MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

B TECH I YEAR- COURSE STRUCTURE

CSE-AI&ML

I Year B. Tech – I Semester

S.No	Subject Code	SUBJECT	L	T	P	C	MAX. MARKS INT	MAX. MARKS EXT
1	R22A0001	English	2	0	0	2	40	60
2	R22A0023	Mathematics – I	3	1	0	4	40	60
3	R22A0201	Principles of Electrical and Electronics Engineering	3	0	0	3	40	60
4	R22A0301	Computer Aided Engineering Graphics	2	0	3	4	40	60
5	R22A0501	Programming for Problem Solving	3	0	0	3	40	60
6	R22A0081	English Language and Communication Skills Lab	-	0	2	1	40	60
7	R22A0281	Principles of Electrical and Electronics Engineering Lab	-	0	3	1.5	40	60
8	R22A0581	Programming for Problem Solving Lab	-	0	3	1.5	40	60
9	R22A0004	Environmental Science	2	0	0	0	40	60
		Total	**15**	**1**	**11**	**20**	**360**	**540**

I Year B. Tech – II Semester

S.No	Subject Code	SUBJECT	L	T	P	C	MAX. MARKS INT	MAX. MARKS EXT
1	R22A0002	Professional English	2	0	0	2	40	60
2	R22A0024	Mathematics – II	3	1	0	4	40	60
3	R22A0021	Applied Physics	3	1	0	4	40	60
4	R22A0022	Engineering Chemistry	3	0	0	3	40	60
5	R22A0502	Problem Solving using Python Programming	3	0	0	3	40	60
6	R22A0082	Applied Physics/Engineering Chemistry Lab	-	0	3	1.5	40	60
7	R22A0582	Problem Solving using Python Programming Lab	-	0	3	1.5	40	60
8	R22A0083	Engineering and Computing Hardware Workshop	-	0	2	1	40	60
9	R22A0003	Human Values and Professional Ethics	2	0	0	0	40	60
		Total	**16**	**2**	**8**	**20**	**360**	**540**

II Year B. Tech – I Semester

S.No	Subject Code	SUBJECT	L	T	P	C	MAX. MARKS INT	MAX. MARKS EXT
1	R22A0027	Statistical Inference and Stochastic Process	3	1	0	4	40	60
2	R22A0503	Data Structures	3	0	0	3	40	60
3	R22A0561	Computer Organization and Architecture	3	1	0	4	40	60
4	R22A0505	Software Engineering	3	0	0	3	40	60
5	R22A0509	Operating Systems	3	0	0	3	40	60
6	R22A0583	Data Structures Lab	0	0	2	1	40	60
7	R22A0587	Operating Systems Lab	0	0	2	1	40	60
8	R22A0585	Software Engineering Lab	0	0	2	1	40	60
9	R22A0061	Public Policy & Governance	3	0	0	0	100	-
		Total	**18**	**2**	**6**	**20**	**420**	**480**

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

II Year B. Tech – II Semester

S.No	Subject Code	SUBJECT	L	T	P	C	MAX. MARKS INT	MAX. MARKS EXT
1	R22A0028	Discrete Mathematics	3	0	0	3	40	60
2	R22A1201	Automata Theory and Compiler Design	3	1	0	4	40	60
3	R22A0504	Database Management Systems	3	0	0	3	40	60
4	R22A6601	Artificial Intelligence	3	0	0	3	40	60
5	R22A0507	Object Oriented Programming through Java	3	0	0	3	40	60
6	R22A0584	Database Management Systems Lab	0	0	2	1	40	60
7	R22A0586	Object Oriented Programming through Java Lab	0	0	2	1	40	60
8	R22A6691	Industry Oriented Project	0	0	4	2	40	60
9	*R22A0005	Foreign Language: French	0	0	2	0	100	-
		Total	**15**	**0**	**12**	**20**	**460**	**540**

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

III Year B. Tech – I Semester

S.No	Subject Code	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R22A6617	Design and Analysis of Computer Algorithms	3	0	0	3	40	60
2	R22A6602	Machine Learning	3	0	0	3	40	60
3	R22A0512	Computer Networks	3	0	0	3	40	60
4	PE-1	Professional Elective (CBCS Pool)	3	0	0	3	40	60
5	OE-1	Open Elective	3	0	0	3	40	60
6	R22A6681	Machine Learning Lab	0	0	2	1	40	60
7	R22A0596	Computer Networks Lab	0	0	2	1	40	60
8	R22A6692	Application Development-I	0	0	4	2	40	60
9	R22A0084	Professional Development Skills-I	0	0	2	1	40	60
		Total	**15**	**0**	**10**	**20**	**360**	**540**

III Year B. Tech – II Semester

S.No	Subject Code	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R22A0517	Big Data Analytics	3	0	0	3	40	60
2	R22A0513	Full Stack Development	3	0	0	3	40	60
3	R22A6604	Knowledge Representation and Reasoning	3	0	0	3	40	60
4	PE-II	Professional Elective (CBCS Pool)	3	0	0	3	40	60
5	OE-II	Open Elective	3	0	0	3	40	60
6	R22A0590	Big Data Analytics Lab	0	0	2	1	40	60
7	R22A0589	Full Stack Development Lab	0	0	2	1	40	60
8	R22A6693	Application Development-II	0	0	4	2	40	60
9	R22A0085	Professional Development Skills-II	0	0	2	1	40	60
		Total	**15**	**0**	**10**	**20**	**360**	**540**

IV Year B. Tech – I Semester

S.No	Subject Code	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R22A6605	Deep Learning	3	1	0	4	40	60
2	R22A6603	Natural Language Processing	3	0	0	3	40	60
3	R22A6201	Cyber Security Essentials	3	0	0	3	40	60
4	PE-III	Professional Elective (CBCS Pool)	3	0	0	3	40	60
5	PE-IV	Professional Elective (CBCS Pool)	3	0	0	3	40	60
6	R22A6682	Natural Language Processing Lab	0	0	2	1	40	60
7	R22A6694	Project Phase-I	0	0	6	3	40	60
		Total	**15**	**1**	**8**	**20**	**280**	**420**

