CoF_6]^{3-}$ and $[Co(CN)_6]^{3-}$) and tetrahedral ($[NiCl_4]^{2-}$ 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) andElectroless 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 ofn-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 (Cannizaro 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**", DhanpatRai 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"**, 5thEdition, 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								

2021-22 Onwards (MR-21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)		B.Tech. I Semester	
Code: B0501	**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 Associatively, 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 university press.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.

COs	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

CO- PO, PSO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak
Programme Outcomes (POs) — **PSOs**

2021-22 Onwards (MR-21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)		B.Tech. I Semester	
Code: B0301	**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 rotatingobject 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 perpendicularto 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 InternationalPublishers, 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",NewAge 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, 3rdEdition, 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://freevideolectures.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)

2021-22 Onwards (MR-21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. I/I Semester		
Code: B0B09	**Semiconductor Physics**	L	T	P
Credits: 4	Common for Sem-I :- AI & ML, CSE (AI & ML), CSE (CS), CSE (IoT) and CSE (DS). Sem-II :- CSE and IT	3	1	-

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=PLzJaFd3A7DZse2tQ2qUFCh SiCj7jBidO0&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									

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.
    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.
    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.
    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.

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

CO- PO, PSO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

2021-22 Onwards (MR-21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. I/I Semester		
Code: B0B11	**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.

2021-22 Onwards (MR-21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. I Semester		
Code: B0B18	**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 $KMnO_4$ 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												

2021-22 Onwards (MR-21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. I / II Semester		
Code: B0H01	**ENGLISH** (Common for CE, EEE, ME, ECE, CSE, CSE (Cyber Security), CSE (AI and ML), CSE (DS), CSE (IOT), AI&ML , IT and Mi.E)	**L**	**T**	**P**
Credits: 3		**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. Eastwod, 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 Enrich 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.

COS															

CO-PO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1					1					2		2			
CO2										1		2			
CO3		1		1						2		2			
CO4					1	1			1	2		2			
CO5				1	1				1	2		2			

2021-22 Onwards (MR-21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. II Semester		
Code: B0201	**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", 3 rd 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.

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 andsmall 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

2021-22 Onwards (MR-21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. II Semester		
Code: B0504	**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

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MODULE - V   **[9 Periods]**

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

Web Programming: Introduction, Wed 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/101EfoB UcccV1SQHw
3. "Basics of Python for Data Science", https://olympus.greatlearning.in/courses/11265
4. "Beginners Guide / Programmers - Python Wiki", https://wiki.python.org/moin/Beginn ersGuide/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.

2021-22 Onwards (MR-21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)		B.Tech. II Semester	
Code: B0506	**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?

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

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

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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.

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

CO- PO, PSO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

2021-22 Onwards (MR-21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. I / II Semester		
Code: B0H02	**English Language and Communication Skills Lab** (Common for CE, EEE, ME, ECE, CSE, IT, CSE(AI&ML,DS,CS,IOT), B.Tech(AI&ML)and Min.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/CommSkll/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

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.

COS	CO-PO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COS	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			

2021-22 Onwards (MR-21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. II Semester		
Code: B1201	Engineering and IT Workshop (Common for CSE 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

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

CO- PO, PSO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

2021-22 Onwards (MR-21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)		B.Tech. II Semester	
Code: B0202	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

2021-22 Onwards (MR-21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)		B.Tech. III Semester	
Code: B0507	**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/yVCWqd6u7wgye1qwH9xY7xPG734QA9tMJN2ncqS12ZbN7pUSSlWCxSgPOZJEokyWJlxQLYsrFyeITA70W9C8Pg
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	

2021-22 Onwards (MR-21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)		B.Tech. III Semester		
Code: B0509	**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_xngrklu evXOJLs1TbxS8q2icgUs3hL4_KAi5So5FgXcVg
3. http://ndl.iitkgp.ac.in/document/yVCWqd6u7wgye1qwH9xY7xAYUzYSlXl4zudlsolr-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.

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														

4. Design a pipeline for consistent execution of instructions with minimum hazards.
5. Recognize and manipulate representations of numbers stored in digital computers.

2021-22 Onwards (MR-21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)		B.Tech. III Semester	
Code: B0510	**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: [09 Periods]
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/yVCWqd6u7wgye1qwH9xY7-3lcmoMApVUMmjlExpIb1zste4YXX1pSpX8a2mLgDzZ-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	

2021-22 Onwards (MR-21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. III Semester		
Code: B0511	**Object Oriented Programming through Java** (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 Orientd 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-4kfhvUwVlXBW-RPf64_TFk2i4LJhgQFPQ   WAEt-Zobbm3twyubjRA1YOe9WVwkN2qGcxBwdHaPdi_mMQ
2. https://ndl.iitkgp.ac.in/result?q={"t":"search","k":"object%20oriented%20programming","s":["type=\"video\""],"b":{"filters":[]}}
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															

2021-22 Onwards (MR-21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)		B.Tech. III Semester		
Code: B0516	**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: SchedulingandConcurrency   [9 Periods]
CPU Scheduling - Basic Concepts, Scheduling Criteria, Scheduling Algorithms and evaluation,ThreadsOverview,Threadingissues.
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 Dhamdhere, "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.

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		

CO- PO, PSO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

2021-22 Onwards (MR-21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)		B.Tech. III Semester	
Code: B0512	**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.

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

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.

2021-22 Onwards (MR-21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. III Semester		
Code: B0513	**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-21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. IV Semester		
Code: B0520	**Operating Systems Lab** (Common for CSE, CSE (Cyber Security), CSE (AI and ML), CSE (DS), CSE (IOT), AI and IT)	**L**	**T**	**P**
Credits: 2		-	1	2

Prerequisites: A course on "Programming for Problem Solving", A course on "Computer Organizationand Architecture".

Co-requisite: A course on "Operating Systems".

Course Objectives:
- To provide an understanding of the design aspects of operating system concepts throughsimulation
- Introduce basic Unix commands, system call interface for process management, interprocesscommunication 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 usingUNIX/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

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		

CO- PO, PSO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

2021-22 Onwards (MR-21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)		B.Tech. IV Semester	
Code: 0B23	Number Theory CSE (Cyber Security)	L	T	P
Credits: 3		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.

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															

   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

2021-22 Onwards (MR-21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. V Semester		
Code: B6201	**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 subnettingand supernetting, explain the concepts of protocols ofTransportLayer,QoSandCongestioncontrolmechanismsanddemonstratedifferent protocols of ApplicationLayer.

MODULE I: Basics of Networking andPhysicallayer   [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/IPmodel.**Physical layer -** Digital transmission, Multiplexing, Transmission Media, Switching, Circuit Switched Networks, Datagram Networks, Virtual Circuit Networks.

MODULEII: Datalinklayer[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

MODULEIII:NetworkLayer[09 Periods] A: Basics of Network Layer - Logical Addressing, Internetworking, Tunneling, Addressmapping,
    B:CommunicationProtocols-
ICMP,IGMP,Forwarding,UnicastRoutingProtocols, Multicast RoutingProtocols.

MODULEIV: 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 - Domainnamespace,DNSininternet,Electronicmail
Protocols and Network Security - FTP, WWW, HTTP, SNMP, Network Security, Cryptography.

TEXT BOOKS:

1. BehrouzA. Forouzan, **"Data Communications and Networking"**, 4thEdition, TMH,2006.
2. AndrewSTanenbaum,**"ComputerNetworks"**,4thEdition,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, CengageLearning.

4. James F.Kurose& Keith W. Ross, **"Computer Networking: ATop-Down Approach Featuring the Internet"**, 3rdEdition, Pearson Education.

E-RESOURCES:

1. 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
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** Sub net and Super net 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.

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, alternation. 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, Savepoint.

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

MODULE V: Storage and Indexing: [09 Periods]

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 l, 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://airccse.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			

2021-22 Onwards (MR-21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. IV Semester		
Code: B1202	**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 (CGt), 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

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			

CO- PO, PSO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

2021-22 Onwards (MR-21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)		B.Tech. IV Semester		
Code: B6601	**Fundamentals of Artificial Intelligence** [Professional Elective - I]		**L**	**T**	**P**
Credits: 3	(Common for CSE, CSE (Cyber Security), CSE (AI and ML), CSE (DS), CSE (IOT) and IT)		**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 Artifical 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)

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													

CO- PO, PSO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

2021-22 Onwards (MR-21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. IV Semester		
Code: B0519	**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: 2		-	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.

CObs	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

CO- PO, PSO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

2021-22 Onwards (MR-20)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)		B.Tech. IV Semester	
Code: B1203	**Web Technologies Lab**	**L**	**T**	**P**
Credits: 1.5	(Common for CSE, CSE (Cyber Security), CSE (AI and ML), CSE (DS), CSE (IOT) and IT)	**-**	**-**	**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, Louden, 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.

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

CO- PO, PSO Mapping
 (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

2021-22 Onwards (MR-21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. V Semester		
Code: B6202	**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 Tranport 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 farming 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.

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

CO- PO, PSO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

2021-22 Onwards (MR-21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. IV Semester		
Code: B00M2	**Environmental Science**	L	T	P
Credits: NIL	(Common for CE, EEE, ME, ECE, MiE, CSE, CSE (Cyber Security), CSE (AI and ML), CSE (DS), CSE (IOT) and IT)	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-sports 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.

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													

CO- PO, PSO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

PREREQUISITES: NIL

PREREQUISITES: NIL

Course Objectives:

Through reading the text, references and discussion of cases students should be able to understand the fundamentals underlying the management of an organization.

MODULE – I: Management and Principles of Management [09 Periods] Introduction to Management: Concepts of Management and organization-nature, importance and Functions of Management, Taylor's Scientific Management Theory, Fayol's Principles of Management.

Management Theories: Mayo's Hawthorne Experiments, Maslow's Theory of Human Needs, Douglas McGregor's Theory X and Theory Y, Herzberg's Two-Factor Theory of Motivation, Systems Approach to Management, Leadership Styles, Corporate Social responsibility.

MODULE – II: Planning, Organization and types of Structures [10 Periods] Planning: Need for planning- -Steps in the process of planning-Advantages and limitation of planning. Types of planning - Vision, Mission, Goals, Objectives, Policy, Strategy, Programmes, Elements of Corporate Planning Process, Management by Objectives (MBO).

Organization and types of Structures: Basic concepts related to Organization - Departmentation and Decentralization, Types of Organizations- Line organization, Line and staff organization, functional organization, committee organization, matrix organization, Virtual Organization, Cellular Organization, boundary less organization, inverted pyramid structure, lean and flat Organization structure.

MODULE – III: STAFFING AND CONTROLLING [10 PERIODS]

Staffing: Basic concepts of HRM, functions of HR Manager: Manpower planning, Recruitment, Selection, Training and Development. Performance Appraisal, Job Evaluation and Merit Rating.

Controlling: process of controlling, types of controlling, managing productivity, Quality Control: chart, R chart, C chart, P chart, (simple Problems), Deming's contribution to quality.

MODULE – IV: Operations and Materials Management [09 Periods] Operations Management : Principles and Types of Plant Layout-Methods of production (Job, batch and Mass Production), Work Study -Basic procedure involved in Method Study and Work Measurement.

Materials Management: Objectives, Need for Inventory control, EOQ, ABC Analysis, Purchase Procedure, Stores Management and Stores Records.

MODULE – V: Project Management and Contemporary Practices [10 Periods] Project Management (PERT/CPM): Network Analysis, Programme Evaluation and Review

Technique (PERT), Critical Path Method (CPM), Identifying critical path, Probability of Completing the project within given time, Project Cost Analysis, Project Crashing. (Simple problems)

Contemporary Management Practices: Basic concepts of ERP, Just-In-Time (JIT) System, Total Quality Management (TQM), six sigma and Capability Maturity Model (CMM) Levels, Bench marking, Balanced Score card.

TEXT BOOKS:

1. Aryasri, **Management Science**, 4thedition TMH, 2004. (UNITSI,II,III,IV,V)
2. Stoner, Freeman, Gilbert, **Management,** Pearson Education, New Delhi, 6th Ed, 2004. (UNITSI,II)

REFERENCES*:*

1. Kotler Philip & Keller Kevin Lane, **"Marketing Management"**, PHI, 12thedition, 2005
2. Koontz&Weihrich,**"EssentialsofManagement"**,TMH,6thedition,2005.
3. Thomas N.Duening &John M. Ivancevich **"Management - Principles and Guidelines"**, Biztantra, 5thedition2003.
4. Memoria&S.V.Gauker,**"PersonnelManagement"**,Himalaya,25thedition,2005
5. SamuelC.Certo,**"ModernManagement"**,PHI,9thedition,2005.

E RESOURCES:

1. http://freevideolectures.com/Course/2689/Management-Science
2. http://www.onlinevideolecture.com/?course=mba-programs&subject=human- resource-management
3. http://www.onlinevideolecture.com/?course=mba-programs&subject=marketing-fundamental
4. http://freevideolectures.com/Course/2371/Project-and-Production-Management
5. http://nptel.ac.in/courses/110105034/

COURSE OUTCOMES:

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

1. Understandthevariousconcepts,principlesandtheoriesofmanagement.
2. Understandthebasicconceptsofplanningandvariousstructuresoforganizations.
3. Understandtheprocessofstaffingandcontrolling
4. Understand the process of operations management. Also learn the concepts of materialsmanagementandmarketingmanagementatanorganization.
5. Understand the various contemporary management practices. Also the project managementtechniques

COS	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1									2	3	1	
CO2		3							2		1	
CO3		3								2	1	
CO4		3		2	1							
CO5				2			3				1	

CO- PO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

2021-22 Onwards (MR-21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. V Semester		
Code: B6201	CRYPTOGRAPHY AND NETWORK SECURITY	L	T	P
Credits: 3		3	-	-

Course Objectives:
- Explain the objectives of information security
- Explain the importance and application of each of confidentiality, integrity, authentication and availability
- Understand various cryptographic algorithms.
- Understand the basic categories of threats to computers and networks
- Describe public-key cryptosystem.
- Describe the enhancements made to IPv4 by IPSec.
- Understand Intrusions and intrusion detection
- Discuss the fundamental ideas of public-key cryptography
- Generate and distribute a PGP key pair and use the PGP package to send an encrypted email message.
- Discuss Web security and Firewalls

MODULE - I
Security Concepts: Introduction, The need for security, Security approaches, Principles of security, Types of Security attacks, Security services, Security Mechanisms, A model for Network Security
Cryptography Concepts and Techniques: Introduction, plain text and cipher text, substitution techniques, transposition techniques, encryption and decryption, symmetric and asymmetric key cryptography, steganography, key range and key size, possible types of attacks.

MODULE - II
Symmetric key Ciphers: Block Cipher principles, DES, AES, Blowfish, RC5, IDEA, Block cipher operation, Stream ciphers, RC4.
Asymmetric key Ciphers: Principles of public key cryptosystems, RSA algorithm, Elgamal Cryptography, Diffie-Hellman Key Exchange, Knapsack Algorithm.

MODULE - III
Cryptographic Hash Functions: Message Authentication, Secure Hash Algorithm (SHA-512),
Message authentication codes: Authentication requirements, HMAC, CMAC, Digital signatures, Elgamal Digital Signature Scheme.
Key Management and Distribution: Symmetric Key Distribution Using Symmetric & Asymmetric Encryption, Distribution of Public Keys, Kerberos, X.509 Authentication Service, Public – Key Infrastructure.

MODULE - IV
Transport-level Security: Web security considerations, Secure Socket Layer and Transport Layer Security, HTTPS, Secure Shell (SSH)
Wireless Network Security: Wireless Security, Mobile Device Security, IEEE 802.11 Wireless LAN, IEEE 802.11i Wireless LAN Security

MODULE - V
E-Mail Security: Pretty Good Privacy, S/MIME IP Security: IP Security overview, IP Security architecture, Authentication Header, Encapsulating security payload, combining security associations, Internet Key Exchange
Case Studies on Cryptography and security: Secure Multiparty Calculation, Virtual Elections, Single sign On, Secure Inter-branch Payment Transactions, Cross site Scripting Vulnerability

TEXT BOOKS:
1. Cryptography and Network Security - Principles and Practice: William Stallings, Pearson Education,
   6th Edition
2. Cryptography and Network Security: Atul Kahate, Mc Graw Hill, 3rd Edition

REFERENCE BOOKS:
1. Cryptography and Network Security: C K Shyamala, N Harini, Dr T R Padmanabhan, Wiley India, 1st Edition.
2. Cryptography and Network Security: Forouzan Mukhopadhyay, Mc Graw Hill, 3rd Edition
3. Information Security, Principles, and Practice: Mark Stamp, Wiley India.
4. Principles of Computer Security: WM. Arthur Conklin, Greg White, TMH
5. Introduction to Network Security: Neal Krawetz, CENGAGE Learning
6. Network Security and Cryptography: Bernard Menezes, CENGAGE Learning

Course Outcomes:
- Student will be able to understand basic cryptographic algorithms, message and web authentication and
  Security issues
- Ability to identify information system requirements for both of them such as client and server
- Ability to understand the current legal issues towards information security

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	3	1	
CO2		3							2		1	
CO3		3								2	1	
CO4		3		2	1							
CO5				2		3					1	

Course Objectives:

- Automata and compiler Design mainly deals with the languages which are formal and regular and also deals with grammar present in the machine.
- An compiler is a program that accepts a program in source language and converts into a machine understandable format.
- The push down automata is the major one it's a five tuple set containing states, alphabets, transition function and accept states.

MODULE-I

Formal Language and Regular Expressions: Languages, Definition Languages regular expressions, Finite Automata – DFA, NFA. Conversion of regular expression to NFA, NFA to DFA. Applications of Finite Automata to lexical analysis, lex tools

Context Free grammars and parsing: Context free grammars, derivation, parse trees, ambiguity LL(K) grammars and LL(1) parsing

MODULE - II:

Bottom up parsing handle pruning LR Grammar Parsing, LALR parsing, parsing ambiguous grammars, YACC programming specification

Semantics: Syntax directed translation, S-attributed and L-attributed grammars, Intermediate code – abstract syntax tree, translation of simple statements and control flow statements.