IV Year B. Tech – II Semester

S.No	Subject Code	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	PE-V	Professional Elective (CBCS Pool)	3	0	0	3	40	60
2	PE-VI	Professional Elective (CBCS Pool)	3	0	0	3	40	60
3	R22A0334	Innovation, Start-Up & Entrepreneurship	4	0	0	4	40	60
4	R22A6695	Project Phase-II	0	0	20	10	80	120
		Total	**10**	**0**	**20**	**20**	**200**	**300**

Professional Electives (CBCS POOL)

S. No	Subject Code	SUBJECT	L	T	P	C	Year/Sem
1	R22A1206	Mobile Application Development	3	0	0	3	III/I
2	R22A6702	Introduction to Data Science	3	0	0	3	
3	R22A0515	Image Processing	3	0	0	3	
4	R22A0568	Computer Graphics	3	0	0	3	
5	R22A6609	Data Warehousing and Business Intelligence	3	0	0	3	III/II
6	R22A6616	Web Technologies (Java Stack-2)	3	0	0	3	
7	R22A0518	Scripting Languages	3	0	0	3	
8	R22A6612	Speech and Video Processing	3	0	0	3	
9	R22A6606	Computer Vision	3	0	0	3	IV/I
10	R22A0525	Augmented Reality & Virtual Reality	3	0	0	3	
11	R22A0569	Web Security	3	0	0	3	
12	R22A6614	Nature Inspired Computing	3	0	0	3	
13	R22A0521	Cloud Computing	3	0	0	3	IV/I
14	R22A0532	Game Theory	3	0	0	3	
15	R22A6607	Expert Systems	3	0	0	3	
16	R22A6214	Database Security	3	0	0	3	
17	R22A0529	Quantum Computing	3	0	0	3	IV/II
18	R22A6608	Text Analytics	3	0	0	3	
19	R22A0564	Mobile Computing	3	0	0	3	
20	R22A6610	Social Network Analysis	3	0	0	3	
21	R22A6613	Cognitive Computing	3	0	0	3	IV/II
22	R22A6611	Generative AI	3	0	0	3	
23	R22A6705	Data Handling and Visualization	3	0	0	3	
24	R22A6615	Federated Machine Learning	3	0	0	3	

List of Open Electives:

OPEN ELECTIVE – I		
S.No	**Subject Code**	**SUBJECT NAME**
1	R22A1251	WEB DEVELOPMENT
2	R22A2151	INTELLECTUAL PROPERTY RIGHTS
3	R22A0551	JAVA PROGRAMMING
4	R22A0351	ROBOTICS and AUTOMATION
5	R22A0451	ELECTRONICS FOR HEALTH CARE
6	R22A0251	RENEWABLE ENERGY SOURCES
7	R22A6751	PRINCIPLES OF DATA SCIENCE

OPEN ELECTIVE – II		
S.No	**Subject Code**	**SUBJECT NAME**
1	R22A0553	DATABASE SYSTEMS
2	R22A6753	BIG DATA ARCHITECTURE
3	R22A0352	DESIGN THINKING
4	R22A0552	PRINCIPLES OF CLOUD COMPUTING
5	R22A6951	IOT & IT'S APPLICATIONS
6	R22A2152	NANO MATERIALS
7	R22A0252	ELECTRICAL AND HYBRID VEHICLES

MALLA REDDY COLLEGE OF ENGINEERING ANDTECHNOLOGY

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

(R22A0001) ENGLISH

INTRODUCTION

English is a global language which is a means to correspond globally. Keeping in account of its vital role in the global market, emphasis is given to train the students to acquire language and communication skills. The syllabus is designed to develop and attain the competency in communicative skills.

The lectures focus on the communication skills and the selected excerpts support as resources for the teachers to develop the relevant skills in the students. The lessons stimulate discussions and help in comprehending the content effectively. The focus is on skill development, nurturing ideas and practicing theskills.

COURSE OBJECTIVES:

1. To enable students to enhance their lexical, grammatical and communicative competence.
2. To equip the students to study the academic subjects with better perspective through theoretical and practical components of the designed syllabus.
3. To familiarize students with the principles of writing and to ensure error-free writing
4. To sharpen the speaking skills of learners by involving them in diverse activities such as group discussions, debates, conversations and roleplays.
5. To train students in soft skills with the help of case studies.

SYLLABUS
Reading Skills:
Objectives
1. To develop an awareness in the students about the significance of silent reading and comprehension.
2. To augment the ability of students to guess the meanings of words from context and grasp the overall message of the text, draw inferences etc.,
   - Skimming the text
   - Understanding the gist of an argument
   - Identifying the topic sentence
   - Inferring lexical and contextual meaning
   - Understanding discourse features
   - Recognizing coherence/sequencing of sentences
   - Scanning the text

NOTE:
The students will be trained in reading skills using the prescribed text for detailed study. They will be examined in reading and answering questions using 'unseen' passages which may be taken from authentic texts, such as magazines/newspaper articles.

Writing Skills:
Objectives
1. To develop an awareness in the students about basic formal writing skills.
2. To equip students with the components of different forms of writing, beginning with the required ones:
   - Writing sentences
   - Use of appropriate vocabulary
   - Coherence and cohesiveness

- Formal and informal letter writing

Unit –I
J K Rowling's Convocation Speech at Harvard
Grammar   –   Tenses and Question Tags
Vocabulary   –   word Formation - AffixesWriting
Writing   –   Paragraph Writing
Reading   –The art of skimming and scanning   -
Reading Exercise Type 1
(Match the statements to the text they referto)

Unit – II

"The Road not taken" by Robert Frost
Grammar   –Direct and Indirect Speech
Vocabulary   –   One-Word Substitutes, Standard Abbreviations,
                                                     Synonyms and Antonyms
Writing   –   Essay Writing (Introduction, body and conclusion)
Reading   –   Reading –The art of Intensive and Extensive -Reading
                                                      Exercise Type 2
Unit – III
Satya Nadella's Email to His Employees on his First Day as CEO of Microsoft
Grammar   –   Voices
Vocabulary   –   Transitive and Intransitive
Writing   –   E-mail   Writing,   Letter   Writing
                                                    (complaints, requisitions, apologies).
Reading   –   Reading Comprehension- Reading Exercise Type3
                                                     (Reading between the lines)

Unit – IV

"Abraham Lincoln's Letter to His Son's Teacher"
Grammar   –   Articles, Punctuation
Vocabulary   –   PhrasalVerbs
Writing   –   PrécisWriting
Reading   –   Reading Exercise Type4 (Clozetest)

Unit –V
Abdul Kalam's Biography
Grammar   –   Subject-Verb Agreement, Noun-Pronoun
Agreement Vocabulary–   Commonly ConfusedWords
Writing   –   MemoWriting
Reading   -   Reading Exercise Type5 (Identifyingerrors)

* Exercises apart from the textbook shall also be used for classroom tasks.

REFERENCE BOOKS:
1. Practical English Usage. Michael Swan. OUP.1995.
2. Remedial English Grammar. F.T. Wood.Macmillan.2007
3. https://www.britannica.com/biography/A-P-J-Abdul-Kalam
4. Study Writing. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press.2006.
5. CommunicationSkills.SanjayKumarandPushpaLata.OxfordUniversityPress.2011.

COURSE OUTCOMES:

After completion of the course students will be able to:

1. Gain competence and proficiency in 'productive' skills, i.e., writing and speaking with the recognition of the need for life-long learning of thesame
2. Hone their language abilities in terms of comprehending complex technical texts with a potential to reviewliterature
3. Present ideas clearly and logically to analyze data and provide valid conclusions in written communication
4. Enrich their grammatical accuracy and fluency to be adept at both the active and passive skills
5. Represent old conventions with a set of the new by professional verbal communicative ability.

MALLA REDDY COLLEGE OF ENGINEERING ANDTECHNOLOGY

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

(R22A0023)MATHEMATICS -I

COURSE OBJECTIVES: To learn

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

UNIT I: Matrices

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

UNIT II: Eigen values and Eigen vectors

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

UNIT III:Multi Variable Calculus (Differentiation)

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

UNIT IV:First Order Ordinary Differential Equations

Exact, Equations reducible to exact form, Applications of first order differential equations - Newton's law of cooling, Law of natural growth and decay,Equations not of first degree-Equations solvable for p, equations solvable for y, equations solvable for x and Clairaut's type

UNIT V : Differential Equations of Higher Order

Linear differential equations of second and higher order with constant coefficients: Non-homogeneous term of the type $f(x) = e^{ax}$, sinax, cosax, x^n, e^{ax} V and x^n V - Method of variation of parameters, Equations reducible linear ODE with constant coefficients-Cauchy's Euler equation and Legendre's equation.

Text Books

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

Reference Books

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

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

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

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
I Year B. TECH -I-SEM   **L/T/P/C**
                                                                           3/-/-/3
(R22A0201)PRINCIPLES OF ELECTRICAL AND ELECTRONICS ENGINEERING

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

UNIT –I: **INTRODUCTION TO ELECTRICAL CIRCUITS**: Concept of Circuit and Network, R-L-C Parameters, Ohms law and its limitations, Kirchhoff's Laws-KVL, KCL.

NETWORK ANALYSIS (D.C EXCITATION): Series and parallel connections of Resistive Networks, voltage division and current division, Mesh analysis, Nodal analysis

NETWORK THEOREMS: Thevenin's Theorem, Norton's Theorem and Superposition Theorem(for independent sources).

UNIT–II: SINGLE PHASE A.C. CIRCUITS: Average value, R.M.S. value, form factor and peak factor for sinusoidal wave form.Concept of phase, phasor representation of sinusoidal quantities phasedifference, Sinusoidal response of pure R, L, C.
THREE PHASE A.C. CIRCUITS: Advantages of Three phase over single phase, Voltage and Current relationship in star and delta connections.

UNIT-III:MACHINES:
DC Generator: principle of operation and working, Action of commutator, constructional features, basic concept of Lap and wave windings, emf equation.
DC Motor: principle of operation, Back emf and its significance, torque equation-Gross torque and Shaft torque.
Single Phase Transformer: principle of operation, emf equation, problems on emf equation.

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

UNIT–V:
BIPOLAR JUNCTION TRANSISTOR: Symbols, types, Construction and Principle of Operation of N-P-N and P-N-P transistors,Amplifying Action, Common Emitter, Common Base and Common Collector configurations.
JFET, Symbol, Construction, Principle of operation, and its Characterstics, MOSFET (Enhancement and Depletion mode) Symbol, Construction, Principle of Operation and its Characteristics.

TEXTBOOKS:
1. EngineeringCircuitAnalysis-WilliamHayt,JackE.Kemmerly,SMDurbin,McGrawHill Companies.
2. ElectricCircuits-A.Chakrabarhty,DhanipatRai&Sons.
3. ElectricalMachines–P.S.Bimbra,KhannaPublishers.
4. "ElectronicDevices&Circuits", SpecialEdition–MRCET,McGrawHillPublications,2017.
5. IntegratedElectronicsAnalogDigitalCircuits,JacobMillmanandD.Halkias,McGrawHill.
6. ElectronicDevicesandCircuits, S.Salivahanan, N.Sureshkumar, McGrawHill.

REFERENCEBOOKS
1. NetworkanalysisbyM.EVanValkenburg,PHIlearningpublications.
2. Networkanalysis-N.CJaganandC.Lakhminarayana,BSpublications.
3. ElectricalCircuitsbyA.Sudhakar,ShyammohanandSPalli,McGrawHillCompanies.
4. ElectricalMachinesbyI.J.Nagrath&D.P.Kothari,TataMcGraw-HillPublishers.
5. Electronic Devices and Circuits, K.LalKishore, B.S Publications
6. Electronic Devices and Circuits, G.S.N.Raju, I.K.International Publications, NewDelhi,2006.