MODULE-III

Bottom up parsing handle pruning LR Grammar Parsing, LALR parsing, parsing ambiguous grammars, YACC programming specification.

MODULE - III

Context Sensitive features – Chomsky hierarchy of languages and recognizers. Type checking, type conversions, equivalence of type expressions, overloading of functions and operations

MODULE - IV

Run time storage: Storage organization, storage allocation strategies scope access to now local names, parameters, language facilities for dynamics storage allocation.

Code optimization: Principal sources of optimization, optimization of basic blocks, peephole optimization, flow graphs, Data flow analysis of flow graphs.

MODULE - V:

Code generation: Machine dependent code generation, object code forms, generic code generation algorithm, Register allocation and assignment. Using DAG representation of Block

TEXTBOOKS:

1. Introduction to Theory of computation. Sipser, 2nd Edition, Thomson.
2. Compilers Principles, Techniques and Tools Aho, Ullman, Ravisethi, Pearson Education.

REFERENCES:
1.   Modern Compiler Construction in C , Andrew W.Appel Cambridge University Press.
2.   Compiler Construction, LOUDEN, Thomson.
3.   Elements of Compiler Design, A. Meduna, Auerbach Publications, Taylor and Francis Group.
4.   Principles of Compiler Design, V. Raghavan, TMH.

Outcomes:
- Graduate should be able to understand the concept of abstract machines and their power to recognize the languages.
- Attainsthe knowledge of language classes & grammars relationship among them with the help of chomsky hierarchy.
- Ability to understand the design of a compiler given features of the languages.
- Ability to implement practical aspects of automata theory.
- Gain knowledge of powerful compiler generation tools.

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	PSO 1	PSO 2	PSO3
CO1	3	3										2	2		
CO2	3	2										2	2		
CO3	2	3										2		2	
CO4	3	2					2					2		2	
CO5	3	2										2	2		

2021-2022 Onwards (MR-21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. V Semester		
Code: B0526	**SOFTWARE ENGINEERING AND MODELING** (Common for CSE and IT)	**L**	**T**	**P**
Credits: 3		3	-	-

PREREQUISITES:NIL

CourseObjectives:

ThiscourseenablesstudentstolearnfundamentalaspectsofSoftwareEngineering,analyzevarious process models, identify various types of requirements and the process for Requirements Engineering, make use of various System Models to conceptualize and construct a system, demonstrate different testing tactics and define metrics for software measurement, classify and mitigate the Software Risks, learn to achieve quality standards, understand the Unified Modeling Language Principles and learns fundamental process pattern for object-oriented analysis and design.

MODULE I: Introduction toSoftwareEngineering   [09 Periods]

Basic terms of Software Engineering- The evolving role of software, Changing Nature of Software, Software Myths, Software engineering-A layered technology, A Process Framework, The Capability Maturity Model Integration(CMMI).

Process Models- The water fall model, Incremental process models, evolutionary process models, unified process.

MODULE II: Requirements of Software Engineering   [09 Periods] Software Requirements-Functional and non-functional requirements, User requirements, System requirements, Interface specification, software requirements document.

Requirements Engineering Process - Feasibility studies, requirements elicitation and analysis, requirements validation, requirements management

MODULE III: Phases of Software Engineering   [10 Periods]

A: System Models -Context models, Behavioral models, Data models, Object models, structured methods.

B: Design Engineering and creating an Architectural Design- Design process and Design quality, Design concepts, the design model, Software architecture, Data design, Architectural styles and patterns, Architectural Design.

MODULE IV: Testing Methodology   [09 Periods]

Testing Strategies- A strategic approach to software testing, test strategies for conventional software, Black-Box and White-Box Testing, Validation Testing, System Testing.

Risk Management - Reactive vs proactive risk strategies, RMMM and plan. Quality concepts, Software quality assurance, Software reviews, Statistical Software Quality Assurance, Software Reliability, ISO 9000 Quality standards

MODULE V: Introduction to UML and Modeling   [11 Periods]

Introduction and Architecture- Introduction to UML, Importance of modeling, principles of modeling, object oriented modeling. Conceptual model of the UML, Architecture, Use cases

Basic Behavioral and Structural- Use case Diagrams, Activity Diagrams, Classes, Relationships, common Mechanisms and diagrams. Advanced classes, advanced relationships, Interfaces, Types and Roles, Packages. Terms, concepts, modeling techniques for Class and Object Diagrams, Interactions, Interaction diagrams.

TEXTBOOKS:

1.   RogerS. Pressman, **"Software engineering-A practitioner's Approach"**, McGraw-Hill International Edition, 6thedition.

2.   Grady Booch, James Rumbaugh, Ivar Jacobson, –**The Unified Modeling**

Language User Guide‖, Pearson Education.

REFERENCES:
1. Pankaj Jalote, **"An Integrated Approach to Software Engineering"**, Springer Verlag, 1997.
2. Meilir Page-Jones, ‒**Fundamentals of Object Oriented Design in UML**‖, Pearson Education.

E ‒RESOURCES:
1. http://freequestionpaper.in/questionpaper/2014/08/Software-Engineering-Roger-S-Pressman-5th-edition-IDM.pdf
2. https://books.google.co.in/books?id=PqsWaBkFh1wCandprintsec=frontcoverandd q=software+
engineering+by+ian+sommerville+FREE+downloadandhl=enandsa=Xandved=0ahUKEw jjv5fhpb_TAhUHOo8KHY5OAC4Q6AEIKjAB#v=onepageandq=software%20engineeri ng%20by
%20ian%20sommerville%20FREE%20downloadandf=false
3. http://ieeexplore.ieee.org/document/4807670/
4. https://link.springer.com/search?facet-journal-id=40411andpackage=openaccessarticlesandquery=andfacet-sub-discipline=%22Software+Engineering%22
5. http://freevideolectures.com/Course/2318/Software-Engineering

COURSE OUTCOMES:

At the end of the course, students will be able to
1. **Analyze** the customer business requirements and choose the appropriate Process model for the given project
2. **Elicit** functional and non-functional requirements using rigorous engineering methodology
3. **Conceptualize**andachieverequirementsdefinedforthesystemusingArchitecturalstyl esand Design patterns
4. **Design** Test cases and define metrics for standardization, mitigate and monitor the risks and assure quality standards.
5. **Understand** the basic concepts of UML and Implement the real time application using UML 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**	**PSO 1**	**PSO 2**	**PSO3**
CO1	3	3										2	2		
CO2	3	2										2	2		
CO3	2	3										2		2	
CO4	3	2					2					2		2	
CO5	3	2										2	2		

Course Objectives:

1. Learn the fundamentals of network coding theory.
2. Understand the performance parameters required for network coding.
3. Gain the knowledge of the network coding design methods.
4. Learn different approaches for the network coding.
5. Understand error correction and detection methods of adversarial errors.

COURSE OUTCOMES:

1. Demonstrate knowledge and understanding of the fundamentals of Network Coding Theory.
2. Summarize all the performance parameters and resources for network coding.
3. Construct the network code for different networks.
4. Deal with different approaches of Network Coding in lossy and lossless networks.
5. Deal with multiple sources network coding and detect adversarial errors.

MODULE- I

Introduction: A historical Perspective, Network Coding; Network Coding Benefits: Throughput, Robustness, Complexity, Security; Network Model.

Main Theorem of Network Multicast: The Min-Cut Max-flow Theorem, The Main network coding Theorem,

Theoretical Framework for Network Coding: A Network Multicast Model, algebraic Framework, Combinatorial Framework, Information-Theoretic Framework, Types of Routing and coding**.**

MODULE – II

Throughput Benefits of Network Coding: Throughput Measures, Linear Programming Approach, Configurations with Large Network Coding Benefits, Configurations with Small Network Coding Benefits, Undirected Graphs.

Networks with Delay and Cycles: Dealing with Delay, Optimizing for Delay, Dealing with Cycles. **Resources for Network Coding:** Bounds on Code Alphabet Size, Bounds on the Number of Coding Points, Coding with Limited Resources.

MODULE - III

Network Code Design Methods For Multicasting: Common initial procedure, centralized algorithms, decentralized algorithms, scalability to network changes. Single-Source Linear Network Coding:

Acyclic Networks: Acyclic Networks, Linear network code, Desirable properties of a linear network code, Existence and construction, Algorithm refinement for multicast.

Cyclic Networks: Delay-Free Cyclic Code, Non-equivalence between local and global descriptions, Convolutional network code, decoding of convolutional network code.

MODULE - IV

Inter-Session Network Coding: Scalar and vector linear network coding, Fractional coding problem formulation, Insufficiency of linear network coding, Information theoretic approaches: Multiple uni cast networks; Constructive approaches: Pair wise XOR coding in wire line networks, XOR coding in wireless networks.

Network Coding in Lossy Networks: Random linear network coding, Coding theorems: Uni cast connections, Multicast connections, Error exponents for Poisson traffic with i.i.d. losses.

Sub graph Selection: Flow-based approaches: Intra-session coding, Computation-constrained coding, Inter-session coding; Queue-Length-Based approaches: Intra-session network coding for multicast sessions, Inter-session coding.

MODULE - V

Multiple Sources Network Coding:

Superposition coding and max-flow bound; Network Codes for Acyclic Networks: Achievable information rate region, Inner bound R_{in}, Outer bound R_{out}, RLP – An explicit outer bound.

Security against adversarial Errors: Error correction: Error Correcting bounds for centralized network coding, Distributed random network coding and polynomial-complexity error correction; Detection of adversarial errors: Model and problem formulation, Detection probability.

TEXT BOOKS:

1. Raymond W. Yeung, Shuo-Yen Robert Li, Ning Cai, Zhen Zhang, "Network Coding Theory", now publishers Inc, 2006, ISBN:1-933019-24-7.
2. Christina Fragouli, Emina Soljanin, "Network Coding Fundamentals", now publishers Inc, 2007, ISBN: 978-1-60198-032-8.

Reference Books:

1. Tracey Ho, Desmond Lun, "Network Coding: An Introduction", Cambridge University Press, 2008, ISBN: 978-0-521-87310-9.
2. Muriel Medard, Alex Sprintson, "Network Coding: Fundamentals and Applications", 1st Edition, 2012, Academic Press, Elsevier, ISBN:978-0-12-380918-6.

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	3										2	2		
CO2	3	2										2	2		
CO3	2	3										2		2	
CO4	3	2						2				2		2	
CO5	3	2										2	2		

Prerequisites: Database Concepts

Course Objectives: To understand the distributed database management and real-time application management.

Module I: Introduction of DBMS: [10 Periods]

Distributed Data Processing, Distributed Database System, Promises of DDBSs, Problem areas

Overview of Relational DBMS

Relational Database Concepts, Normalization, Integrity rules, Relational data languages

Module II: Distributed DBMS Architecture: [09 Periods]

Architectural Models for Distributed DBMS, DDBMS Architecture.

Distributed Database Design: Alternative Design Strategies, Distributed Database, Design issues, Fragmentation, Allocation.

Module III: Query Processing and Decomposition [09 Periods]

A: Query Processing objectives, Characterization of query processors.

B: Layers of query processing, query decomposition, Localization of distributed data.

Module IV: Query Optimization: [09 Periods]

Query optimization, centralized query optimization, Distributed query optimization algorithms.

Module V: Transaction Management and Concurrency Control [11 Periods]

Transaction Management: Definition, properties of transaction, types of transactions. Distributed **Concurrency Control:** Serializability, concurrency control Mechanisms & Algorithms, Time stamped & Optimistic concurrency control Algorithms, Deadlock Management

TEXTBOOKS:

1. M.Tamer OZSU and Patuck Valduriez: Principles of Distributed Database Systems, Pearson Edn. Asia, 2001.
2. Stefano Ceri and Willipse Pelagatti: Distributed Databases, McGraw Hill.

REFERENCES:

1. Henry F Korth, A Silberchatz and Sudershan: Database System Concepts, MGH.
2. Raghuramakrishnan and Johhanes Gehrke: Database Management Systems, MGH.

Course Outcomes:

1. Understand the role of a distributed database management system in an Enterprise/organization.
2. Design queries of a distributed database management system
3. Apply the principles of query optimization techniques to a database schema.
4. Understand the concept of a database transaction including concurrency control, backup and recovery and data object locking and protocols.
5. Explain the various types of locking mechanisms used in within database management systems.

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			

2021-22 Onwards (MR-21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. IV Semester		
Code: B0526	**ARTIFICIAL INTELLIGENCE**	L	T	P
Credits: 3		3	-	-

Prerequisites: Discrete Mathematics

Course Objectives: This course enable the students to understand the basic fundamentals of Artificial Intelligence, determine various problem solving strategies, understand the logic concepts, different approaches to represent the knowledge, develop the expert systems in various phases and its applications, apply the fuzzy logic in various problem solving techniques

MODULEI:Introduction [10 Periods]

Introduction to Artificial Intelligence: Introduction ,history, intelligent systems, foundations of AI, applications, tic-tac-tie game playing, development of AI languages, current trends in AI.

MODULE II: Problem Solving [09 Periods]

Problem solving: state-space search and control strategies: Introduction, general problem solving, characteristics of problem, exhaustive searches, heuristic search techniques, iterative deepening a*, constraint satisfaction. Problem reduction and game playing: Introduction, problem reduction, game playing, alphabeta pruning, two-player perfect information games.

MODULE III: Logic Concepts and Knowledge Representation [10 Periods]

A: Logic Concepts - Introduction, propositional calculus, proportional logic, natural deduction system, axiomatic system, semantic tableau system in proportional logic, resolution refutation in proportional logic, predicate logic.

B: Knowledge Representation - Introduction, approaches to knowledge representation, knowledge representation using semantic network, extended semantic networks for KR, knowledge representation using frames advanced knowledge representation techniques: Introduction, conceptual dependency theory, script structure, cyc theory, case grammars, semantic web

MODULE IV: Expert System and Applications [10 Periods]

Introduction phases in building expert systems, expert system versus traditional systems, rule-based expert systems, blackboard systems truth maintenance systems, application of expert systems, list of shells and tools.

MODULE V: Uncertainty Measure [09 Periods]

Probability theory: Introduction, Bayesian belief networks, certainty factor theory, dempster-shafer theory. Fuzzy sets and fuzzy logic: Introduction, fuzzy sets, fuzzy set operations, types of membership functions, multi valued logic, fuzzy logic, linguistic variables and hedges, fuzzy propositions, inference rules for fuzzy propositions, fuzzy systems.

TEXT BOOKS:

1. Saroj Kaushik, "Artificial Intelligence", CENGAGE Learning,
2. Stuart Russel, Peter Norvig, "Artificial intelligence, A modern Approach", 2nd ed, PEA
3. Rich, Kevin Knight, Shiv Shankar B Nair, "Artificial Intelligence", 3rd Ed, TMH

4. Patterson,"Introduction to Artificial Intelligence", PHI

REFERENCES:
1. George F Lugar, "Atificial intelligence, structures and Strategies for Complex problem solving", 5th edition, PEA
2. Ertel, Wolf Gang, "Introduction to Artificial Intelligence", Springer 3. Blay WhitBY "Artificial Intelligence" Rosen Publishing.

E-RESOURCES:
1. https://i4iam.files.wordpress.com/2013/08/artificial-intelligence-by-rich-andknight.pdf
2. https://books.google.co.in/books?id=pVR9W5LEZUwC&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false
3. https://www.journals.elsevier.com/artificial-intelligence/
4. http://www.ceser.in/ceserp/index.php/ijai
5. http://ndl.iitkgp.ac.in/document/yVCWqd6u7wgye1qwH9xY7_M07uyea_7zp_zR G3BvdUVy2TIab45fvPeNJfynQsAbmBEgDSUqzidwcse6xwotJA
6. http://ndl.iitkgp.ac.in/document/xttk-4kfhvUwVlXBW-YWRBg_vrHK12lgOzTVbb5oZ6eQOBjCWDfRvquHJLEOFENjI5AmOqRc9Ar3eJF4CG Frw

Course Outcomes:
At the end of the course, students will be able to
1. Describe the key components of the Artificial Intelligence field.
2. Identify various problem solving strategies.
3. Construct the solution for the problem using various logic and knowledge representation techniques.
4. Interpret the knowledge in various domains using expert systems.
5. Discover the solutions by using
   the probability theory and fuzzy logic.

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	-	-									
CO2	-	2	2									
CO3	2	2	2	3								
CO4	2	2	2	2								
CO5	1	2										

2021-22 Onwards (MR-210)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. VSemester		
Code: B0527	SEMANTIC WEB	L	T	P
Credits: 3		3	-	-

Prerequisites: Web Technologies

COURSE OBJECTIVES:

This course enables the students to learn and understand the fundamental technologies for enabling the envisioned semantic web, study various knowledge representation techniques, make use of development tools and methods for ontology engineering, construct application and services using semantic web technologies and analyze various collaboration networks.

MODULE I: World Wide Web [09 Periods]
Web Intelligence – Thinking and Intelligent Web Applications, The Information Age, The World Wide Web, Limitations of today's Web, The Next Generation Web, Machine Intelligence, Artificial Intelligence
Web Description- Ontology, Inference Engines, Software Agents, Berners-Leewww, Semantic Road Map, Logic on the semantic Web.

MODULE II: Knowledge Representation for the Semantic Web [10 Periods]
Ontology - Ontologies and their role in the semantic web, Ontologies Languages for the Semantic Web-Resource Description Frame work (RDF)/RDF Schema,
Web Languages - Ontology Web Language (OWL), UML, XML, XML Schema.
MODULE III: Ontology Engineering [10 Periods]
A: Ontology Development-Ontology Engineering, constructing Ontology, Ontology, Development Tools, Ontology Methods
B: Ontology Sharing and Merging - Ontology Sharing and Merging, Ontology, Libraries and Ontology mapping, Logic, Rule and Inference Engines.
MODULE IV: Semantic Web Applications, Services and Technology [10 Periods]
Semantic Web Services - Semantic Web applications and services, Semantic Search, e-learning
Semantic Web Applications - Semantic Bioinformatics, Knowledge Base, XML Based Web Services, Creating an OWL-S Ontology for Web Services, Semantic Search Technology, Web Search Agents and Semantic Methods

MODULEV: Social Network Analysis and Semantic Web [09 Periods]
Social Network Analysis-What is social Networks analysis, development of the social networks analysis, Electronic Sources for Network Analysis - Electronic Discussion networks.
Semantic Web - Blogs and Online Communities, Web Based Networks, Building Semantic Web Applications with social network features.

TEXT BOOKS:

1. Berners Lee, Gödel and Turing,"**Thinkingontheweb**",Wileyinterscience,2008.
2. PeterMika,".**SocialNetworksandtheSemanticWeb**",Springer,2007.

REFERENCES:

1. J.Davies, R.Studer, P.Warren, Johri. Wiley & Sons, "Semantic Web Technologies, Trends and Research in Ontology Based Systems"

2. Liyang Lu Chapman and Hall, **" Semantic Web and Semantic Web Services**", CRC Publishers,(Taylor & FrancisGroup)

E-RESOURCES:

1. http://as.wiley.com/WileyCDA/WileyTitle/productCd-0471768669.html
2. http://www.springer.com/in/book/9780387710006
3. https://research.vu.nl/ws/portalfiles/portal/2312133
4. http://nptel.ac.in/courses/106105077/18

COURSE OUTCOMES:

At the end of the course, students will be able to
1. **Develop** web applications using semantic techniques.
2. **Relate** knowledge representation methods for semantic web.
3. **Explain** the key aspects of ontology engineering.
4. **Design** web services and its applications.
5. **Analyze** and build a social network.

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	2	3		1									2		
CO3			2	3	3								2	1	
CO4			2	2	2				3					2	
CO5	2	3			1								2		

Prerequisites: Data Structures
Course Objectives:
- To learn fundamental concepts an algorithm, Pseudo code, performance analysis, time complexity,
  Dis joint sets, spanning trees and connected components.
- To Learn and Understanding of divide and conquer, applications, binary search, sorting and Strassen's matrix, greedy method, job sequencing, spanning trees and shortest path problem.
- To Learn and understanding dynamic programming, matrix chain, optimal binary search, knapsack problem and optimization methods, all pairs shortest path, travelling sales problem and reliability design.
- To Learn and understanding backtracking, n-queen problems, subset problem, graph coloring, Hamiltonian cycles and branch bound methods, travelling sales, knapsack problem, branch and bound, FIFO branch.
- To Learn and understanding of NP Hard and NP complete problems

MODULE I:Basics of Algorithm Design [09 Periods] Introduction -Algorithm, Pseudo code for expressing algorithms, Performance AnalysisSpace complexity, Time complexity, Asymptotic Notations, Amortized analysis. Disjoint Sets -Disjoint set operations, union and find algorithms, spanning trees, connected components and bi connected components.

MODULE II:Algorithm Methods [10 Periods] Divide and Conquer - General method, applications-Binary search, Quick sort, Merge sort, Strassen's matrix multiplication Greedy method General method, applications-Job sequencing with deadlines, general knapsack problem, Minimum cost spanning trees, Single source shortest path problem.

MODULE III:Dynamic Programming and Optimization Techniques [10 Periods] A: Dynamic Programming - General method, applications-Matrix chain multiplication, Optimal binary search trees, 0/1 knapsack problem . B: Optimization Techniques - All pairs shortest path problem, travelling sales person problem, Reliability design.

MODULE IV:Backtracking and Branch and Bound [10 Periods] Backtracking-General method, n-queen problem, sum of subsets problem, graph coloring, Hamiltonian cycles Branch and Bound - General method, applications: Travelling sales person problem, 0/1 knapsack problem-LC Branch and Bound solution, FIFO Branch and Bound solution. 92

MODULE V:NP-Hard and NP-Complete problems [09 Periods] NP-Hard and NP-Completeness: Basic concepts, NP - Hard and NP Complete classes, Cook's theorem, Deterministic and Non-Deterministic algorithms, NP-hard graph problems and scheduling problem

TEXTBOOKS:
1. Ellis Horowitz, SatrajSahni and Rajasekharan, "Fundamentals of Computer Algorithms"Galgotia publications pvt. Ltd 2. T.H.Cormen, C.E.Leiserson, R.L.Rivest, and C.Stein, "Introduction to Algorithms", second edition, PHI Pvt. Ltd./ Pearson Education

REFERENCES:
1. M.T.Goodrich and R.Tomassia "Algorithm Design, Foundations, Analysis and Internet examples", John wiley and sons.
2. R.C.T.Lee, S.S.Tseng, R.C.Chang and T.Tsai, "Introduction to Design and Analysis of Algorithms A strategic approach", Mc Graw Hill. 3. Parag Himanshu Dave, Himanshu BalchandraDave,"Design and Analysis of algorithms" Pearson

E-RESOURCES:
1.https://comsciers.files.wordpress.com/2015/12/horowitz-and-sahani-fundamentals-ofcomputer-algorithms-2nd-edition.pdf
2.https://books.google.co.in/books?id=7qKXCzF1XC8C&printsec=frontcover&dq=T.H.Co rmen,C.E.Leiserson,+R.L.Rivest,and+C.Stein,+%22Introduction+to+Algorithms%22,+se cond+edition,+PHI+Pvt.+Ltd./+Pearson+Education,ebook,pdf&hl=en&sa=X&ved=0ahU KEwjFupORxdXTAhXLQo8KHU7FC5cQ6AEIKjAB#v=onepage&q&f=false
3. http://en.cnki.com.cn/Article_en/CJFDTOTAL-JFYZ200208019.htm
4. http://nptel.ac.in/courses/106101060/

Course Outcomes: At the end of the course, students will be able to
1. Analyze performance of algorithms using asymptotic notations, performance analysis, disjoint sets, spanning trees and connected components
2. Describe and analyze paradigms for designing good algorithms using Divide-andConquer and Greedy Techniques, applications, binary search, sorting and Strassen's matrix, greedy method, job sequencing, spanning trees and shortest path problem.
4. Synthesize dynamic-programming algorithms and analyze matrix chain, optimal binary search, knapsack problem and optimization methods, all pairs shortest path, travelling sales problem and reliability design.
5. Apply backtracking and branch and bound techniques to solve some complex problems, n-queen problems, subset problem, graph coloring, Hamiltonian cycles and branch bound methods, travelling sales, knapsack problem, branch and bound, FIFO branch
6. Apply algorithm design techniques to solve certain NP-complete problems.

| COs | \multicolumn{12}{l|}{Programme Outcomes (POs)} | \multicolumn{3}{l|}{PSOs} |
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	3	2									3	2	
CO2	3	2	3	2									3	2	
CO3	3	2	3	2									3	2	
CO4	3	2	3	2									3	2	
CO5	3	2	3	2									3	2	

CO- PO, PSO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

2021-2022 Onwards (MR-21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. VI Semester		
Code: B0532	INTERNET OF THINGS [Professional Elective – IV]	L	T	P
Credits: 3		3	-	-

Prerequisites: Basic knowledge of computer architecture, programming and communication protocols

COURSE OBJECTIVES:

 Understand the basics of Embedded System, IoT and the development model. Understand the architecture, Instruction set and work on ARM microcontroller using practical hands-on. Ability to select appropriate hardware and microcontrollers based on need of application. Understand the Internet of Things Standards, Frameworks and Techniques. Apply the tools, techniques and skills acquired towards development of Projects.

MODULE I - INTRODUCTION TO EMBEDDED SYSTEMS AND INTERNET OF THINGS (IOT)

[09 Periods]

Architecture of Embedded Systems, Embedded Systems Development process, Architecture of Internet of Things, Applications of Embedded Systems and IoT, Design Methodology for IOT Products

MODULE II - OVERVIEW OF OPEN SOURCE HARDWARE AND ITS RELEVANCE TO IOT

[09 Periods]

Introduction and Programming Arduino Development Board , Working with Sensor Integration, Interfacing Input / Output devices (Pot, LDR, LCD, etc), Introduction to Network Connectivity, Concepts of IP based communication, Client – Server model of communication, Introduction to Wi-Fi communication using ESP8266, ESP8266 in Station & Access Point Mode

MODULE III – FUNDAMENTALS OF PYTHON PROGRAMMING & RASPBERRY PI

[10 Periods]

A: Introduction to python programming, working with functions, classes, REST full Web Services, Client Libraries.
B: Introduction & programming Raspberry Pi3, Integrating Input Output devices with Raspberry Pi3

MODULE IV – IOT PLATFORM: CLOUD COMPUTING PLATFORMS FOR IOT DEVELOPMENT (IBMCLOUD)[10PERIODS]

IOT Platform Architecture (IBM Internet of Things & Watson Platforms), API Endpoints for Platform Services , Devices Creation and Data Transmission,

Introduction to NODE-RED and Application deployment

MODULE V – IOT USE CASES : SMART CITY PROJECT & INDUSTRIAL USE CASES

[10 Periods]

Introduction to Smart City Project & IOT Use cases , Development of Smart city Applications , Project Work -1 (Smart city Use case) , Project Work-2 (Industrial Use case)

TEXT BOOKS:

1. Internet of Things: A Hands-On Approach by by Arsheep Bahga,VijayMadisetti
2. The Internet of Things: Key applications and Protocols ‖ Wiley Publications 2nd Edition

REFERENCES:

1. Embedded Systems: Real-Time Inter facing to Arm (r) Cortex-M Microcontrollers: Volume-1&2 by Jonathan WValvano
2. Designing the Internet of Things by Adrian McEwen, Hakim Cassimally, Wiley Publications,2012
3. Embedded Real Time Systems: Concepts, Design and Programming ‖by Dr.K.V.K.K.Prasad, Dream Tech Publication, 2003.

E-RESOURCES:

1. http://www.itu.int/en/ITU-T/gsi/iot/Pages/default.aspx
2. http://electronicdesign.com/embedded/understanding-protocolsbehind-internet- things
3. http://eclipse.org/community/eclipse_newsletter/2014/february/article2.php
4. http://iot.eclipse.org/protocols.html
5. http://www.slideshare.net/paolopat/internet-ofthingsprotocolswar
6. http://www.slideshare.net/RealTimeInnovations/io-34485340
7. http://www.networkworld.com/article/2456421/internet-of-things/aguide-to-the- confusing-internet-of-things-standards-world.html

COURSE OUTCOMES:

At the end of the course, students will be able to
1. **Describe** the fundamental concepts of IoT and its applications
2. **Illustrate** M2M concepts with protocols.
3. **Develop** applications using Python Scripting Language.
4. **Build** real world applications by applying Ras pberryPI.
5. **Examine** web based services.

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	3	3	3	3	3						3	3	3
CO2	3	2	3	2	3							2	3	3	3
CO3	3	3	3	3	3								3	3	3
CO4	3	3	3	3	3	3							3	3	3
CO5	3	3	3	3	3								3	3	3

2021-22 Onwards (MR-21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. VSemester		
Code: B0503	DISTRIBUTEDSYSTEMS	L	T	P
Credits: 3		3	-	-

Prerequisites: Computer Networks, DBMS and Operating Systems

COURSE OBJECTIVES:

Student will be able to learn fundamental aspects of Distributed systems and analyze basics of Architectural and Fundamental Models. To identify various types of requirementsandtheprocessfor Distributedobjects.To makeuse ofvariousOSlayers to conceptualize and construct a system, to demonstrate different file systems tactics anddefineEventsandtimeorderingindistributedtransactions.

MODULE I:BASICCONCEPTS [09PERIODS]

Characterization of Distributed Systems – Examples – Resource Sharing and the Web – Challenges – System Models – Architectural andFundamental Models – Networking and Internetworking – Types of Networks – Network Principles – Internet Protocols – CaseStudies.

MODULE II: Processes andDistributedObjects [09 Periods]

Inter–process Communication – The API for the Internet Protocols – External Data Representation and Marshalling – Client –Server Communication – Group Communication – Case Study – Distributed Objects and Remote Invocation – Communication Between Distributed Objects – Remote Procedure Call – Events and Notifications – JavaRMI – Case Study.

MODULE III: OPERATING SYSTEMISSUESI [10PERIODS]

The OS Layer – Protection – Processes and Threads – Communication andInvocation – OS Architecture – Security – Overview – Cryptographic Algorithms – Digital Signatures– CryptographyPragmatics–CaseStudies– DistributedFile Systems– File Service Architecture – Sun Network File System – The AndrewFile System.

MODULE IV: Operating SystemIssuesII [10 Periods]

Name Services – Domain Name System – Directory and Discovery Services – Global Name Service – X.500 Directory Service – Clocks – Events and Process States – SynchronizingPhysicalClocks–LogicalTimeAndLogicalClocks–GlobalStates– Distributed Debugging – Distributed Mutual Exclusion – Elections – Multicast Communication RelatedProblems.

MODULE V: Distributed TransactionProcessing [10 Periods]

Transactions – Nested Transactions – Locks – Optimistic Concurrency Control – Timestamp Ordering – Comparison – Flat and Nested Distributed Transactions – Atomic Commit Protocols – Concurrency Control in Distributed Transactions – Distributed Deadlocks – Transaction Recovery – Overview of Replication And Distributed MultimediaSystems.

TEXT BOOKS:

1. George Coulouris, Jean Dollimore and Tim Kindberg, "Distributed Systems ConceptsandDesign",3rdEdition,PearsonEducation,2002.
2. Andrew S. Tanenbaum, MaartenvanSteen, Distibuted Systems, "Principles and Pardigms", Pearson Education,2002.

REFERENCES:

1. SapeMullender,"DistributedSystems",2ndEdition,AddisonWesley,1993.
2. Albert Fleishman, Distributes Systems, "Software Design and Implementation", springer, Verlag,1994.
3. M.L.Liu,"DistributedComputingPrinciplesandApplications",PearsonEducation, 2004.

E- REFERENCES:

1. http://www.gecg.in/papers/ds5thedn.pdf
2. https://cs.uwaterloo.ca/~bernard/courses/cs454/0.Begin.pdf
3. https://www.cs.helsinki.fi/u/jakangas/Teaching/DistSys/DistSys-08f-1.pdf
4. https://courses.cs.ut.ee/MTAT.08.009/2014_fall/uploads/Main/slides10-2.pdf

COURSE OUTCOMES:

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

1. Structuring distributed applications: using client-server andremote procedure calls.
2. Learnsinterprocesscommunicationanddistributedobjects.
3. DesignCryptographicAlgorithmsandsecurityissuesfordistributedsystems.
4. Assess distributed filesystems.
5. Orderingof events:usinglogicalandphysicalclocks.

COS	Programme Outcomes(POs)												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		2	3		3								3	1	
CO2	1	3		2									2	1	
CO3			3	2	3				3				2	3	
CO4	2	3											2		
CO5	2	2			2								3		

CO- PO, PSO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

2021-22 Onwards (MR-21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. V Semester		
Code: B0527	MULTIMEDIA ANDANIMATION ECHNIQUES	L	T	P
Credits: 3		3	-	-

Prerequisites: Computer Graphics

COURSE OBJECTIVES:

This course will enable the students to learn the fundamental concepts of animation, creatingflashanimationconcepts,learnthe3danimationtechniques,applythemotion capturesoftwareforanimationandanalyzevariouscolormodels.

MODULEI:INTRODUCTION   [09PERIODS]

What is mean by Animation – Why we need Animation – History of Animation– Uses of Animation – Types of Animation – Principles of Animation – Some Techniques of Animation – Animation on the WEB – 3D Animation – Special Effects -Creating Animation.

MODULE II: Creating AnimationinFlash   [10   Periods] Introduction   to   Flash Animation – Introduction to Flash – Working with the Timeline and Frame-based   Animation - Working   with   the   Time   line   and Twinbasedanimation -UnderstandingLayers–Actionscript.

MODULE III: 3DAnimationEffects   [10 Periods]
    A: 3D Animation & its Concepts – Types of 3D Animation – Skeleton &Kinetic3D Animation.
B: Texturing & Lighting of 3D Animation – 3D Camera Tracking –Applications & Software of 3D Animation.

MODULE IV:MotionCapture   [09 Periods]
Motion Caption – Formats – Methods – Usages – Expression – Motion Capture Softwares' – Script Animation Usage – Different Languages of Script Animation among theSoftware.

MODULE V:COLORMODEL   [10PERIODS]

Concept Development –Story Developing –Audio &Video – Color Model –Device IndependentColorModel–   GammaandGammaCorrection-ProductionBudgets-3D AnimatedMovies.

TEXT BOOKS:

1.   Juke Parent, **"Computer Animation: Algorithms and   Techniques"**,   3rd Edition,(Hardcover,RickParent).
2.   Williams Richars, "**The Animator's Survival Kit--Revised Edition: A Manual of Methods, Principles and Formulas for Classical, Computer, Games, Stop Motion and Internet",** Faber & Faber,2012.

REFERENCES:

1. Alex Michael, **"Animating with Flash MX Professional Creative Animation Techniques"**, 1stedition Focal Press, 2003.

E-RESOURCES:

1. http://www.bkstr.com/floridastore/home Autodesk Maya2016
2. https://itunes.apple.com/us/app/the-animators-survival-kit/id627438690?mt=8
3. http://ieeexplore.ieee.org/document/7239940/
4. nptel.ac.in/courses/106102063/25

COURSE OUTCOMES:

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

1. **Understand** fundamental concepts ofanimation.
2. **Implement** animation using flashconcepts.
3. **Outline**thescriptingconceptsin3Danimationmethods.
4. **Analyze**thedifferentlanguagesofscriptinganimationtechniques.
5. **Apply**thestorydevelopingandcolormodelin3Danimatedmovies.