COURSEOUTCOMES:

 After the course completion the students will be able to

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

MALLA REDDY COLLEGE OF ENGINEERING ANDTECHNOLOGY

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

(R22A0301) COMPUTER AIDED ENGINEERING GRAPHICS

COURSE OBJECTIVES:

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

UNIT 1

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

UNIT 2

Projection of Points: Introduction to reference planes, four quadrants, importance of reference lines. Projection of points in all the four quadrants
Projection of Lines: Parallel to both the reference planes, Parallel to one plane and perpendicular to other plane, Inclined to one plane and parallel to other plane, Inclined to both planes

UNIT 3

Projections of Planes: Introduction toRegular planes. Parallel/Perpendicular to one reference plane, Inclined to one plane and Inclined to both the reference planes.
Projections of Solids: Introduction - Prisms, Pyramids, Cone and Cylinder, Axis parallel and perpendicular to one reference plane, Axis inclined to one reference plane.

UNIT 4

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

UNIT 5

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

TEXT BOOKS:

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

REFERENCE BOOKS:

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

COURSE OUTCOMES:

After the completion of course the student will be capable to

1. To produce geometric construction, dimensioning & Curves and detail drawings.
2. To compile Projections of points, lines, then create virtual drawing by using computer
3. To sketch the Planes and Solid Projections

4. To develop isometric drawings of simple objects reading the orthographic projections of those objects.
5. To understand and visualize the 3-D view of engineering objects. Elaborate the conversions of 2D - 3D and Vice-Versa

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

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

(R22A0501)PROGRAMMINGFOR PROBLEM SOLVING

COURSE OBJECTIVES:
1. To Understand the use of computer system in problem solving and to build program logic with algorithms and flowcharts.
2. To learn the syntax and semantics of C programming language.
3. To learn the usage of structured programming approach in solving problems.
4. To learn the usage of strings and pointers.
5. Understand the usage of structures and files.

UNIT-I: Introduction to Programming:
Computer Languages, Compilers, Compiling and executing a program, Representation of Algorithms and Flowcharts with examples.

Introduction to C Programming Language:
Structure of a C Program, I/O: Simple input and output with scanf() and printf(), C Tokens- Keywords, Identifiers, Constants, Variables, Data types, Operators, Expressions and precedence, Expression evaluation, Type conversion.

UNIT-II: Conditional Branching and Arrays:
Control Structures – Selection Statements (Decision Making)- if and switch statements, nested if-else, Iteration and loops: use of while, do-while and for loops, nested loops, use of goto, break and continue statements.
Arrays: Definition, one and two dimensional arrays, creating, accessing and manipulating elements of arrays.

UNIT- III: Designing Structured Programs using Functions:
Functions: Declaring a function, Categories of functions, passing parameters to functions: call by value, call by reference, passing arrays to functions, Scope- Local Vs Global, Storage classes, Recursion with example programs.

UNIT-IV: Strings and Pointers:
Strings: Introduction to strings, Declaration and Initialization, String input/output functions, String manipulation functions with example programs, Array of Strings.
Pointers: Defining pointers, Declaration and Initialization, accessing variables through pointers, Pointers to arrays, Pointers to functions, Pointers to structures, Command line arguments, Enumeration data type, Dynamic Memory Management Functions: malloc(), calloc(), realloc() and free().

UNIT-V: Structures and File handling in C:
Structures: Defining structures, Declaration and Initialization, Array of structures, unions.
Files: Text and Binary files, Opening and Closing files, File input /output functions, Creating and Reading and writing text files, Appending data to existing files.

TEXTBOOKS:
1. JeriR.Hanly and Elliot B.Koffman,Problem solving and Program Design in C 7thEdition,Pearson.
2. Mastering C, K.R.Venugopal, S R Prasad, Tata McGraw-Hill Education.
3. Computer Programming, E.Balagurusamy, First Edition, TMH.
4. Computer Science: A Structured Programming Approach Using C, B.A.Forouzan and R.F. Gilberg, Third Edition, Cengage Learning.

REFERENCEBOOKS:
1. BrianW.KernighanandDennisM.Ritchie,TheCProgrammingLanguage,PrenticeHallofIndia.
2. YashavantKanetkar,LetUsC,18thEdition,BPB.
3. Programming in C, Stephen G.Kochan, Fourth Edition, Pearson Education.

4. Herbert Schildt , C:The CompleteReference,McGrawHill,4thEdition.

COURSE OUTCOMES: The student will be able
1. To write algorithms and to draw flowcharts for solving problems.
2. To convert the algorithms/flowcharts to C programs.
3. To code and test a given logic in the C programming language.
4. To decompose a problem into functions and to develop modular reusable code.
5. To use arrays, pointers, strings, structures and files to write C programs.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

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

(R22A0081) ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB

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

OBJECTIVES:

1. To facilitate computer-aided multi-media instruction enabling individualized and independent language learning
2. To sensitize the students to the nuances of English speech sounds, word accent, intonation and rhythm
3. To bring about a consistent accent and intelligibility in their pronunciation, ample speaking opportunities are provided.
4. To improve the fluency in spoken English and neutralize mother tongue influence
5. To train students to use language appropriately for interviews, group discussions and public speaking

English Language and Communication Skills Labs 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 and Communication Skills Lab

UNIT –I
CALL Lab: Introduction to Phonetics –Speech Sounds –Vowels and Consonants- Transcriptions
ICS Lab: Ice-Breaking activity - JAM session

UNIT –II
CALL Lab: Pronunciation: Past Tense Markers and Plural Markers
ICS Lab: Situational Dialogues/Role Plays-–Greetings - Taking Leave – Introducing Oneself and Others - Requests and Seeking Permissions

UNIT–III
CALL Lab: Syllable and Syllabification
ICS Lab: Communication at Workplace- Situational Dialogues/Role Plays – Seeking Clarifications – Asking for and Giving Directions – Thanking and Responding – Agreeing and Disagreeing – Seeking and Giving Advice

UNIT –IV
CALL Lab: Word Stress and Intonation
ICS Lab:Information transfer – from visual to verbal - maps, charts, tables and graphs

UNIT –V
CALL Lab: Errors in Pronunciation- Accent - the Influence of Mother Tongue (MTI)
ICS Lab: Making a Short Speech - Extempore

ELCS Lab:

1. Computer Assisted Language Learning (CALL) Lab:

The Computer aided Language Labfor 60 students with 60 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:
    i) P –IV Processor
       a) Speed –2.8 GHZ
       b) RAM –512 MB Minimum
       c) HardDisk –80 GB

ii) Headphones of High quality

2. Interactive Communication Skills (ICS) 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.

DISTRIBUTION AND WEIGHTAGE OF MARKS

English Language Laboratory Practical Examination:

1. The practical examinations for the English Language Laboratory shall be conducted as per the University norms prescribed for the core engineering practical sessions.