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	1	2			2							-	1		
CO2			3		3							3		2	
CO3					3							-		2	
CO4				2								-			
CO5			3		3							3		3	3

2021-22 Onwards(MR-21)	MALLAREDDYENGINEERING COLLEGE (Autonomous)	B.Tech. VI Semester		
Code:B6206	CRPTOGRAPHY AND NETWORK SECURITYLAB	L	T	P
Credits:1.5		-	-	3

LIST OF EXPERIMENTS:

1.   Write a C program that contains a string (char pointer) with a value ï¿½Hello worldï¿½.
  The program should XOR each character in this string with 0 and displays the result.
2.   Write a C program that contains a string (char pointer) with a value ï¿½Hello worldï¿½.
  The program should AND or and XOR each character in this string with 127 and display the result.
3.   Write a Java program to perform encryption and decryption using the following algorithms
1.   Ceaser cipher
2.   Substitution cipher
3.   Hill Cipher
4.   Write a C/JAVA program to implement the DES algorithm logic.
5.   Write a C/JAVA program to implement the Blowfish algorithm logic.
6.   Write a C/JAVA program to implement the Rijndael algorithm logic.
7.   Write the RC4 logic in Java Using Java cryptography; encrypt the text ï¿½Hello worldï¿½
  using Blowfish. Create your own key using Java key tool.
8.   Write a Java program to implement RSA algorithm.
9.   Implement the Diffie-Hellman Key Exchange mechanism using HTML and JavaScript.
10.   Calculate the message digest of a text using the SHA-1 algorithm in JAVA.
11.   Calculate the message digest of a text using the MD5 algorithm in JAVA.

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	3	2										2		2	
CO3	2	2										2		2	
CO4	3	2						2				2		2	
CO5	3	2										2		2	

2021-22 Onwards (MR-21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. V Semester		
Code: B6207	AUTOMATA AND COMPILER DESIGN LAB	L	T	P
Credits: 1.5		-	-	3

PREREQUISITES: NIL COURSE
OBJECTIVES:

Thiscourseoutlinesthemajorconceptareasoflanguagetranslationandvariousphases of compiler, extend the knowledge of parser by parsing LL parser and LR parser, analyzetheintermediateformsandtheroleofsymboltable,classifycodeoptimization techniquesandanalyzethedataflowanddevelopmachinecodegenerationalgorithms.
Software Requirements: C++ Compiler / JDK kit, (LEX, YACC) / UBUNTU

LIST OF PROGRAMS:

Consider the following mini Language, a simple procedural high-level language, only operating on integer data, with a syntax looking vaguely like a simple C crossed with Pascal.
The syntax of the language is defined by the following BNF grammar:
<program> ::= <block>
<block> ::= { <variabledefinition><slist> } | { <slist> }
<variabledefinition> ::= int<vardeflist>;
<vardeflist> ::= <vardec> | <vardec>, <vardeflist>
<vardec> ::= <identifier> | <identifier> [<constant>]
<slist> ::= <statement> | <statement>; <slist>
<statement> ::= <assignment> | <ifstatement> | <whilestatement> | <block> | <printstatement> | <empty>
<assignment> ::= <identifier> = <expression> | <identifier> [<expression>] = <expression>
<ifstatement> ::= <bexpression> then <slist> else <slist> endif | if <bexpression> then <slist> endif
<whilestatement> ::= while <bexpression> do <slist> enddo
<print statement> ::= print (<expression>)
<expression> ::= <expression><additionop><term> | <term> | addingop><term>
<bexpression> ::= <expression><relop><expression>
<relop> ::= < | <= | == | >= | > | !=
<addingop> ::= + | -
<term> ::= <term><mulitop><factor> | <factor>
<muli top> ::= * | /
<factor> ::= <constant> | <identifier> | <identifier> [<expression>] | (<expression>)
<constant> ::= <digit> | <digit><constant>
<identifier> ::= <identifier><letterordigit> | <letter>
<letterordigit> ::= <letter> | <digit>
<letter> ::= a|b|c|d|e|f|g|h|i|j|k|l|m|n|o|p|q|r|s|t|u|v|w|x|y|z
<digit> ::= 0|1|2|3|4|5|6|7|8|9
<empty> has the obvious meaning

Comments (zero or more characters enclosed between the standard C / Java style comment brackets /*...*/) can be inserted. The language has rudimentary support for 1-dimensional arrays.

The declaration
int a[3] declares an array of three elements, referenced as a[0], a[1] and a[2] Note also that you should worry about the scoping of names.

A simple program written in this language is:
```
{
int a[3], t1, t2; t1 = 2;
a[0] = 1; a[1] = 2; a[t1] = 3;
t2 = -(a[2] + t1 * 6)/ a[2] - t1);
if t2 > 5 then print(t2); else
{
int t3; t3 =99;
t2 =-25;
print(-t1 + t2 * t3); /* this is a comment on 2 lines */
}
endif
}
```

1. Design a Lexical analyzer for the above language. The lexical analyzer should ignore redundant spaces, tabs and newlines. It should also ignore comments. Although the syntax specification states that identifiers can be arbitrarily long, you may restrict the length to some reasonablevalue.

2. Implement the lexical analyzer using JLex, flex or lex or other lexical analyzer generatingtools.

3. WriteaCprogramtorecognizestringsunder'a*','a*b+','abb'

4. WriteaCprogramtotestwhetheragivenidentifierisvalidornot

5. Write a Program for Implementation ofrecursive descent Parser.

6. DesignPredictiveparserforthegivenlanguage.

7. Writeaprogramtocalculatefirstfunctionforthegivengrammar.

8. Write a Program forImplementation of Shift Reduce parsing

9. WriteaprogramtoDesignpredictiveparserorLL(1)parserforthegivengrammar.

10. DesignLALRbottomupparserfortheabovelanguage.

11. Convert the BNF rules into Yaccform and write code to generate abstract syntax tree.

12. Write program to generate machine code fromthe abstract syntax tree generated by theparser.

The following instruction set may be considered as target code.
Thefollowingisasimpleregister-based machine,supportingatotalof17instructions. Ithasthreedistinctinternalstorageareas.Thefirstisthesetof8registers,usedbythe individualinstructionsasdetailedbelow,thesecondisanareausedforthestorageof variablesandthethirdisanareausedforthestorageofprogram.Theinstructionscan beprecededbyalabel.Thisconsistsofanintegerintherange1to9999andthelabel isfollowedbyacolontoseperateitfromtherestoftheinstruction.Thenumericallabel canbeusedastheargumenttoajumpinstruction,asdetailedbelow.

In the description of the individual instructions below, instruction argument types are specified as follows:

R specifies a register in the form R0, R1, R2, R3, R4, R5, R6 or R7 (or r0, r1, etc). L specifies a numerical label (in the garbage 1 tp 9999).

V specifies a "variable location" (a variable number, or a variable location pointed to by a register - see below).

A specifies a constant value, a variable location, a register or a variable location pointed to by a register (an indirect address). Constant values are specified as an integer value,

optionally preceded by a minus sign, preceded by a # symbol. An indirect address is specified by an @ followed by a register.

So, for example an A-type argument could have the form 4 (variable number 4), #4 (the constant value 4), r4 (register 4) or @r4 (the contents of register 4 identifies the variable location to be accessed).

The instruction set is defined as follows: LOAD A, R

loads the integer value specified by A into register R. STORE R, V

stores the value in register R to variableV. OUTR

outputs the valuein register R. NEGR

negates the value in register R. ADD A, R

adds the value specified by A to register R, leaving the result in register R. SUB A, R

subtracts the value specified by A from register R, leaving the result in register R. MUL A, R

multiplies the value specified by A by register R, leaving the result in register R. DIV A, R

divides register R by the value specified by A, leaving the result in register R. JMP L

causesanunconditionaljumptotheinstructionwiththelabelL. JEQ R,L

jumpstotheinstructionwiththelabelLifthevalueinregisterRiszero. JNE R,L

jumpstotheinstructionwiththelabelLifthevalueinregisterRisnotzero. JGE R,L

jumps to the instruction with the label L if the value in register R is greater than or equal to zero. JGT R, L

jumps to the instruction with the label L if the value in register R is greater than zero. JLE R, L

jumps to the instruction with the label L if the value in register R is less than or equal to zero. JLT R, L

jumps to the instruction with the label L if the value in register R is less than zero. NOP

is an instruction with no effect. It can be tagged by a label. STOP

stops execution of the machine. All programs should terminate by executing a STOP instruction.

TEXT BOOKS:

1. A.V.Aho.J.D.Ullman,"**Principlesofcompilerdesign**",PearsonEducation.
2. Andrew N. Appel, "**Modern Compiler Implementation in C**", Cambridge UniversityPress.
3. D.M Dhamdhere, **Systemsprogrammingandoperating systems"** ,2ndedition,tataMcGrawhillpublishingcomppvt.Ltd.

REFERENCES:

1. JohnR.Levine,TonyMason,DougBrown,"**Lex&yacc**",O'reilly
2. DickGrune,HenryE.Bal,CarielT.H.Jacobs,"**ModernCompilerDesign**",Wiley dreamtech.
3. Cooper&Linda," **Engineering a Compiler**", Elsevier.
4. Louden," **Compiler Construction**",Thomson.

COURSE OUTCOMES:

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

1. **Apply**theknowledgeof lextool&yacctooltodevelopascanner&parser.
2. **Develop**programforsolvingparserproblems.
3. **Create** program forintermediate code generation.

4. **Write** code to generate abstract syntax tree and to convert BNF to YACC.
5. **Implement** target code from the abstract syntaxtree.

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	3	2										2		2	
CO3	2	2										2		2	
CO4	3	2					2					2		2	
CO5	3	2										2		2	

PRE REQUISITES: NIL

Quants: Number System (NS)

Number Systems-Factors and Multiples: The H.C.F. of two or more than two numbers; Factorization Method Division Method; Finding the H.C.F. of more than two numbers; product of two numbers = Product of their H.C.F. and L.C.M.;Co-primes;H.C.F.and L.C.M.ofFractions:ComparisonofFractions.

VERBAL: ARTICLES, PARA JUMBLES

Articles- Types of articles, Countable nouns, Uncountable nouns, Usage of articles, Omission ofarticles.

Para Jumbles- Para Jumbles, Types of Para Jumbles, Strategies to answer questions on JumbledParagraphs.

LOGICAL: DATA ARRANGEMENTS, BLOOD RELATION

Data Arrangements- Linear Arrangement, Circular Arrangement, Multi-DimensionalArrangement.

BloodRelations-Classificationofbloodrelations,Pointingaperson,Equation related problems.

MODULE–II[6PERIODS]

Quants: Time and Distance, Pipes

Time & Distance-;Km/hr to m/sec conversion; m/sec to km/hr conversion**;** over certain distance at x km/hr and an equal distance at y km/hr

VERBAL: SENTENCE COMPLETION, PREPOSITIONS

Sentence Completion- Formats of Question; Strategies to solve sentence completion questions-Proactive and reactive solving, Identifying clues-Signposts,Typesofsignposts,Rootwords,Sentencestructureclues.

Prepositions- Definition, Types of prepositions, Preposition of Place, Preposition of Time, Preposition of Direction, Compound Prepositions, PrepositionalPhrases.

LOGICAL: CODING AND DECODING

Coding and Decoding-Number Series, Alphabet Series, Analogy, Odd Man Out, VisualReasoning.

MODULE–III   [6PERIODS]

Quants: Ages, Progression, Logarithms

Ages, Progression-; Arithmetic progression; Arithmetic mean; Geometric progression andmean

Logarithms-Why logarithms: Properties of Logarithms: Laws of logarithm: Characteristic oflogarithm:

VERBAL: VOCABULARY: VOCABULARY-ETYMOLOGY, ROOT WORDS, PREFIXES AND SUFFIXES; SYNONYMS AND ANTONYMS,TIPSTOSOLVEQUESTIONSONSYNONYMSANDANTONYMS;WORDANALOGY, PATTERNSOFQUESTIONSONWORDANALOGY;MISCELLANEOUSVOCABULARY.

LOGICAL: DATA INTERPRETATION AND DATA SUFFICIENCY

DataInterpretation-Tables,Piecharts,BarGraphs,Linegraphs
Data Sufficiency-Strategies tosolve.

MODULE–IV   [6PERIODS]

Quants: Permutations and Combinations, Probability

Permutations-Factorial Notation: The different arrangements; Number of Permutations: number of all permutations of n things, taken all at a time; nsubjectsofwhich$p_1$arealikeofonekind;$p_2$arealikeofanotherkind; $p_3$are alikeofthirdkind;Numberof   Combinations:Thenumberofallcombinations ofnthings,takenratatime.

VERBAL: SENTENCE CORRECTION

Sentence Correction- Subject-Verb Agreement; Modifiers; Parallelism; Pronoun- Antecedent Agreement; Verb Time Sequence; Comparisons; Determiners; ExerciseQuestions.

LOGICAL: CLOCKS AND CALENDARS

Clocks: Introduction, Derivation of angles, Angles between hands of the clock, Handstogether,Handsatangulardistance,Gain&Lossproblems.
Calendars: - Leap year-Non leap year, Odd days, Finding the day from date,Repeatedyears.

MODULE-V: [6PERIODS]

Quants: Areas and Volumes (Mensuration)

Areas &Volumes-Pythagoras Theorem Results on Quadrilaterals Perimeter; Area of a circle Circumference Length of an arc Area of a sector; Area of a triangle.

VERBAL: READING COMPREHENSION, CRITICAL REASONING

ReadingComprehension-Speedreadingstrategies;ReadingComprehension
- types of questions, tackling strategies; Critical Reasoning.

LOGICAL: DIRECTIONS, CUBES, SYLLOGISMS

Directions-Introduction,Directionbasedquestions,Shadowbasedproblems.
Cubes-Cube&cuboidconcepts,3-2-1-0facedproblems.
Syllogisms-StatementsandConclusion,SyllogismsusingVennDiagrams

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				2
CO2						2		2				2
CO3						2		2				2
CO4						2		2				2
CO5						2		2				2

PREREQUISITES: NIL

Course Objectives: EEA is a think beyond program which will make the student to examine the application of microeconomics theory as applied to the manager's responsibilities in an organization. To explain the basic principles of managerial economics, accounting and current business environment underlying business decision making. This course should emphasize the quantitative and qualitative applications of economic principle to business analysis

MODULE-1 Business Environment and Managerial Economics   [10 Periods]
Business Environment: Characteristic features of Business, Features and evaluation of Sole Proprietorship, Partnership, Joint Stock Company, Public Enterprises and their types, Latest trends in Business Environment (Entrepreneurship).
Managerial Economics: Definition, Nature and Scope of Managerial Economics– Demand Analysis: Demand Determinants, Law of Demand and its exceptions. Elasticity of Demand, Types, Significance of Elasticity of Demand, Demand Forecasting, Factors governing demand forecasting, methods of demand forecasting.

MODULE – II   Theory of Production and Cost Analysis   [10 Periods] Theory of Production: Production Function – ISO quants and ISO costs, MRTS, Least Cost Combination of Inputs, Cobb-Douglas Production function, Laws of Returns, Internal and External Economies of Scale.
Cost Analysis: Cost concepts, Opportunity cost, fixed vs. Variable costs, explicit costs Vs. Implicit costs, Out of pocket costs vs. Imputed costs. Break-even Analysis (BEA)- Determination of Break-Even Point (simple problems) - Managerial Significance and limitations of BEA.

MODULE – III MARKET STRUCTURES AND PRICING POLICIES   [09 PERIODS]

A. **Introduction to Markets & Market structures:** Types of competition, Features of Perfect competition, Monopoly and Monopolistic Competition. Price-Output Determination in case of Perfect Competition and Monopoly.
B. **Pricing Policies & Methods:** Cost plus Pricing, Marginal Cost Pricing, Sealed Bid Pricing, Going Rate Pricing, PLC based pricing methods.

MODULE – IV   Capital and Capital Budgeting   [09 Periods]
Capital: Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements, Methods and sources of raising finance.
Capital Budgeting: Nature and scope of capital budgeting, features of capital budgeting proposals, Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR) and Net Present Value Method (simple problems)

MODULE – V FINANCIAL ACCOUNTING AND RATIOS   [10 PERIODS]

Financial Accounting: Introduction, Accounting principles, Accounting Cycle, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments).

Financial Analysis Through Ratios: Computation, Analysis and Interpretation of Liquidity Ratios (Current Ratio and quick ratio), Activity Ratios (Inventory turnover ratio and Debtor Turnover ratio), Capital structure Ratios (Debt- Equity ratio, Interest Coverage ratio), and Profitability ratios (Gross Profit Ratio, Net Profit ratio, Operating Ratio, P/E Ratio and EPS).

TEXT BOOKS:

1. Aryasri, "**Managerial Economics and Financial Analysis**", TMH, 2nd edition, 2005.
2. Varshney&Maheswari,"**ManagerialEconomics**",5th editionSultanChand,2003

REFERENCES:

1. H. Craig Peterson & W. Cris Lewis, "**Managerial Economics**", PHI,4th Edition.
2. Domnick Salvatore, "**Managerial Economics In a Global Economy**", Thomson, 4th Edition.
3. Raghunatha Reddy &Narasimhachary, "**Managerial Economics & Financial Analysis**", 4th Edition Scitech.
4. S.N.Maheswari&S.K.Maheswari,"**FinancialAccounting**",6thEdition Vikas.
5. Dwivedi,"**ManagerialEconomics**",Vikas,6thEdition.

E-RESOURCES:

1. http://www.learnerstv.com/Free-Economics-video-lecture-courses.htm
2. http://nptel.ac.in/courses/110105067/
3. http://nptel.ac.in/courses/110107073/
4. http://nptel.ac.in/courses/110101005/
5. http://nptel.ac.in/courses/109104073/

COURSE OUTCOMES:

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

1. Understand the concepts of managerial economics and their application in evaluating the demand.
2. Evaluatetheproductionfunctionandidentifiestheleastcostcombinationtocontrol the costs of production.
3. Understandthestructuresofvariousmarkettypesandtheirpricingpolicies.
4. Understand the types of business forms and also be able to evaluate the investments using capital budgeting techniques.
5. Understandthebasicconceptsoffinancialaccountingandevaluationofcompany performance using ratio analysis.