2. For the Language lab sessions, there shall be a continuous evaluation during the year for 30 marks and 70 year-end Examination marks. Of the 30 marks, 20 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The year-end Examination shall be conducted by the teacher concerned with the help of another member of the staff of the same department of the other institution.

OUTCOMES:

1. Learning with precision through computer-assisted individualized and independent language learning to work independently in engineering set up.
2. Improved conversational reception and articulation techniques in the course of repetitive instruction thereby gaining confidence both in institutional and professional environment.
3. Accuracy in pronunciation and restoring Standard English thereby crafting better command in English language so that the students have a cutting edge over others in society.
4. Imbibing appropriate use of language in situations to work as an individual and as o leader in diverse teams
5. Equip themselves with the pre-requisites, and relevant techniques to effectively attend corporate interviews

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

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

-/-/3/1.5

(R22A0281)PRINCIPLES OF ELECTRICAL AND ELECTRONICS ENGINEERING LAB

COURSE OBJECTIVES:

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

Among the following experiments any 10 are to be conducted

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

COURSE OUTCOMES:

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

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

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
I Year B. TECH -I-SEM   **L/T/P/C**
                                                                        -/-/3/1.5
(R22A0581)PROGRAMMINGFOR PROBLEM SOLVING LAB

COURSE OBJECTIVES:
1. To work with an IDE to create, edit, compile, run and debug programs.
2. To analyze the various steps in program development.
3. To develop programs to solve basic problems by understanding basic concepts in C like operators, control statements etc.
4. To develop modular, reusable and readable C Programs using the concepts like functions, arrays etc.
5. To create, read from and write to text and binary files.

Practice sessions:
a. Write a simple program that prints the results of all the operators available in C (includingpre/postincrement,bitwiseand/or/not,etc.).Readrequiredoperandvaluesfrom standard input.
b. Writeasimpleprogramthatconvertsonegivendatatypetoanotherusingautoconversionandcasting.Takethevaluesfromstandard input.

Simple numeric problems:
a. Write a program for finding the max and min from the three numbers.
b. Write the program for the simple, compound interest.
c. Write a program that declares Class awarded for a given percentage of marks, where mark

<40%= Failed, 40% to <60% = Second class, 60% to <70%=First class, >= 70% = Distinction. Read percentage from standard input.
d. Write a program that prints a multiplication table for a given number and the number of rows in the table. For example, for a number 5 and rows=3,the output should be:

5 x1=5

5 x2=10

 5 x3=15

Expression Evaluation:
a. A building has 10 floors with a floor height of 3 meters each. A ball is dropped from the top ofthebuilding.Findthetimetakenbytheballtoreacheachfloor.(Usetheformulas=ut+(1/2)at^2where u and a are the initial velocity in m/sec(=0) and acceleration in m/sec^2 (=9.8m/s^2)).
b. WriteaCprogram,whichtakestwointegeroperandsandoneoperatorfromtheuser,performsthe operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement).
c. Write a C program to find the factorial of a given number.
d. WriteaCprogramtofindthesumofindividualdigitsofapositiveintegerandtestgivennumberispalindrome.
e. A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.
f. Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
g. Write a C program to find the roots of a Quadratic equation.

Arrays, Functions and Pointers:
a. Write a C program to find the minimum, maximum and average in an array of integers.
b. Write a C program that uses functions to perform the following:
   1. Addition of Two Matrices
   2. Multiplication of Two Matrices

c. Write a C program to find the Transpose of a matrix.

d. Write a function to swap the values of two variables using call by value.

e. Write a function to swap the values of two variables using call by reference.

f. Write C programs that use both recursive and non-recursive functions

　　1. To find the factorial of a given integer.

　　2. To find the GCD(greatest common divisor) of two given integers.

g. Write a program for reading elements using a pointer into an array and display the values using the array.

h. Write a program for display values reverse order from an array using a pointer.

i. Write a program through a pointer variable to sum of n elements from an array.

Strings:

a. Write a C program that uses functions to perform the following operations:

　　1. To insert a sub-string into a given main string from a given position.

　　2. To delete n Characters from a given position in a given string.

b. Write a C program to determine if the given string is a palindrome or not(Spelled same in both directions with or without a meaning like madam, civic, noon, abcba, etc.)

c. Write a C program that displays the position of a character ch in the string S or–1 if S doesn't contain ch.

d. Write a C program to count the lines, words and characters in a given text.

Structures:

a. Write a C program to create a structure named book and display the contents of a book.

b. Write a C program to create a structure named student and display the details of 5 students using array of structures.

c. Write a C program to calculate total and percentage marks of a student using structure.

Files:

a. Write a C program to display the contents of a file to standard output device.

b. Write a C program which copies one file to another file.

c. Write a C program to count the number of times a character occurs in a text file. The file name and the character are supplied as command line arguments.

d. Write a C program to merge two files into a third file (i.e.,the contents of the first file followed by those of the second are put in the third file).

Miscellaneous:

a. Write a menu driven C program that allows a user to enter n numbers and then choose between finding the smallest, largest, sum, oraverage.The menu and all the choices are to be functions. Use a switch statement to determine what action to take. Display an error message if an invalid choice is entered.

b. Write a C program to construct a pyramid of numbers as follows:

```
1          *              1
1 2        * *            2 2
1 23       * **           3 33
                          4 444
```

TEXTBOOKS:

1. Jeri R. Hanly and Elliot B.Koffman, Problem solving and Program Design in C 7th Edition,Pearson.

2. B.A. Forouzan and R.F. Gilberg C Programming and Data Structures, Cengage Learning, (3rdEdition).

REFERENCEBOOKS:

1. BrianW.Kernighan and DennisM.Ritchie,The CProgramming Language,PHI.

2. E.Balagurusamy,ComputerfundamentalsandC,2ndEdition,McGraw-Hill.

3. YashavantKanetkar,LetUsC,18thEdition,BPB.

4. R.G.Dromey,HowtosolveitbyComputer,Pearson(16thImpression).

5. Programmingin C,Stephen G.Kochan,FourthEdition,PearsonEducation.

6. HerbertSchildt,C:The CompleteReference,McGrawHill,4thEdition.

7. ByronGottfried,Schaum'sOutlineofProgrammingwithC,McGraw-Hill.

COURSE OUTCOMES:

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

- Formulate the algorithms for simple problems.
- identify and correct logical errors encountered during execution.
- Represent and manipulate data with arrays, strings, structures and pointers.
- create, read and write to and from simple text and binary files.
- Modularize the code with functions so that they can bere used.

MALLA REDDY COLLEGE OF ENGINEERING ANDTECHNOLOGY

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

(R22A0082) APPLIED PHYSICS LAB/ENGINEERING CHEMISTRY LAB

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

LIST OF EXPERIMENTS:
1. Melde's experiment –Frequency of electrical vibrator.
2. Newton's Rings –Radius of curvature of Plano convex lens.
3. Laser -Wave length of light by using Diffraction grating.
4. CR circuit – Time constant of RC circuit.
5. LCR Circuit- Quality factor and resonance frequency of LCR circuit.
6. LED -Characteristics of LED.
7. Solar cell -Characteristics of Solar cell.
8. Optical fiber- Numerical aperture of an optical fiber.
9. Torsional pendulum- Rigidity modulus of given wire (demonstrative).
10. Hall Effect – Hall coefficient of semiconducting samples (demonstrative).

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

COURSE OUTCOMES:
1. Students can compare the elastic constants of different metallic wires, and also determine the ac frequency of vibrating bar.
2. Students can illustrate the interference of light phenomena.
3. Wavelength of the given laser can be determined by using diffraction phenomenon
4. By understanding electrical principles, Time constant of RC and resonance phenomenon of LCR circuits can be analyzed.
5. V-I characteristics of various semiconductor devices can be illustrated.

(R22A0082) ENGINEERING CHEMISTRY LAB

COURSE OBJECTIVES:

The students will be able:

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

List of Experiments

Titrimetry:

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

Instrumental Methods

Conductometry:

3. *Estimation of concentration of HCl by Conduct o metric titrations.*
4. *Estimation of concentration of Acetic acid by Conduct o metric titrations.*

Potentiometry:

5. *Estimation of concentration of HCl by Potentiometric titrations.*
6. *Estimation of amount of Fe^{2+} by Potentiometric titration using $KMnO_4$.*

Colorimetry:

7. *Estimation of Copper by Colorimetric method.*

Preparation

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

Physical Property

9. *Determination of Surface Tension of a given liquid by Stalagmometer.*

Corrosion control method

10. Electroplating of Copper on an Iron object.

Text Book:

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

Suggested Readings:

1. *Practical Engineering Chemistry by K. Mukkanti, etal, B.S. Publications, Hyderabad.*
2. *Text Book of engineering chemistry by R. N. Goyal and HarrmendraGoel, Ane Books Private Ltd.*

COURSE OUTCOMES:

The students will be able:

1. To estimate the total hardness present in a sample of water.
2. To know the strength of an acid by conduct o metric and potentiometric methods.
3. To find the amount of Cu^{2+} present in unknown sample using colorimetric method.
4. To prepare a thermosetting polymer.
5. To determine the surface tension of a given liquid.
6. To understand the electroplating method for corrosion protection of metals.

MALLA REDDY COLLEGE OF ENGINEERING ANDTECHNOLOGY

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

(R22A0083) ENGINEERING AND COMPUTING HARDWARE WORKSHOP

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

COURSE OBJECTIVES:

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

Part I: COMPUTING HARDWARE WORKSHOP

Task- 1: PC HARDWARE
Identification of the peripherals of a computer, components in a CPU and its functions.Block diagram of the CPU along with the configuration of each peripheral. Functions ofMotherboard. Assembling and Disassembling of PC. Installation of OS. Basic Linux commands.

Task- 2: TROUBLESHOOTING
Hardware Troubleshooting: Students are to be given a PC which does not boot due to proper assembly or defective peripherals and the students should be taught to identify and correct the problem.
Software Troubleshooting: Students have to be given a malfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition.

Task 3: INTERNET
Web Browsers, Access of websites, Surfing the Web, Search Engines, Customization of web browsers, proxy settings, bookmarks, search toolbars, pop-up blockers. Antivirus downloads, Protection from various threats.

MS OFFICE
Task 4: MICROSOFT WORD
Overview of MS word features. Usage of Hyperlink, Symbols, Spell Check, Track Changes. Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge in word. Using Word to create Project Certificate, Project Abstract, News Letter, Resume.

Task 5: MICROSOFT EXCEL
Overview of Excel Features Excel formulae & Functions, conditional formatting, Charts, Hyper linking, Renaming and Inserting worksheets, Data Analysis functions.
Creating a Scheduler (Features: - Gridlines, Format Cells, Summation, auto fill, Formatting)
Calculating GPA (Features: - Cell Referencing, Formulae and functions in excel

Task 6: MICROSOFT POWER POINT
Overview of PowerPoint features, Insertion of images, slide transition, Custom animation, Hyperlinks.