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

2021-22 Onwards (MR-21)	MALLAREDDYENGINEERING COLLEGE (Autonomous)	B.Tech. VISemester		
Code:B6208	**ETHICAL HACKING**	L	T	P
Credits:3		3	-	-

Prerequisites:

- A course on "Operating Systems"
- A course on "Computer Networks"
- A course on "Network Security and Cryptography"

Course Objectives:

- The aim of the course is to introduce the methodologies and framework of ethical hacking for enhancing the security.
- The course includes-Impacts of Hacking; Types of Hackers; Information Security Models; Information Security Program; Business Perspective; Planning a Controlled Attack; Framework of Steps (Reconnaissance, Enumeration, Vulnerability Analysis, Exploitation, Deliverable and Integration)

MODULE – I: Introduction
Hacking Impacts, The Hacker Framework: Planning the test, Sound Operations, Reconnaissance, Enumeration, Vulnerability Analysis, Exploitation, Final Analysis, Deliverable, Integration Information Security Models: Computer Security, Network Security, Service Security, Application Security, Security Architecture Information Security Program: The Process of Information Security, Component Parts of Information Security Program, Risk Analysis and Ethical Hacking

MODULE – II: The Business Perspective
Business Objectives, Security Policy, Previous Test Results, Business Challenges Planning for a Controlled Attack: Inherent Limitations, Imposed Limitations, Timing is Everything, Attack Type, Source Point, Required Knowledge, Multi-Phased Attacks, Teaming and Attack Structure, Engagement Planner, The Right Security Consultant, The Tester, Logistics, Intermediates, Law Enforcement

MODULE – III: Preparing for a Hack
Technical Preparation, Managing the Engagement Reconnaissance: Social Engineering, Physical Security, Internet Reconnaissance

MODULE – IV:Enumeration
Enumeration Techniques, Soft Objective, Looking Around or Attack, Elements of Enumeration, Preparing for the Next Phase Exploitation: Intutive Testing, Evasion, Threads and Groups, Operating Systems, Password Crackers, RootKits, applications, Wardialing, Network, Services and Areas of Concern

MODULE -V: Deliverable
The Deliverable, The Document, Overal Structure, Aligning Findings, Presentation Integration: Integrating the Results, Integration Summary, Mitigation, Defense Planning, Incident Management, Security Policy, Conclusion

TEXT BOOK

- James S. Tiller, "The Ethical Hack: A Framework for Business Value Penetration Testing", Auerbach Publications, CRC Press

REFERENCE BOOKS

- EC-Council, "Ethical Hacking and Countermeasures Attack Phases", Cengage Learning
- Michael Simpson, Kent Backman, James Corley, "Hands-On Ethical Hacking and Network Defense", Cengage Learning

Course Outcomes:

- Gain the knowledge of the use and availability of tools to support an ethical hack
- Gain the knowledge of interpreting the results of a controlled attack
- Understand the role of politics, inherent and imposed limitations and metrics for planning of a test
- Comprehend the dangers associated with penetration testing

CO-PO,PSOMapping (3/2/1indicatesstrengthofcorrelation)3-Strong,2-Medium,1-Weak															
CO	ProgrammeOutcomes(POs)												PSOs		
	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO	1	1	1	1										1	1	1
CO	1	2	2	2	1								1	1		2
CO	1	1	1	2	1								1	1		1
CO	1	1	1	1	1								1	1	1	1
CO	1	2	2	2	2								2	2	1	3

PRE REQUISITES: NIL

Course Objectives:

This course provides the students to understand stages in building a Data Warehouse,identifytheneedandimportanceofpreprocessingtechniques,implementsimilarity anddissimilaritytechniques,analyzeandevaluateperformanceofalgorithmsforAssociation Rules,analyzeClassificationandClusteringalgorithms.

MODULEI: Introduction and Mining Issues & Data   [09Periods]

Introduction- Why Data Mining? What Is Data Mining? What Kinds of Data Can Be mined? What Kinds of Patterns Can Be Mined? Which Technologies Are Used? Which Kinds of Applications Are Targeted?

Mining Issues and Data-Major Issues in Data Mining, Types of Data, Data Quality

MODULE II: Data, Measuring Data Similarity and Dissimilarity [10 Periods]

Data – Data Pre-processing, Aggregation, Sampling, Dimensionality Reduction, Feature Subset Selection, Feature Creation, Data Discretization and Binarization, Variable transformation.

Measuring Data Similarity and Dissimilarity- Similarity and Dissimilarity between simple attributes, Dissimilarities and similarities between data objects, Examples of Proximity measures, Issues in Proximity Calculation, Selection of right proximity measure.

MODULEIII: Classification and Techniques   [09Periods]

A: Classification -Basic Concepts, General Approach to solving a classification problem, Decision Tree Induction: Working of Decision Tree, building a decision tree .**B: Techniques-**Methods for expressing an attribute test conditions, measures for selecting the best split, Algorithm for decision tree induction.

MODULEIV: Classifier and Association Analysis   [10Periods]

Classifiers -Alterative Techniques**,** Bayes' Theorem, Naïve Bayesian Classification, Bayesian Belief Networks

Association Analysis - Basic Concepts and Algorithms: Problem Definition, Frequent Item Set generation, Rule generation, compact representation of frequent item sets, FP-Growth Algorithm

MODULEV: Cluster Analysis and DBSCAN   [10Periods]

Cluster Analysis- Basic Concepts and Algorithms: Overview: What Is Cluster Analysis? Different Types of Clustering, Different Types of Clusters; K-means: The Basic K-means Algorithm, K-means Additional Issues, Bisecting K-means, Strengths and Weaknesses; Agglomerative Hierarchical Clustering: Basic Agglomerative Hierarchical Clustering Algorithm.

DBSCAN- Traditional Density Center- Based Approach, DBSCAN Algorithm, Strengths and Weaknesses.

TEXTBOOKS:

1. Pang-Ning Tan & Michael Steinbach, "**Introduction to DataMining**", VipinKumar, Pearson.
2. JiaweiHan,MichelKamber,"**DataMiningconceptsandTechniques**",3/e, Elsevier.

REFERENCES:

1. HongboDu,"**DataMiningTechniquesandApplications:AnIntroduction**",CengageLearning.
2. Vikram PudiandP. Radha Krishna, "**DataMining**", Oxford.
3. MohammedJ.Zaki,WagnerMeira,Jr,"**Data Mining and Analysis-fundamental Concepts and Algorithms**",Oxford
4. Alex Berson,StephenSmith,"**Data Warehousing Data Mining & OLAP**",TMH.

E-RESOURCES:

1. http://www-users.cs.umn.edu/~kumar/dmbook/index.php
2. http://myweb.sabanciuniv.edu/rdehkharghani/files/2016/02/The-Morgan-Kaufmann-Series-in-Data-Management-Systems-Jiawei-Han-Micheline-Kamber-Jian-Pei-Data-Mining.-Concepts-and-Techniques-3rd-Edition-Morgan-Kaufmann-2011.pdf
3. http://www.ijctee.org/files/Issuethree/IJCTEE_1111_20.pdf
4. http://www.ccsc.org/southcentral/E-Journal/2010/Papers/Yihao%20final%20paper%20CCSC%20for%20submission.pdf
5. https://gunjesh.wordpress.com/

COURSE OUTCOMES:

At the end of the course, students willbe able to
1. **Acquire** knowledge in building a DataWarehouse
2. **Understand** the need and importance of preprocessing techniques
3. **Implement** Similarity and dissimilarity techniques
4. **Analyze** and evaluate performance of algorithms for Association Rules.
5. **Deploy** Classification and Clustering algorithms

CO	Programme Outcomes (POs)												PSOs		
	sPO	PO	PO	PO	PO	PO	PO	PO	PO	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO	1	1	1	1									1	1	1
CO	1	2	2	2	1								1	1	2
CO	1	1	1	2	1								1	1	1
CO	1	1	1	1	1								1	1	1
CO	1	2	2	2	2							2	2	1	3

CO-PO, PSO Mapping
(3/2/1indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

2021-22 Onwards (MR-21)	MALLAREDDYENGINEERING COLLEGE (Autonomous)	B.Tech. VI Semester		
Code:B6209	**CRYPT ANALYSIS**	**L**	**T**	**P**
Credits:3		3	-	-

Prerequisites: A Course on "Computer Networks, Mathematics".

Course Objectives:

☐ To understand the importance of cryptanalysis in our increasingly computer- driven world.

☐ To understand the fundamentals of Cryptography

☐ To understand the Lattice- based cryptanalysis and elliptic curves andpairings

☐ To understand birthday- based algorithms for functions and attacks on streamciphers

☐ To apply the techniques for secure transactions in real worldapplications

MODULE- I

A bird's – eye view of modern Cryptography: Preliminaries, Defining Security in Cryptography **Monoalphabetic Ciphers:** Using Direct Standard Alphabets, The Caesar Cipher, Modular arithmetic, Direct Standard alphabets, Solution of direct standard alphabets by completing the plain component, Solving direct standard alphabets by frequency considerations, Alphabets based on decimations of the normal sequence, Solution of decimated standard alphabets, Monoalphabets based on linear transformation. **Polyalphabetic Substitution:** Polyalphabetic ciphers, Recognition of polyalphabetic ciphers, Determination of number of alphabets, Solution of individual alphabets if standard, Polyalphabetic ciphers with a mixed plain sequence, Matching alphabets, Reduction of a polyalphabetic cipher to a monoalphabetic ciphers with mixed cipher sequences

MODULE - II

Transposition: Columnar transposition, Solution of transpositions with Completely filled rectangles, Incompletely filled rectangles, Solution of incompletely filled rectangles – Probable word method, Incompletely filled rectangles general case, Repetitions between messages; identical length messages. **Sieve algorithms:** Introductory example: Eratosthenes's sieve, Sieving for smooth composites

MODULE - III

Brute force Cryptanalysis: Introductory example: Dictionary attacks, Brute force and the DES Algorithm, Brute force as a security mechanism, Brute force steps in advanced cryptanalysis, Brute force and parallel computers. **The birthday paradox: Sorting or not?:** Introductory example: Birthday attacks on modes of operation, Analysis of birthday paradox bounds, Finding collisions, Application to discrete logarithms in genericgroups.

MODULE - IV

Birthday- based algorithms for functions: Algorithmic aspects, Analysis of random functions, Number-theoretic applications, A direct cryptographic application in the context of blockwise security, Collisions in hash functions. **Attacks on stream ciphers:** LFSR- based key stream generators,

Correlation attacks, Noisy LFSR model, Algebraic attacks, Extension to some non- linear shift registers, The cube attack.

MODULE - V

Lattice- based cryptanalysis: Direct attacks using lattice reduction, Coppersmith's small roots attacks. **Elliptic curves and pairings:** Introduction to elliptic curves, The Weil pairing, the elliptic curve factoringmethod.

TEXT BOOKS:

1. Elementary Cryptanalysis A Mathematical Approach by Abraham Sinkov, The mathematical Association of America(lnc).
2. Algorithmic Cryptanalysis" by Antoine joux, CRCPress'

REFERENCES:

1. Algebraic Cryptanalysis, Bard Gregory, Springer,2009
2. Cryptanalysis of Number Theoretic Ciphers, Sameul S. Wag staff, Champan&Hall/CRC.
3. Cryptanalysis: A Study of Cipher and Their Solution, Helen F.Gaines,1989

COURSE OUTCOMES:

- ☐ Ability to apply cryptanalysis in system design to protect it from variousattacks.
- ☐ Ability to identify and investigate vulnerabilities and security threats and the mechanisms to counter them.
- ☐ Ability to analyze security of cryptographic algorithm against brute force attacks, birthday attacks.

CO	CO-PO,PSOMapping (3/2/1indicatesstrengthofcorrelation)3-Strong,2-Medium,1-Weak													
	ProgrammeOutcomes(POs)											PSOs		
	sPO	PO	PO	PO	PO	PO	PO	PO	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO	1	1	1	1								1	1	1
CO	1	2	2	2	1						1	1		2
CO	1	1	1	2	1						1	1		1
CO	1	1	1	1	1						1	1	1	1
CO	1	2	2	2	2						2	2	1	3

2021-22 Onwards (MR-21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	M.Tech II Sem		
Code: B6210	ADVANCED WIRELESS NETWORKS	L	T	P
Credits: 3		3	-	-

Pre-Requisites: Computer Networks

Course Objectives:

☐ The students should get familiar with the wireless/mobile market and the future needs and challenges.

☐ To get familiar with key concepts of wireless networks, standards, technologies and their basic Operations.

☐ To learn how to design and analyse various mediumaccess.

☐ To learn how to evaluate MAC and network protocols using network simulation softwaretools.

☐ The students should get familiar with the wireless/mobile market and the future needsand challenges.

Course Outcomes: After completion of course, students would be able to:

☐ Demonstrate advanced knowledge of networking and wireless networking and understand various types of wireless networks, standards, operations and usecases.

☐ Be able to design WLAN, WPAN, WWAN, Cellular based upon underlying propagation and performanceanalysis.

☐ Demonstrate knowledge of protocols used in wireless networks and learn simulating wireless networks.

☐ Design wireless networks exploring trade-offs between wire line and wirelesslinks.

☐ Develop mobile applications to solve some of the real-worldproblems.

MODULE - I

Introduction:

Wireless Networking Trends, Key Wireless Physical Layer Concepts, Multiple Access Technologies - CDMA, FDMA, TDMA, Spread Spectrum technologies, Frequency reuse, Radio Propagation and Modelling, Challenges in Mobile Computing: Resource poorness, Bandwidth, energy etc.

WIRELESS LOCAL AREA NETWORKS:

IEEE 802.11 Wireless LANs Physical & MAC layer, 802.11 MAC Modes (DCF& PCF) IEEE 802.11 standards, Architecture & protocols, Infrastructure vs. Adhoc Modes, Hidden Node & Exposed Terminal Problem, Problems, Fading Effects in Indoor and outdoor WLANs, WLAN Deployment issues

MODULE – II

Wireless Cellular Networks:

1G and 2G, 2.5G, 3G, and 4G, Mobile IPv4, Mobile IPv6, TCP over Wireless Networks, Cellular architecture, Frequency reuse, Channel assignment strategies, Handoff strategies,

Interference and system capacity, Improving coverage and capacity in cellular systems, Spread spectrum Technologies.

MODULE - III

WiMAX (Physical layer, Media access control, Mobility and Networking), IEEE802.22 Wireless Regional Area Networks, IEEE 802.21 Media Independent Handover Overview

WIRELESS SENSOR NETWORKS:
Introduction, Application, Physical, MAC layer and Network Layer, Power Management, Tiny OS Overview.

MODULE - IV

Wireless PANs:
Bluetooth AND Zigbee, Introduction to Wireless Sensors,.

MODULE - V

Security:
Security in wireless Networks Vulnerabilities, Security techniques, Wi-Fi Security, DoS in wireless communication.

ADVANCED TOPICS
IEEE 802.11x and IEEE 802.11i standards, Introduction to Vehicular Adhoc Networks

REFERENCES:

1. Schiller J., Mobile Communications, Addison Wesley2000
2. Stallings W., Wireless Communications and Networks, Pearson Education2005
3. Stojmenic Ivan, Handbook of Wireless Networks and Mobile Computing, John Wiley and Sons Inc2002
4. Yi Bing Lin and Imrich Chlamtac, Wireless and Mobile Network Architectures, John Wiley and Sons Inc2000
5. Pandya Raj, Mobile and Personal Communications Systems and Services, PHI200

CO- PO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak						
COs	Program Outcomes (POs)					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	1		1			
CO2	1		1			
CO3			1		1	
CO4			1		2	1
CO5	1		1	1	2	3

2021-22 Onwards (MR-21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. VIII Semester		
Code: B0532	**MOBILE COMPUTING**	**L**	**T**	**P**
Credits: 3		3	-	-

PREREQUISITES: **NIL**

MODULE I:

Mobile Computing: Novel Applications, Limitations of Mobile Computing, Mobile Computing Architecture: Programming languages, Functions of Operating Systems, Functions of Middleware for mobile Systems, Mobile Computing Architectural layers, Protocols, Layers.

MODULE II:

Mobile Devices: Handheld Mobile Smartphones with Multimedia Functionalities, Smartcards, Smart Sensors,Mobile System Networks: Cellular Network, WLAN Network and Mobile IP, Ad-hoc Networks, Mobility Management

MODULE III:

Global System For Mobile Communications (Gsm): Mobile Services, System Architecture, Protocols, Localization & Calling, Handover, Security. GPRS: GPRS System Architecture, UMTS: UMTS System Architecture. LTE: Long Term Evolution

MODULE IV:

Mobile Network Layer: Mobile IP: Goals, Assumptions, Entities and Terminology, IP Packet Delivery, Agent Discovery, Registration, Tunneling and Encapsulation, Optimizations, Dynamic Host Configuration Protocol (DHCP) Mobile Transport Layer: Traditional TCP, Indirect TCP, Snooping TCP, Mobile TCP, Fast retransmit/fast recovery, Transmission /time-out freezing, Selective retransmission, Transaction oriented TCP, TCP over 2.5G/3G Wireless Networks.

MODULE V:

Security Issues in Mobile Computing: Introduction, Information Security, Security Techniques and Algorithms, Security Protocols, Security Models, Security Frameworks for mobile Environment.

TEXT BOOKS:

1. Raj Kamal, "Mobile Computing", OXFORD UNIVERSITY PRESS.
2. Asoke K Talukder, et al, "Mobile Computing", Tata McGraw Hill, 2008.

REFERENCES:

1. Jochen Schiller, "Mobile Communications", Pearson Education, Second Edition, 2008.
2. Dr. Sunilkumar, et al "Wireless and Mobile Networks: Concepts and Protocols", Wiley India.
3. Matthew S.Gast, "802.11 Wireless Networks", SPD O'REILLY.