Task 7: GOOGLE FORMS
Google forms   introduction, opening Google forms, editing forms, add questions, copy duplicate questions, delete questions, required questions, more button, form color and themes, preview form, advance form settings, send form, view responses, close form

PART II: ENGINEERING WORKSHOP

A.   List of Experiments:
1. Residential house wiring using switches, fuse, indicator, lamp and energy meter.
2. Fluorescent lampwiring
3. Stair casewiring
4. Soldering and Desoldering practice – components, devices and circuits using general

1. Purpose PCB.
Note: Minimum ONE experiment need to be conducted in each trade

A.   TRADES FOR EXERCISES:
At least two exercises from each trade:
1. Carpentry:
To prepare T-Lap Joint, Dovetail Joint.
To prepare Mortise & Tenon Joint.

2. Fitting:
To prepare V-Fit, Dovetail Fit & Semi-circular fit.
3. Tin-Smithy:
To make Square Tin, Rectangular Tray & Conical Funnel.
Note: Minimum ONE experiment need to be conducted in each trade

Trades to demonstrate:
1. Plumbing
2. Foundry
3. Welding
4. Black smithy
5. Metal cutting (Water Plasma)
Note: Minimum a total of 3 trades to be demonstrated.

TEXT BOOKS – IT WORKSHOP

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

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

COURSE OUTCOMES:

- Ability to identify, assemble and troubleshoot the major components of a computer and perform the installation of Operating System.
- Capacity to make effective usage of the internet for academics and develop professional documents, spreadsheets and presentations.
- Students will be able to understand the domestic, illumination, stair-case wiring procedures and soldering de soldering practice
- The student will have hands-on experience on manufacturing of components using different trades of engineering processes
- The student will be able to perform in a team, adhering to industrial safety practices and follow professional working standards.

MALLA REDDY COLLEGE OF ENGINEERING ANDTECHNOLOGY

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

(R22A0004) ENVIRONMENTAL SCIENCE

COURSE OBJECTIVES: On successful completion of this course, students will be able:

1. CO1: To distinguish the inter relationship between living organism and environment.
2. CO2: To categorize various types of natural resources available on the earth surface.
3. CO3: To detect the causes, and control measures of various types of environmental pollution.
4. CO4: To articulate the issues related to solid waste and its management.
5. CO5: To explain and understand the importance of Sustainable development.

COURSE OUTCOMES: The basic concepts included in this course will help the student to:
1. CO1: Differentiate between various biotic and abiotic components of ecosystem.
2. CO2: Describe the various types of natural resources.
3. CO3: Examine the problems associated with waste management.
4. CO4: Evaluate the causes, and apply control measures of various types of environmental pollutions.
5. CO5: Develop technologies on the basis of ecological principles on environment which in turn helps in sustainable development.

UNIT-I ECOSYSTEMS (6 hours)
Definition, Scope and Importance of Ecosystem; Structure of an Ecosystem - abiotic and biotic component; Functions of an ecosystem- food chains, food webs and ecological pyramids.
Activities: **Activities**: Case studies, poster making, Essays on biotic components.

UNIT-II NATURAL RESOURCES (6hours)
Classification of Resources: Definition of natural resource - renewable and non -renewable resources. Forest resources - functions and uses of forests, Deforestation - causes and consequences. Water resources – Dams - benefits and environmental problems over dams. Renewable resources - solar energy (solar cells), hydro power, biogas and bio-fuel.
Activities: Case studies, seminars, Group Project works, to prepare rain water harvesting models, to demonstrate the generation of electricity with the utilization of non-conventional energy resources.

UNIT-III ENVIRONMENTAL POLLUTION AND TECHNIQUES (6 hours)
Definition, Types of pollution- Air pollution- causes, effects, control measures of air pollution and prevention techniques. Water pollution- causes, effects, control measures and techniques.
Activities: Work sheets, Debate, seminars, surrounding case studies.

UNIT-IV SOLID WASTE MANAGEMENT (5 hours)
Definition of Solid waste, characteristics of solid waste; Solid waste management- collection, transportation, processing treatment and disposal methods; e-waste management; 3R techniques- reduce, reuse and recycle.
Activities: Quiz, Puzzles, Seminars, Case studies.

UNIT-V SUSTAINABLE DEVELOPMENT (4 hours)
Definition of sustainable development, sustainable development goals, threats to sustainability, strategies to achieve sustainable development.
Activities: Worksheets, seminars, slogans, group projects.

TEXT BOOKS
1. Textbook of Environmental Studies for Undergraduate Courses by ErachBharucha for University Grants Commission

2. Environmental Studies by R. Rajagopalan, Oxford University Press.
3. Textbook of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications
4. Dr. P. D Sharma, "Ecology and Environment", Rastogi Publications, New Delhi, 12 Edition, 2015

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

MALLA REDDY COLLEGE OF ENGINEERING ANDTECHNOLOGY

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

(R22A0002) PROFESSIONAL ENGLISH

INTRODUCTION:

English is a tool for global communication and is the dominant language, which is sweeping almost all the fields in the world. It has become a necessity for people to speak in English comfortably, if they want to enter the global workforce. Hence, the course is designed to help the students to meet the global standards. Each unit focuses on English skill-set to improve: Interview skills, giving presentations and professional etiquette.

COURSE OBJECTIVES:
1   To enrich students to express themselves appropriately and fluently in professional contexts.
2   To enhance their employability through regular participation in group discussions and interviewskills.
3   To lay foundation with writing strategies for the future workplaceneeds.
4   To acquaint students with different components of professional presentationskills.
5   To equip students with necessary training in listening to comprehend dialects of English language.

UNIT-I
**"*Mokshagundam Visvesvaraya"*
Speaking   - Description of Pictures, Places, Objects andPersons
Grammar   - 'If'Clauses
Vocabulary   - Homonyms, homophones andhomographs
Writing   - ParagraphWriting
NOTE: Listening and speaking tasks are solely for lab purpose and not for testing in the examinations.

UNIT –II
Speaking   -   SmallTalks
Grammar   -   Finite and Non-finite verbs
Vocabulary   -   Standard Abbreviations (Mini Project)
Writing   -   Job Application – Cover letter
NOTE: Listening and speaking tasks are solely for lab purpose and not for testing in the examinations.