CO- PO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak						
COs	**Program Outcomes (POs)**					
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**
CO1	1		1			
CO2	1		1			
CO3			1		1	
CO4			1		2	1
CO5	1		1	1	2	3

Pre-requisite: DataStructures

Course Objectives:

- TolearntheimportantconceptsandalgorithmsinIRS
- Tounderstandthedata/filestructuresthatarenecessarytodesign,andimplementinformation retrieval(IR)systems.

MODULE I

IntroductiontoInformationRetrievalSystems:DefinitionofInformationRetrievalSystem,ObjectivesofInformationRetrievalSystems,FunctionalOverview,RelationshiptoDatabaseManagement Systems,DigitalLibrariesand DataWarehouses

Information Retrieval System Capabilities: Search Capabilities, Browse Capabilities, MiscellaneousCapabilities

MODULEII

Cataloging and Indexing: History and Objectives of Indexing, Indexing Process, Automatic Indexing,InformationExtraction

Data Structure: Introduction to Data Structure, Stemming Algorithms, Inverted File Structure, N-GramData Structures, PAT Data Structure, Signature File Structure, Hypertext and XML Data Structures,HiddenMarkovModels

MODULE III

Automatic Indexing: Classes of Automatic Indexing, Statistical Indexing, Natural Language, ConceptIndexing,HypertextLinkages

Document and Term Clustering: Introduction to Clustering, Thesaurus Generation, Item Clustering,Hierarchy ofClusters

MODULE IV

UserSearchTechniques:SearchStatementsandBinding,SimilarityMeasuresandRanking,Relevance Feedback, Selective Dissemination of Information Search, Weighted Searches of BooleanSystems,Searching theINTERNETand Hypertext

InformationVisualization:IntroductiontoInformationVisualization,CognitionandPerception,InformationVisualizationTechnologies

MODULE V

Text Search Algorithms: Introduction to Text Search Techniques, Software Text Search Algorithms,HardwareTextSearchSystems

Multimedia Information Retrieval: Spoken Language Audio Retrieval, Non-Speech Audio Retrieval,GraphRetrieval,ImageryRetrieval,Video   Retrieval

TEXTBOOK:

1.InformationStorageandRetrievalSystems–
TheoryandImplementation,SecondEdition,GeraldJ.Kowalski,MarkT.Maybury,Springer

REFERENCES

1. Frakes,W.B.,RicardoBaeza-
Yates:InformationRetrievalDataStructuresandAlgorithms,PrenticeHall,1992.
2. InformationStorage& RetrievalBy RobertKorfhage–JohnWiley&Sons.
3. ModernInformationRetrievalByYatesandNetoPearsonEducation.

COURSEOUTCOMES:

- AbilitytoapplyIRprinciplestolocaterelevantinformationlarge collectionsofdata
- Abilitytodesigndifferentdocument clusteringalgorithms
- Implement retrievalsystemsforwebsearchtasks.
- DesignanInformationRetrievalSystemforwebsearchtasks.

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

2021-22 Onwards (MR-21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B. Tech. VI Semester		
Code: B0540	**IT SECURITY METRICS**	**L**	**T**	**P**
Credits: 3		3	-	-

Learning Objectives:

      To learn security metrics.

      To learn The Security Process Management Framework.

      To learn Measurements Security Operations.

      To learn Measuring Security Cost and Value.

      To learn The Security Improvement Program.

MODULE-1: What Is a Security Metric? Metric and Measurement, Security Metrics Today, The Dissatisfying State of Security Metrics, Reassessing Our Ideas About Security Metrics. Designing Effective Security Metrics: Choosing Good Metrics, GQM for Better Security Metrics, More Security Uses for GQM, Summary.

MODULE-2: Understanding Data: What Are Data? Data Sources for Security Metrics; We Have Metrics and Data -Now what, Summary, Case Study 1. The Security Process Management Framework: Managing Security as a Business Process, the SPM Framework, Before You Begin SPM, Summary. The Analyzing Security Metrics Data: The Most Important Step, Analysis Tools and Techniques, Summary. Designing the Security Measurement Project: Before the Project Begins, Phase One: Build a Project Plan and Assemble the Team, Phase two: Gather the Metrics Data, phase Three: Analyze the Metrics Data and Build Conclusions, phase Four: Present Results, Phase Five: Reuse the Results, Project Management Tools, Summary.

MODULE-3: Measurements Security Operations: Sample Metrics for Security Operations, Sample Measurement Project for Security Operations, Summary. Measuring Compliance and Conformance: The Challenges of Measuring Compliance, Sample Measurement Projects for Compliance and Conformance, Summary.

MODULE-4: Measuring Security Cost and Value: Sample Measurement Projects for Compliance and Conformance, The Importance of Data to Measuring Cost and Value, Summary. Measuring People, Organizations, and Culture: Sample Measurement Projects for People, Organizations, and Culture, Summary.

MODULE-5: The Security Improvement Program: Moving from Projects to Programs, Managing Security Measurement with a Security, Requirements for a SIP, Measuring the SIP, Summary. Learning Security: Different Contexts for Security Process Management: Organizational Learning, Three Learning Styles for IT Security Metrics, Final Thoughts, Summary.

TEXTBOOKS:
1. IT SECURITY METRICS, Lance Hayden, TATA McGraw-HILL.
2. SECURITY METRICS, CAROLINE WONG, TATA McGraw-HILL

O- PO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak						
COs	**Program Outcomes (POs)**					
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**
CO1	1		1			
CO2	1		1			
CO3			1		1	
CO4			1		2	1
CO5	1		1	1	2	3

2021-22 Onwards (MR-21)	**MALLA REDDY ENGINEERING COLLEGE** (Autonomous)	**B. Tech.** VI Semester		
Code: B0540	**INTERNET TECHNOLOGIES AND SERVICES**	L	T	P
Credits: 3		3	-	-

Objective:

The student who has knowledge of programming with java should be able to develop web based solutions using multi-tier architecture. S/he should have good understanding of different technologies on client and server side components as Follows:

Client Side: HTML5, CSS3, Javascript, Ajax, JQuery and JSON

Server Side: Servlets, JSP

Database: MySQL with Hibernate and Connection Pooling

Framework: Struts with validation framework, Internationalization (I18N)

SOA: Service Oriented Architecture, Web services fundamentals, Axis framework for WS

MODULE I: Client Side Technologies: Overview of HTML - Common tags, XHTML, capabilities of HTML5 Cascading Style sheets, CSS3 enhancements, linking to HTML Pages, Classes in CSS Introduction to JavaScripts, variables, arrays, methods and string manipulation, BOM/DOM (Browser/Document Object Model), accessing elements by ID, Objects in JavaScript Dynamic HTML with JavaScript and with CSS, form validation with JavaScript, Handling Timer Events Simplifying scripting with JQuery, JASON for Information exchange.

MODULE II: Introduction to Java Servlets: Introduction to Servlets: Lifecycle of a Servlet, Reading request and initialization parameters, Writing output to response, MIME types in response, Session Tracking: Using Cookies and Sessions Steps involved in Deploying an application Database Access with JDBC and Connection Pooling Introduction to XML, XML Parsing with DOM and SAX Parsers in Java Ajax - Ajax programming with JSP/Servlets, creating XML Http Object for various browsers, Sending request, Processing response data and displaying it. Introduction to Hibernate

MODULE III: Introduction to JSP: JSP Application Development: Types of JSP Constructs (Directives, Declarations, Expressions, Code Snippets), Generating Dynamic Content, Exception Handling, Implicit JSP Objects, 30 SCHOOL OF IT,JNT UNIVERSITY HYDERABAD-500085 : : REGULATIONS,COURSE STRUCTURE & SYLLABUS FOR M.TECH(CNIS) W.E.F 2019-20 Conditional Processing, Sharing Data Between JSP pages, Sharing Session and Application Data, Using user defined classes with jsp:useBean tag, Accessing a Database from a JSP.

MODULE IV: Introduction to Struts Framework: Introduction to MVC architecture, Anatomy of a simple struts2 application, struts configuration file, Presentation layer with JSP, JSP bean, html and logic tag libraries, Struts Controller class, Using form data in Actions, Page Forwarding, validation frame work, Internationalization

MODULE V : Service Oriented Architecture and Web Services Overview of Service Oriented Architecture – SOA concepts, Key Service Characteristics, Technical Benefits of a SOA Introduction to Web Services– The definition of web services, basic operational model of web services, basic steps of implementing web services. Core fundamentals of SOAP – SOAP Message Structure, SOAP encoding, SOAP message exchange models, Describing Web Services –Web Services life cycle, anatomy of WSDL Introduction to Axis– Installing axis web service framework, deploying a java web service on axis. Web Services Interoperability – Creating java and .Net client applications for an Axis Web Service (Note: The Reference Platform for the course will be open source products Apache Tomcat Application Server, MySQL database, Hibernate and Axis) .

TEXT BOOKS:

1. Web Programming, building internet applications, Chris Bates 3rd edition, WILEY Dreamtech .

2. The complete Reference Java 7th Edition , Herbert Schildt., TMH.

3. Java Server Pages,Hans Bergsten, SPD, O'Reilly.

4. Professional Jakarta Struts - James Goodwill, Richard Hightower, Wrox Publishers.

5. Developing Java Web Services, R. Nagappan, R. Skoczylas, R.P. Sriganesh, Wiley India, rp – 2008.

6. Understanding SOA with Web Services, Eric Newcomer and Greg Lomow, Pearson Edition – 2009

7. Java Web Service Architecture, James McGovern, Sameer Tyagi et al., Elsevier – 2009

REFERENCES:

 1. Programming the world wide web,4th edition,R.W.Sebesta,Pearson

2. Core SERVLETS ANDJAVASERVER PAGES VOLUME 1: CORE TECHNOLOGIES , Marty Hall and Larry Brown Pearson

 3. Internet and World Wide Web – How to program , Dietel and Nieto PHI/Pearson.

4. Jakarta Struts Cookbook , Bill Siggelkow, S P D O'Reilly.

5. Professional Java Server Programming,S.Allamaraju & othersApress(dreamtech).

6. Java Server Programming ,Ivan Bayross and others, The X Team,SPD

7. Web Warrior Guide to Web Programmming-Bai/Ekedaw-Cengage Learning.

8.BeginningWebProgramming-JonDuckett,WROX.

CO- PO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak						
COs	**Program Outcomes (POs)**					
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**
CO1	1		1			
CO2	1		1			
CO3			1		1	
CO4			1		2	1
CO5	1		1	1	2	3

2021-22 Onwards (MR-21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B. Tech. VI Semester		
Code: B0540	CLOUD COMPUTING	L	T	P
Credits: 3		3	-	-

Objectives:

Cloud computing has evolved as a very important computing model, which enables information, software, and shared resources to be provisioned over the network as services in an on-demand manner.

This course provides an insight into what is cloud computing and the various services cloud is capable.

MODULE I: Computing Paradigms, High-Performance Computing, Parallel Computing.Distributed Computing.ClusterComputing.Grid Computing, Cloud Computing., Biocomputing, Mobile Computing.QuantumComputing, Optical Computing. Nanocomputing.

MODULE II: Cloud Computing Fundamentals: Motivation for Cloud Computing, The Need for Cloud Computing, Defining Cloud Computing, Definition of Cloud computing, Cloud Computing Is a Service, Cloud Computing Is a Platform, Principles of Cloud computing, Five Essential Characteristics...Four Cloud Deployment Models .

MODULE III: Cloud Computing Architecture and Management: Cloud architecture, Layer, Anatomy of the Cloud, Network Connectivity in Cloud Computing, Applications, on the Cloud, Managing the Cloud, Managing the Cloud Infrastructure Managing the Cloud application, Migrating Application to Cloud, Phases of Cloud Migration Approaches for Cloud Migration.

MODULE IV: Cloud Service Models: Infrastructure as a Service, Characteristics of IaaS.Suitability of IaaS,Pros and Cons of IaaS,Summary of IaaS Providers,Platform as a Service,Characteristics of PaaS,Suitability of PaaS,Pros and Cons of PaaS,Summary of PaaS Providers,Software as a Service,Characteristics of SaaS, Suitability of SaaS, Pros and Cons of SaaS,Summary of SaaS Providers.Other Cloud Service Models.

MODULE V: Cloud Service Providers:EMC,EMC IT,Captiva Cloud Toolkit,Google,Cloud Platform,Cloud Storage,Google Cloud Connect,Google Cloud Print,Google App Engine,Amazon Web Services,Amazon Elastic Compute Cloud,Amazon Simple Storage Service,Amazon Simple Queue ,service,Microsoft,Windows Azure,Microsoft Assessment and Planning Toolkit,SharePoint,IBM,Cloud Models,IBM SmartCloud,SAP Labs,SAP HANA Cloud 92 SCHOOL OF IT,JNT UNIVERSITY HYDERABAD-500085 : : REGULATIONS,COURSE STRUCTURE & SYLLABUS FOR M.TECH(CNIS) W.E.F 2019-20 Platform,Virtualization Services Provided by SAP,Salesforce,Sales Cloud,Service Cloud: Knowledge as a Service,Rackspace,VMware,Manjrasoft,Aneka Platform.

TEXTBOOKS:
1. Essentials of cloud Computing: K.Chandrasekhran , CRC press, 2014

REFERENCES:
1. Cloud Computing: Principles and Paradigms by Rajkumar Buyya, James Broberg and Andrzej M. Goscinski, Wiley, 2011.
2. Distributed and Cloud Computing, Kai Hwang, Geoffery C.Fox, Jack J.Dongarra, Elsevier, 2012.
3. Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance, Tim Mather, Subra Kumaraswamy, ShahedLatif,O'Reilly,SPD,rp2011

CO- PO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak						
COs	**Program Outcomes (POs)**					
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**
CO1	1		1			
CO2	1		1			
CO3			1		1	
CO4			1		2	1
CO5	1		1	1	2	3

2021-22 Onwards (MR-21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B. Tech. VI Semester		
Code: B0540	SOFTWARE QUALITY ASSURANCE AND TESTING	L	T	P
Credits: 3		3	-	-

Objectives:

The student should be able to:

To understand software testing and quality assurance as a fundamental component of software life cycle.

To define the scope of SW T&QA projects To efficiently perform T&QA activities using modern software tools To estimate cost of a T&QA project and manage budgets .

To prepare test plans and schedules for a T&QA project.

To develop T&QA project staffing requirements .

To effectively manage a T&QA project.

MODULE I: Software Quality Assurance and Standards: The Software Quality challenge, What is Software Quality, Software Quality factors, The components of Software Quality Assurance system, Software Quality Metrics, Costs of Software Quality, Quality Management Standards, Management and its role in Software Quality Assurance, SQA unit and other actors in SQA system. - (Chapters: 1-4, 21-23, 25, 26) of T3 Quality Standards: ISO 9000 and Companion ISO Standards, CMM, CMMI, PCMM, Malcom Balridge, 3 Sigma, 6 Sigma and other latest quality standards (Refer Internet and R11, R12, R13).

MODULE II: Software Testing Strategy and Environment: Minimizing Risks, Writing a Policy for Software Testing, Economics of Testing, Testing-an organizational issue, Management Support for Software Testing, Building a Structured Approach to Software Testing, Developing a Test Strategy Building Software Testing Process: Software Testing Guidelines, workbench concept, Customizing the Software Testing Process, Process Preparation checklist - (Chapters: 2,3) of T1 Software Testing Techniques: Dynamic Testing – Black Box testing techniques, White Box testing techniques, Static testing, Validation Activities, Regression testing -(Chapters: 4, 5, 6, 7, 8) of T2 .

MODULE III : Software Testing Tools: Selecting and Installing Software Testing tools – (Chapter 4) of T1. Automation and Testing Tools - (Chapter 15) of T2 Load Runner, Win runner and Rational Testing Tools, Silk test, Java Testing Tools, JMetra, JUNIT and Cactus. (Refer Internet and R9, R10) 80 SCHOOL OF IT,JNT UNIVERSITY HYDERABAD-500085 : : REGULATIONS,COURSE STRUCTURE & SYLLABUS FOR M.TECH(CNIS) W.E.F 2019-20 .

MODULE IV: Testing Process Seven Step Testing Process – I: Overview of the Software Testing Process, Organizing of Testing, Developing the Test Plan, Verification Testing, Validation Testing. (Chapters 6, 7, 8, 9, 10) of T1 .

MODULE V: Seven Step Testing Process – II: Analyzing and Reporting Test results, Acceptance and Operational Testing, Post-Implementation Analysis Specialized Testing Responsibilities: Software Development Methodologies, Testing Client/Server Systems (Chapters 12, 13, 14, 15) of T1.

TEXT BOOKS:
1. Effective Methods for Software Testing, Third edition, William E. Perry, Wiley India, 2009 .
2. Software Testing – Principles and Practices, Naresh Chauhan, Oxford University Press, 2010.
3. Software Quality Assurance – From Theory to Implementation, Daniel Galin, Pearson Education, 2009.

REFERENCES:
1. Testing Computer Software, Cem Kaner, Jack Falk, Hung Quoc Nguyen, Wiley India, rp2012.
2. Software Testing – Principles, Techniques and Tools, M.G.Limaye, Tata McGraw-Hill, 2009.
3. Software Testing - A Craftsman's approach, Paul C. Jorgensen, Third edition, Auerbach Publications, 2010.
4. Foundations of Software Testing, Aditya P. Mathur, Pearson Education, 2008.
5. Software Testing and Quality Assurance – Theory and Practice, Kshirasagar Naik, Priyadashi Tripathy, Wiley India, 2010.
6. Software Testing, Ron Patton, Second edition, Pearson Education, 2006.

7. Software Testing and Analysis – Process, Principles and Techniques, Mauro Pezze, Michal Young, Wiley India, 2008.
8. Software Testing Techniques, Boris Beizer, Second edition, Wiley India, 2006
9. Foundations of Software Testing, Dorothy Graham, et al., Cengage learning, 2007, rp 2010.
10. Software Testing - Effective Methods, Tools and Techniques, Renu Rajani, Pradeep Oak, Tata McGraw-Hill, rp2011.
11. Software Automation Testing Tools for Beginners, Rahul Shende, Shroff Publishers and Distributors, 2012.
12. Software Testing Tools, K.V.K.K. Prasad, Dream Tech Press, 2008.
13. Software Testing Concepts and Tools, Nageswara Rao Pusuluri, Dream Tech press, 2007.

CO- PO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak						
COs	**Program Outcomes (POs)**					
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**
CO1	1		1			
CO2	1		1			
CO3			1		1	
CO4			1		2	1
CO5	1		1	1	2	3

2021-22 Onwards (MR-21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B. Tech. VI Semester		
Code: B0540	**NATURAL LANGUAGE PROCESSING**	**L**	**T**	**P**
Credits: 3		3	-	-

Objectives:
To acquire basic understanding of linguistic concepts and natural language complexity, variability.
To acquire basic understanding of machine learning techniques as applied to language.
To implement N-grams Models.

MODULE I: Introduction and Overview What is Natural Language Processing, hands-on demonstrations. Ambiguity and uncertainty in language. The Turing test. Regular Expressions Chomsky hierarchy, regular languages, and their limitations. Finite-state automata. Practical regular expressions for finding and counting language phenomena. A little morphology. Exploring a large corpus with regex tools. Programming in Python An introduction to programming in Python. Variables, numbers, strings, arrays, dictionaries, conditionals, iteration. The NLTK (Natural Language Toolkit) String Edit Distance and Alignment Key algorithmic tool: dynamic programming, a simple example, use in optimal alignment of sequences. String edit operations, edit distance, and examples of use in spelling correction, and machine translation.

MODULE II: Context Free Grammars Constituency, CFG definition, use and limitations. Chomsky Normal Form. Top-down parsing, bottom-up parsing, and the problems with each. The desirability of combining evidence from both directions Non-probabilistic Parsing Efficient CFG parsing with CYK, another dynamic programming algorithms. Early parser. Designing a little grammar, and parsing with it on some test data. Probability Introduction to probability theory Joint and conditional probability, marginals, independence, Bayes rule, combining evidence. Examples of applications in natural language. Information Theory The "Shannon game"--motivated by language! Entropy, cross entropy, information gain. Its application to some language phenomena.

MODULE III: Language modeling and Naive Bayes Probabilistic language modeling and its applications. Markov models. N-grams. Estimating the probability of a word, and smoothing. Generative models of language. Part of Speech Tagging and Hidden Markov Models, Viterbi Algorithm for Finding Most Likely HMM Path Dynamic programming with Hidden Markov Models, and its use for part-of-speech tagging, Chinese word segmentation, prosody, information extraction, etc. 130 SCHOOL OF IT,JNT UNIVERSITY HYDERABAD-500085 : : REGULATIONS,COURSE STRUCTURE & SYLLABUS FOR M.TECH(CNIS) W.E.F 2019-20.

MODULE IV: Probabilistic Context Free Grammars Weighted context free grammars. Weighted CYK. Pruning and beam search. Parsing with PCFGs A tree bank and what it takes to create one. The probabilistic version of CYK. Also: How do humans parse? Experiments with eye-tracking. Modern parsers. Maximum Entropy Classifiers The maximum entropy principle and its relation to maximum likelihood. Maximum entropy classifiers and their application to document classification, sentence segmentation, and other language tasks.

MODULE V: Maximum Entropy Markov Models & Conditional Random Fields Part-of-speech tagging, nounphrase segmentation and information extraction models that combine maximum entropy and finite-state machines. State-of-the-art models for NLP. Lexical Semantics Mathematics of Multinomial and Dirichlet distributions, Dirichlet as a smoothing All for multinomial's Information Extraction & Reference Resolution- Various methods, including HMMs. Models of anaphora resolution. Machine learning methods for co reference.

TEXT BOOKS:
1. "Speech and Language Processing": Jurafsky and Martin, Prentice Hall
2. "Statistical Natural Language Processing"- Manning and Schutze, MIT Press
3. "Natural Language Understanding". James Allen. The Benajmins/Cummings Publishing Company

REFERENCES BOOKS:
 1. Cover, T. M. and J. A. Thomas: Elements of Information Theory. Wiley.
2. Charniak, E.: Statistical Language Learning. The MIT Press.
3. Jelinek, F.: Statistical Methods for Speech Recognition. The MIT Press.
4. Lutz and Ascher - "Learning Python", O'Reilly

CO- PO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak						
COs	**Program Outcomes (POs)**					
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**
CO1	1		1			
CO2	1		1			
CO3			1		1	
CO4			1		2	1
CO5	1		1	1	2	3

2021-22 Onwards (MR-21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B. Tech. VI Semester		
Code: B0540	BLOCKCHAIN TECHNOLOGY	L	T	P
Credits: 3		3	-	-

Objectives:

Familiarise the functional/operational aspects of cryptocurrency ECOSYSTEM.

Understand emerging abstract models for Blockchain Technology.

identify major research challenges and technical gaps existing between theory and practice in cryptocurrency domain .

MODULE 1 :The consensus problem - Asynchronous Byzantine Agreement - AAP protocol and its analysis - Nakamoto Consensus on permission-less, nameless, peer-to-peer network - Abstract Models for BLOCKCHAIN - GARAY model - RLA Model - Proof of Work (PoW) as random oracle - formal treatment of consistency, liveness and fairness - Proof of Stake (PoS) based Chains - Hybrid models (PoW + PoS) .

MODULE 2: cryptographic basics for cryptocurrency - a short overview of Hashing, signature schemes, encryption schemes and elliptic curve cryptography .

MODULE 3 : Bitcoin - Wallet - Blocks - Merkley Tree - hardness of mining - transaction verifiability - anonymity - forks - double spending - mathematical analysis of properties of Bitcoin.

MODULE 4 : Ethereum - Ethereum Virtual Machine (EVM) - Wallets for Ethereum - Solidity - Smart Contracts - some attacks on smart contracts .

MODULE 5: (Trends and Topics) - Zero Knowledge proofs and protocols in Blockchain - Succinct non interactive argument for Knowledge (SNARK) - pairing on Elliptic curves - Zcash .

Text Books:

1. Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller, and Steven Goldfeder. Bitcoin and cryptocurrency technologies: a comprehensive introduction. Princeton University Press, 2016. (Free download available).

Reference Books :

1. Joseph Bonneau et al, SoK: Research perspectives and challenges for Bitcoin and cryptocurrency, IEEE Symposium on security and Privacy, 2015 (article available for free download) { curtain raiser kind of generic article, written by seasoned experts and pioneers}.

2. J.A.Garay et al, The bitcoin backbone protocol - analysis and applications EUROCRYPT 2015 LNCS VOl 9057, (VOLII), pp 281-310. (Also available at eprint.iacr.org/2016/1048) . (serious beginning of discussions related to formal models for bitcoin protocols).

3. R.Pass et al, Analysis of Blockchain protocol in Asynchronous networks , EUROCRYPT 2017, (eprint.iacr.org/2016/454) . A significant progress and consolidation of several principles).

4. R.Pass et al, Fruitchain, a fair blockchain, PODC 2017 (eprint.iacr.org/2016/916)

CO- PO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak						
COs	Program Outcomes (POs)					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	1		1			
CO2	1		1			
CO3			1		1	
CO4			1		2	1
CO5	1		1	1	2	3

Code:80H03	ENGLISHCOMMUNICATION	L	T	P
	ANDPRESENTATIONSKILLSLAB			
Credits:1	(CommonforEEE,ECE,CSEandIT)	-	-	2

PRE-REQUISITES:
NILCOURSEOBJECTIVES:

Thelearnersneedtobeawareofthecharacteristicsoftechnicalcommunicationintheirworkplaces;asaresult,theyareexposedtodifferentchannelsoftechnicalcommunication. Hence the acquired skills make the learners effective communicatorsusing persuasive language. Besides the above said, one of the major objectives is tomaintainobjectivityinwritingdocuments andtoproduceprofessionalqualitydocumentsusingdifferentcomponentsofthelanguage.

Methodology: Facilitator's role: Since classroom learning augments thinking process,helpingthemtodevelop written,spokenandnonverbalcommunication,thefacilitator /Facultywouldbrieflydiscussthetopicswiththestudentsandlateronguidethem whilethestudentsinvolvedin activities,writingwork andwhilemakingpresentations.Thefacilitatorisrequiredtodesignalotofpractical/industry orientedprojectworksforthestudents *Studentsarerequiredtoparticipate,perform,writeandsubmittheworkintheformofwritten documents or Power Point Presentations to hone their spoken written and nonverbal communication skills. Students are to take up field work and submit the projectwork.

MODULEI:ORALPRESENTATION

Mechanics of Presentations – Methodology of Presentation, Importance of Non-verbalcommunicationduringpresentations–NuancesofPresentation.
*ThisparticularMODULEisforinternalevaluationpurpose(s).

MODULEII: E-CORRESPONDENCEANDEMAILETIQUETTE

Common web mail services, yahoo, Gmailetc, fields to pay attention- To:, Cc:, Bcc:,Reply All, Subject, Salutation, Body, Signature, Font, Caps Lock , Highlight,The'KISS' strategy(Keep It Simple and Short,)Points to remember while signing off,IntroductiontoTechnicalVocabulary.
• ThisMODULEispurelyforinternalassessment/evaluation

MODULEIII:GROUPDISCUSSION

Initiators-Contributor-Informer-TeamLeader-Motivator-CreativeContributor,Importance of ,Non verbal communication -eye contact, voice characters, posture,gestures, do's and don'ts, Role play and Simulation- Learners assuming the roles ofcharactersand participating in Group discussion, analysis, or prediction with strictlydefinedgoals.

MODULEIV:INTERVIEWSKILLS&OFFICEETIQUETTE

Preparing for the interview, types of interviews, interview session, importance of nonverbalcommunicationduringtheinterview,do'sanddon'tsofinterview,followupandth anking letter. FAQ's.Formal Conversation, office attire- do's and don'ts, greetingsandmeetings,speakingtoseniors andhandshakes,offeringandtakingvisitingcards.

MODULE V: JOB HUNT PROCESS

SWOT analysis, correspondence and browsing the internet to search for a suitable job(s), job application-cover letter drafting, drafting a winning resume', types of resume's-electronic, video and printed resume's

• Instruction: Students are required to prepare their video resume which will be assessed by the faculty member.

REFERENCES:

1. Chrissie: **Handbook of Practical Communication Skills**: Jaico Publishing house, 1999.
2. Daniels, Aubrey: **Bringing Out the Best in People**: Tata McGraw-Hill: New York, 2003.
3. Wright, Goulstone, Mark: **Just Listen: Discover the Secret to getting through to absolutely anything**: American Management Association, 2010.
4. Leslie.T.Giblin: **Skill with people** Publication details not known
5. Lewis, Norman: **Word Power Made Easy**: Goyal Publications: New Delhi, 2009.
6. Murthy, A.G, Krishna,: **Ten Much**: Tata McGraw-Hill: New Delhi, 2010.

E-RESOURCES:

1. http://www.mindtools.com/pages/article/newTMC_05.htm
2. http://www.kent.ac.uk/careers/intervw.htm
3. http://www.wikihow.com/Write-a-Report

COURSE OUTCOMES:

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

1. Give Oral Presentations Confidently.
2. Draft appropriate Resume in accordance with the context.
3. Participate and present their view and ideas logically and confidently.
4. Understand the importance of communication in various settings.
5. Utilize the technology for career advancement.

COs	CO-PO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak											
	Programme Outcomes (POs)											
	PO1	PO2	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

2021-22 Onwards (MR-21)	MALLAREDDYENGINEERING COLLEGE (Autonomous)	B.Tech. VISemester		
Code:B0544	**DATA MINING LAB**	L	T	P
Credits:2		-	1	2

PREREQUISITES: NIL

COURSE OBJECTIVES:

This course provides the students to understand stages in building a Data Warehouse,identifytheneedandimportanceofpreprocessingtechniques,implementsimilarityanddissimilaritytechniques,analyzeandevaluateperformanceofalgorithmsforAssociationRules,analyzeClassificationandClusteringalgorithms.

SoftwareRequirements:WEKATOOL

LISTOFPROGRAMS:

1. Demonstrationofpreprocessingondatasetstudent.arff.
2. Implementationofpreprocessingondatasetlabor.arff.
3. DemonstrationofAssociationruleprocessondatasetcontactlenses.arffusingapriori Algorithm.
4. ImplementAssociationruleprocessondatasettest.arff usingapriorialgorithm.
5. Applyclassificationruleprocessondatasetstudent.arffusingj48algorithm.
6. Performclassificationruleprocess ondatasetemployee.arffusingj48algorithm.
7. Useclassificationruleprocessondatasetemployee.arffusingid3algorithm.
8. Deployclassificationruleprocessondatasetemployee.arff usingnaïvebayesAlgorithm.
9. Implementclusteringruleprocessondatasetiris.arff usingsimplek-means.
10. Makeuseofclusteringruleprocessondatasetstudent.arffusingsimplek-means.
11. Designadecisiontreebypruningthenodesonyourown.Convertthedecisiontreeinto "if- then-else rules". The decision tree must consists of 2-3 levels and convertitintoasetofrules.
12. Generate Association rules for the following transactional database using Apriorialgorithm.

TID	ListofItems
T100	I1,I2,I5
T200	I2,I4
T300	I2,I3
T400	I1,I2,I4
T500	I1,I3
T600	I2,I3
T700	I1,I3
T800	I1,I2,I3,I5

TEXTBOOKS:

1. Pang-Ning Tan & Michael Steinbach, "**Introduction to Data Mining**",VipinKumar,Pearson.
2. Jiawei Han, Michel Kamber ,"**Data Mining concepts and Techniques**", 3/e,Elsevier.

REFERENCES:

1. HongboDu,"**DataMiningTechniquesandApplications:AnIntroduction**",CengageLearning.
2. VikramPudiandP.RadhaKrishna,"**DataMining**",Oxford.
3. MohammedJ.Zaki,WagnerMeira,Jr,"**DataMiningandAnalysis-FundamentalConceptsandAlgorithms**",Oxford
4. AlexBerson,StephenSmith,"**DataWarehousingDataMining&OLAP**",TMH.

COURSE OUTCOMES:

Attheendofthecourse,studentswillbe ableto
1. **Analyze**theclassificationrules onvarious databases.
2. **Deploy**associationrulesforanykindofdatabases.
3. **Develop** clusteringrulesforapplications.

COs	CO-PO,PSOMapping (3/2/1indicatesstrengthofcorrelation)3-Strong,2-Medium,1-Weak														
	ProgrammeOutcomes(POs)												PSOs		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	1	1	1	1									1	1	1
CO2	1	2	2	2	2								2		2
CO3	1	2	3	2	1								1		2

2021-22 Onwards (MR-21)	MALLAREDDYENGINEERING COLLEGE (Autonomous)	B.Tech. VISemester		
Code:B6211	**ETHICAL HACKING LAB**	**L**	**T**	**P**
Credits:1.5		-	-	2

Course Objectives:

- The aim of the course is to introduce the methodologies and framework of ethical hacking for enhancing the security.
- The course includes-Impacts of Hacking; Types of Hackers; Information Security Models; Information Security Program; Business Perspective; Planning a Controlled Attack; Framework of Steps (Reconnaissance, Enumeration, Vulnerability Analysis, Exploitation, Deliverable and Integration)

LIST OF EXPERIMENT:
1. Setup a honey pot and monitor the honey pot on network
2. Write a script or code to demonstrate SQL injection attacks
3. Create a social networking website login page using phishing techniques
4. Write a code to demonstrate DoS attacks
5. Install rootkits and study variety of options
6. Study of Techniques uses for Web Based Password Capturing.
7. Install jcrypt tool (or any other equivalent) and demonstrate Asymmetric, Symmetric Crypto algorithm, Hash and Digital/PKI signatures studied in theory Network Security And Management
8. Implement Passive scanning, active scanning, session hizaking, cookies extraction using Burp suit tool

COURSE OUTCOMES:
1. Gain the knowledge of the use and availability of tools to support an ethical hack
2. Gain the knowledge of interpreting the results of a controlled attack

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

Course Objectives:
•To learn the concepts of the rapidly changing and fascinating field of computer forensics
•To be familiar with the technical expertise and the knowledge required to investigate, detect, and prevent digital crimes
•To identify the approaches on digital forensics legislations, digital crime, forensics processes and procedures
•To understand perceptions of E-evidence collection, preservation, network forensics, art of steganography and mobile device forensics

MODULE –I:

Digital Forensics Science: Forensics science, computer forensics, and digital forensics.
Computer Crime: Criminalistics as itrelates to the investigative process, analysis of cyber criminalistics area, holistic approach to cyber-forensics

MODULE –II:

Cyber Crime Scene Analysis: Discuss the various court orders etc., methods to search and seizure electronic evidence, retrieved and un-retrieved communications, Discuss the importance of understanding what court documents would be required for a criminal investigation

MODULE –III:

Evidence Management & Presentation: Create and manage shared folders using operating system, importance of the forensic mindset, define the workload of law enforcement, explain what the normal case would look like, define who should be notified of a crime ,parts of gathering evidence, Define and apply probable cause.

MODULE –IV:

Computer Forensics: Prepare a case, begin an investigation, understand computer forensics, workstations and software, Conduct an investigation, Complete a case, Critique a case

MODULE –V:

Network Forensics: open-source security tools for network forensic analysis, Recent trends in mobile forensic technique and methods to search and seizure electronic evidence requirements for preservation of network data.

Legal Aspects of Digital Forensics: ITAct2000,amendment of ITAct 2008.

TEXT BOOK:

1. The Basics of Digital Forensics, John Sammons, Elsevier
2. ComputerForensics:ComputerCrimeSceneInvestigation,JohnVacca,LaxmiPublications

REFERENCES:

1. Learn Computer Forensics: A Beginner's Guide to Searching, Analyzing, and Securing Digital Evidence, William Oettinger, 1stEdition, Packt Publishing, 2020,ISBN:1838648178
2. Cybercrime and Digital Forensics :An Introduction, Thomas J.Holt, Adam M. Bossler, Kathryn C. Seigfried – Spellar, Routledge

2021-22 Onwards (MR21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. VII Semester		
Code: B0551	**MACHINE LEARNING**	**L**	**T**	**P**
Credits: 3		**3**	**-**	**-**

Course Objectives:
This course provides the students a broad introduction to python programming, machine learning, discuss about various learning algorithms like decision tree learning, Bayesian learning, computational learning, instance based learning, combined inductive and analytical learning methods, analyze genetic algorithms and various learning set of rules.

MODULE I: PYTHON PROGRAMMING -MACHINE LEARNING (ML)   [10 PERIODS]

INTRODUCTION TO PYTHON:

Python, expression, variables, assignment statements, functions, built in function, strings, modules, lists, making choice(Boolean, if, storing conditional statements), repetition(loops, while, counted loops, user input loops, control loops , style notes), File processing(one record per line, records with multiple fields, positional data, multiline records, looking ahead, writing files), sets and dictionaries(sets, dictionaries, inverting a dictionary), Algorithms with suitable example. Construction of functions, methods, Graphical user interfaces, databases and applications.

Introduction - Well-posed learning problems, designing a learning system, Perspectives and issues in ML
Concept Learning - Introduction, Concept Learning task, Concept learning as search, Find- S: Finding a maximally specific hypothesis, Version spaces and candidate elimination algorithm, Remarks on version spaces and Candidate elimination, Inductive bias.

Module II: Decision Tree Learning and ANN   [09 Periods]
Decision Tree learning - Introduction, Decision Tree representation, Appropriate Problems, Decision Tree learning algorithm, Hypothesis Space Search, Inductive bias, Issues.
Artificial Neural Networks - Introduction, Neural network representation, Problems for Neural Network Learning, Perceptions, Multilayer networks and Back Propagation algorithm, Remarks on back propagation algorithm, Evaluation Hypotheses, Motivation, Estimation hypothesis accuracy, Sampling theory, General approach for deriving confidence intervals, Difference in error of two hypotheses,
Module III: Bayesian learning and Instance based Learning   [10 Periods]
A: Bayesian learning - Introduction and concept learning, Maximum Likelihood and Least Squared Error Hypotheses, Maximum likelihood hypotheses for predicting probabilities, Minimum description length principle.
B: Instance-based Learning - K -Nearest Neighbor Learning, Locally Weighted Regression, Radial Basis Functions, Case-Based Reasoning, Lazy and Eager Learning, Genetic Algorithm: Motivation, Hypothesis Space Search, Genetic Programming, Models of Evolution and Learning, Parallelizing Genetic Algorithms
Module IV: Rules and Analytical Learning   [09 Periods]
Learning Sets of Rules - Introduction, Sequential Covering Algorithms, Learning Rule Sets:Learning First Order Rules, Learning Sets of First Order Rules: FOIL, Induction as Inverted Deduction, Inverting Resolution.
Analytical Learning - Introduction, Learning with Perfect Domain Theories: Prolog-EBG Remarks on Explanation-Based Learning, Explanation-Based Learning of Search Control Knowledge

Module V: Learning Techniques   [10 Periods]
Combining Inductive and Analytical Learning - Motivation, Inductive-Analytical Approaches to Learning, Using Prior Knowledge to initialize Hypothesis, Using PriorKnowledge to alter Search Objective, Using Prior Knowledge to Augment Search Operators.
Reinforcement Learning - Introduction, Learning Task, Q Learning, Non-Deterministic,Rewards and Actions, Temporal Difference Learning, Generalizing from Examples, Relationship to Dynamic Programming

TEXT BOOKS:

1. Jennifer Campbell paulGries Jason Montojo Greg Wilson, "Practical Programming" An introduction to Computer Science Using Python
2. Tom M. Mitchell, ‒**Machine Learning**‖, MGH, 1st Edition, 2013.
3. Stephen Marsland, ‒**Machine Learning: An Algorithmic Perspective**‖, Chapman and Hall / CRC, 2nd Edition, 2014.

REFERENCES:

1. Neural Networks,William WHsieh, ‒**Machine Learning Methods in the Environmental Sciences**‖
2. Richard O. Duda, Peter E. Hart and David G. Stork, ‒**Pattern Classification**‖, John Wiley & Sons Inc., 2001
3. Chris Bishop, ‒**Neural Networks for Pattern Recognition**‖, Oxford University Press, 1995

E-RESOURCES:

1. http://www.zuj.edu.jo/download/machine-learning-tom-mitchell-pdf/
2. https://goo.gl/FKioSh
3. http://www.ntu.edu.sg/home/egbhuang/pdf/ieee-is-elm.pdf
4. www.fxpal.com/publications/a-genetic-algorithm-for-video-segmentation-and-summarization.pdf
5. http://nptel.ac.in/courses/106106139/
6. http://nptel.ac.in/courses/106105152/

2021-22 Onwards (MR-21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. VII Semester		
Code: B6217	CYBER SECURITY	L	T	P
Credits: 3		3	-	-

PREREQUISITES: NIL

COURSE OBJECTIVES:

- This course makes the students to understand the concept of cyber security and issues andchallenges associated with it, the cybercrimes, their nature, legal remedies and as to how report the crimes through available platforms and procedures.
- The course includes the reporting procedure of inappropriate content, underlying legal aspects and best practices for the use of social media platforms, the basic concepts related to E-commerce and digital payments, the basic security aspects related to computer and mobiles.

MODULE-I: INTRODUCTION TO CYBER SECURITY   [9 PERIODS]

Hacking, Types of hacking, Myths about hacking, Types of hackers, Motives for Hacking, Ethical hacking, Concept of cyber security, Issues and challenges of cyber security, Cyberterrorism, Cyber forensics, The INDIAN cyberspace, Regulation of cyberspace, National cyber security policy, Communication technology, Internet, World wide web, Advantages and Disadvantages of the Internet, Internet infrastructure for data transfer and governance, Internet society, Recent cyber-attacks and Data breaches in India.

MODULE-II: CYBER CRIME AND CYBER LAW   [10 PERIODS]

Cybercrime, Classification of cybercrimes, Common cybercrimes- cybercrime targeting computers and mobiles, cybercrime against women and children, financial frauds, social engineering attacks, malware and ransomware attacks, zero day and zero click attacks, Cybercriminals modus- operandi, Reporting of cybercrimes, Remedial and mitigation measures, Legal perspective of cybercrime, IT Act 2000 and its amendments, Cybercrime and offences, Organizations dealing with Cybercrime and Cyber security in India, Case studies.

MODULE-III: SOCIAL MEDIA OVERVIEW AND SECURITY   [10 PERIODS]

Introduction to Social networks, Types of social media, Social media platforms, Social media monitoring, Hashtag, Viral content, Social media marketing, Social media privacy, Challenges, opportunities and pitfalls in online social network, Security issues related to social media, Flagging and reporting of inappropriate content, Laws regarding posting of inappropriate content, Best practices for the use of social media, Case studies.

MODULE-IV: E-COMMERCE AND DIGITAL PAYMENTS   [10 PERIODS]

Definition of E- Commerce, Main components of E-Commerce, Elements of E-Commerce security, E-Commerce threats, E-Commerce security best practices, Introduction to digital payments, Components of digital payment and stake holders, Modes of digital payments- Banking Cards, Unified Payment Interface (UPI), e-Wallets, Unstructured Supplementary Service Data (USSD), Aadhar enabled Payment Systems (AePS), Digital payments related common frauds and preventive measures, RBI guidelines on digital payments and customer protection in unauthorized banking transactions, Relevant provisions of Payment Settlement Act,2007.

MODULE-V: DIGITAL DEVICES SECURITY, TOOLS AND TECHNOLOGIES FOR CYBER SECURITY [9 PERIODS]

End Point device and Mobile phone security, Password policy, Security patch management, Data backup, Downloading and management of third-party software, Device security policy, Cyber Security best practices, Significance of host firewall and Ant-virus, Management of host firewall and Anti-virus, Wi-Fi security, Configuration of basic security policy and permissions, Cyber safety tips.

TEXT BOOKS

1. Cyber Crime Impact in the New Millennium, by R. C Mishra , Auther Press. Edition 2010.
2. Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives by Sumit Belapure and Nina Godbole, Wiley India Pvt. Ltd. (First Edition, 2011).

REFERENCE BOOKS

1. Security in the Digital Age: Social Media Security Threats and Vulnerabilities by Henry A. Oliver, Create Space Independent Publishing Platform. (Pearson , 13th November, 2001)
2. Electronic Commerce by Elias M. Awad, Prentice Hall of India Pvt Ltd. Cyber Laws: Intellectual Property & E-Commerce Security by Kumar K, Dominant Publishers.

COURSE OUTCOMES:

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

1. **Explore** various concepts of cyber security and issues.
2. **Investigate** more on various challenges associated with cyber security.
3. **Analyze** reporting procedure of inappropriate content.
4. **Review** underlying legal aspects and best practices for the use of social media platforms.
5. **Examine** various basic concepts related to E-commerce and digital payments.

	Programme Outcomes (POs)												PSOs		
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3		1	3								3		3	
CO2		2	2		2								2		
CO3	2	3		1	1								2	3	
CO4		3	3									1	3	2	
CO5	3		2	3	3							2		1	

CO - PO, PSO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

2021-22 Onwards (MR21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech VII Sem		
Code: B6219	**Open Elective-II** Software Project Management	**L**	**T**	**P**
Credits: 3		3	-	-

Course Objectives & Outcomes

The objectives of the course are:

1. To study how to plan and manage projects at each stage of the software development life cycle (SDLC)
2. To train software project managers and other individuals involved in software project planning and tracking and oversight in the implementation of the software project management process.
3. To understand successful software projects that support   organization's strategic goals

Course Outcomes

After completing this Course, the student should be able to:
1. To match organizational needs to the most effective software development model
2. To understand the basic concepts and issues of software project management
3. To effectively Planning the software projects
4. To implement the project plans through managing people, communications   and change
5. To select and employ mechanisms for tracking the software projects
6. To conduct activities necessary to successfully complete and close the   Software projects
7. To develop the skills for tracking and controlling software deliverables
8. To create project plans that address real-world management challenges

MODULE I: Introduction

Project, Management, Software Project Management activities, Challenges in software projects, Stakeholders, Objectives & goals
Project Planning: Step-wise planning, Project Scope, Project Products & deliverables, Project activities, Effort estimation, Infrastructure

MODULE II: Project Approach

Lifecycle models, Choosing Technology, Protoyping
Iterative & incremental Process Framework: Lifecycle phases, Process Artifacts, Process workflows (Book 2)

MODULE III: Effort estimation & activity Planning

Estimation techniques, Function Point analysis, SLOC, COCOMO, Use case-based estimation , Activity Identification Approaches, Network planning models, Critical path analysis

MODULE IV: Risk Management

Risk categories, Identification, Assessment, Planning and management, PERT technique, Monte

Carlo approach

MODULE V: Project Monitoring &Control , Resource Allocation

Creating a framework for monitoring & control, Progress monitoring, Cost monitoring, Earned value Analysis, Defects Tracking, Issues Tracking, Status reports, Types of Resources, Identifying resource requirements, Resource scheduling

MODULE VI: Software Quality

Planning Quality, Defining Quality - ISO 9016, Quality Measures, Quantitative Quality Management Planning, Product Quality & Process Quality
Metrics, Statistical Process Control Capability Maturity Model, Enhancing software Quality (Book3)

Text Books:

1. Software Project Management, Bob Hughes & Mike Cotterell, TATA Mcgraw-Hill
2. Software Project Management, Walker Royce: Pearson Education, 2005.
3. Software Project Management in practice, PankajJalote, Pearson.

Reference Book:

1. Software Project Management, Joel Henry, Pearson Education.

<table>
<tr><td colspan="15" align="center">CO- PO, PSO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak</td></tr>
<tr><td rowspan="2">COs</td><td colspan="11">Programme Outcomes(POs)</td><td colspan="3">PSOs</td></tr>
<tr><td>PO 1</td><td>PO 2</td><td>PO 3</td><td>PO 4</td><td>PO5</td><td>PO 6</td><td>PO 7</td><td>PO 8</td><td>PO 9</td><td>PO 10</td><td>PO 11</td><td>PO 12</td><td>PSO1</td><td>PSO2</td><td>PSO3</td></tr>
<tr><td>CO1</td><td>1</td><td>1</td><td>1</td><td>1</td><td></td><td>1</td><td></td><td></td><td></td><td></td><td></td><td>1</td><td>1</td><td>2</td><td>1</td></tr>
<tr><td>CO2</td><td>1</td><td>2</td><td>1</td><td>2</td><td>1</td><td></td><td></td><td></td><td></td><td></td><td></td><td>1</td><td>1</td><td>2</td><td></td></tr>
<tr><td>CO3</td><td>1</td><td>3</td><td>2</td><td>2</td><td>1</td><td>1</td><td></td><td></td><td></td><td></td><td></td><td>2</td><td>1</td><td>2</td><td>1</td></tr>
<tr><td>CO4</td><td>1</td><td>3</td><td>3</td><td>3</td><td>1</td><td>2</td><td></td><td></td><td></td><td></td><td></td><td>3</td><td>2</td><td>2</td><td>1</td></tr>
<tr><td>CO5</td><td>1</td><td>3</td><td>3</td><td>3</td><td>1</td><td>2</td><td></td><td></td><td></td><td></td><td></td><td>3</td><td>2</td><td>3</td><td>1</td></tr>
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COURSEOBJECTIVES:
- To learn the concepts of the rapidly changing and fascinating field of computer forensics
- To be familiar with the technical expertise and the knowledge required to investigate, detect, and prevent digital crimes
- To identify the approaches on digital forensics legislations, digital crime, forensics processes and procedures
- To understand perceptions of E-evidence collection, preservation, network forensics, art of steganography and mobile device forensics

List of experiments:
1. Study of Computer Forensics and different tools used for forensic investigation

2. How to Recover Deleted Files using Forensics Tools

3. Study the steps for hiding and extract any text file behind an image file/ Audio file using Command Prompt.

4. How to Extract Exchange able image file format (EXIF) Data from Image Files using Exit reader Software

5. How to make the forensic image of the hard drive using En Case Forensics.

6. How to Restoring the Evidence Image using En Case Forensics

7. How to Collect Email Evidence in Victim PC

8. How to Extracting Browser Artifacts

9. How to View Last Activity of Your PC

10. Find Last Connected US Bon your system (USB Forensics)

11. Comparison of two Files for forensics investigation by Compare IT software

12. Live Forensics Case Investigation using Autopsy

	CO- PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	**Programme Outcomes(POs)**												**PSOs**		
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO1 0**	**PO1 1**	**PO1 2**	**PSO 1**	**PSO 2**	**PSO 3**
CO1	3	3										2	2		
CO2	3	2										2	2		
CO3	2	3										2		2	
CO4	3	2					2					2		2	

2021-22 Onwards(MR21)	**MALLA REDDY ENGINEERING COLLEGE** (Autonomous)	**B.Tech.** VII Semester		
Code: B0560		**L**	**T**	**P**
Credits: 2	**Machine Learning Lab**	**-**	**1**	**2**

Prerequisites: Computer Programming, Python

Course Objective: The objective of this lab is to get an overview of the various machine learning techniques and can able to demonstrate them using python.

Course Outcomes: After the completion of the course the student can able to:
- understand complexity of Machine Learning algorithms and their limitations;
- understand modern notions in data analysis-oriented computing;
- be capable of confidently applying common Machine Learning algorithms in practice and implementing their own;
- Be capable of performing experiments in Machine Learning using real-world data

Software Requirement: Python

List of Programs

1. The probability that it is Friday and that a student is absent is 3 %. Since there are 5 school days in a week, the probability that it is Friday is 20 %. What is the probability that a student is absent given that today is Friday? Apply Baye's rule in python to get the result. (Ans: 15%)

2. Extract the data from database using python

3. Implement k-nearest neighbors classification using python

4. Given the following data, which specify classifications for nine combinations of VAR1 and VAR2 predict a classification for a case where VAR1=0.906 and VAR2=0.606, using the result of k means clustering with 3 means (i.e., 3 centroids) VAR1 VAR2 CLASS 1.713 1.586 0 0.180 1.786 1 0.353 1.240 1 0.940 1.566 0 1.486 0.759 1 1.266 1.106 0 1.540 0.419 1 0.459 1.799 1 0.773 0.186 1

5. The following training examples map descriptions of individuals onto high, medium and low credit-worthiness.
   medium skiing design single twenties no -> high Risk
   high golf trading married forties yes -> low Risk
   low speedway transport married thirties yes -> med Risk
   medium football banking single thirties yes -> low Risk
   high flying media married fifties yes -> high Risk
   low football security single twenties no -> med Risk
   medium golf media single thirties yes -> med Risk
   medium golf transport married forties yes -> low Risk
   high skiing banking single thirties yes -> high Risk
   low golf unemployed married forties yes -> high Risk

Input attributes are (from left to right) income, recreation, job, status, age-group, home owner. Find the unconditional probability of `golf' and the conditional probability of `single' given `med Risk' in the dataset?

6. Implement linear regression using python.

7. Implement the multivariate linear regression.

8. Implement simple logistic regression and multivariate logistics regression.

9. Implement Naïve Bayes theorem to classify the English text

10. Implement an algorithm to demonstrate the significance of genetic algorithm

11. Implement the finite words classification system using Back-propagation algorithm
12. Implement anomaly detection and recommendation.

REFERENCES:

1. Willi Richert, Luis Pedro Coelho, ─Building Machine Learning with Python‖, **Packt** Publishing, 2013.