Unit –III
Speaking   - Oralpresentations
Grammar   - Transformation ofSentences
Vocabulary   -Idioms
Writing   - AbstractWriting
NOTE: Listening and speaking tasks are solely for lab purpose and not for testing in the examinations.

Unit – IV
'How a Chinese Billionaire Built Her Fortune'
Speaking   -   Telephonic Expressions and Conversations
Grammar   -   Auxiliary verbs & model Verbs, Degrees of Comparison
Vocabulary   -   WordAnalogy
Writing   -   Job Application -Resume

NOTE: Listening and speaking tasks are solely for lab purpose and not for testing in the examinations.

Unit – V

Speaking	-	Group discussion
Grammar	-	Common Errors, Prepositions
Vocabulary	-	Technical Vocabulary
Writing	-	Report Writing

NOTE: Listening and speaking tasks are solely for lab purpose and not for testing in the examinations.

REFERENCE BOOKS:

1. Practical English Usage. Michael Swan. OUP.1995.
2. Remedial English Grammar. F.T. Wood.Macmillan.2007
3. Skills Annexe& Epitome of Wisdom - B.Tech 1st Year English Study Material, JNTUH.
4. Study Writing. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press.2006.
5. CommunicationSkills.SanjayKumarandPushpaLata.OxfordUniversityPress.2011.
6. ExercisesinSpokenEnglish.Parts.I-III.CIEFL,Hyderabad.OxfordUniversityPress
7. 'English for Engineers'. Cambridge University Press

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

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

(R22A0024)MATHEMATICS-II

OBJECTIVES:

- The aim of numerical methods is to provide systematic methods for solving problems in a numerical form using the given initial data, also used to find the roots of an equation and to solve differential equations.
- The objective of interpolation is to find an unknown function which approximates the given data points and the objective of curve fitting is to find the relation between the variables x and y from given data and such relationships which exactly pass through the data (or) approximately satisfy the data under the condition of sum of least squares of errors.
- PDE aims at forming a function with many variables and also their solution methods, Method of separation of variables technique is learnt to solve typical second order PDE.
- Evaluation of multiple integrals.
- In many engineering fields the physical quantities involved are vector valued functions. Hence the vector calculus aims at basic properties of vector-valued functions and their applications to line, surface and volume integrals.

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

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

UNIT – II: Numerical Methods
Solution of algebraic and transcendental equations: Introduction, Bisection Method, Method of false position, Newton Raphson method and their graphical interpretations.

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

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

UNIT III: Partial Differential Equations
Introduction, formation of partial differential equation by elimination of arbitrary constants and arbitrary functions, solutions of first order Lagrange's linear equation and non-linear equations, Charpit's method, Method of separation of variables for second order equations and applications of PDE to one dimensional equation (Heat equation).

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

Unit V: Vector Calculus
Introduction, Scalar point function and vector point function, Directional derivative, Gradient, Divergence, Curl and their related properties, Laplacian operator, Line integral - work done, Surface integrals, Volume integral. Green's Theorem, Stoke's theorem and Gauss's Divergence Theorems (Statement & their Verification).

Text Books:
a. Higher Engineering Mathematics by B V Ramana ., Tata McGraw Hill.
b. Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers.

c.   Mathematical Methods by S.R.KIyenger, R.K.Jain, Narosa Publishers.

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

Course Outcomes: After learning the contents of this paper the student will be able to
1. Find the most appropriate relation of the data variables using curve fitting and this method of data analysis helps engineers to understand the system for better interpretation and decision making.
2. Find the roots of algebraic, non algebraic equations.
3. Solve first order linear and non-linear partial differential equations.
4. Evaluate multiple integrals.
5. Evaluate the line, surface, volume integrals and converting them from one to another using vector integral theorems.

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

(R22A0021) APPLIED PHYSICS

COURSE OBJECTIVES:
1 To understand the basic principles of lasers and optical fibers.
2 To interpret dual nature of the matter and behavior of a particle quantum mechanically.
3 To classify the solids depending upon electrical conductivity.
4 To understand the concepts of semiconductors and devices.
5 To analyze dielectric and magnetic properties of the materials.

UNIT – I
LASERS & FIBER OPTICS **(15 Hours)**
Lasers: Characteristics of lasers, Absorption, Spontaneous and stimulated emissions, Einstein'sCoefficients,Population inversion, meta stable state, types of pumping, lasing action, construction and working of Ruby Laser, Helium-Neon Laser, Semiconductor diode Laser, Applications of lasers.
Fiber Optics: Introduction to optical fiber, Construction and working principle of an Optical Fiber, Acceptance angle and Numerical aperture, Types of Optical fibers - Mode and index profile,Losses in optical fiber, Optical Fiber in Communication System, Applications of optical fibers.
UNIT – II
QUANTUM MECHANICS **(10 Hours)**
Wave nature of particles, de Broglie's hypothesis, matter waves, Heisenberg's uncertainty principle, Davisson and Germer's experiment, G.P Thomson experiment, Schrodinger time-independent wave equation-significance of wave function, Particle in one dimensional square well potential.
UNIT – III
FREE ELECTRON THEORY OF METALS **(12 Hours)**
Free electron theory (Classical & Quantum)- Assumptions, Merits and drawbacks, Fermi level, Density of states, Periodic potential, Bloch's theorem, Kronig – Penny model (qualitative) , E –k diagram, Effective mass, Origin of energy bands in solids, Classification of materials : Metals, semiconductors and insulators.
UNIT-IV
SEMICONDUCTOR PHYSICS **(15 Hours)**
Intrinsic and Extrinsic semiconductors, Direct and Indirect band gap semiconductors, Carrier concentration in intrinsic and extrinsic semiconductors. Dependence of Fermi level on carrier concentration and temperature, Formation of PN Junction, V-I characteristics of PN Junction diode, Energy Diagram of PN diode, Hall effect, semiconductor materials for optoelectronic devices - LED, Photo diode, Solar cell.
UNIT – V
DIELECTRICS AND MAGNETIC PROPERTIES OF MATERIALS **(12 Hours)**
Dielectrics: Introduction, Types of polarizations – Electronic, Ionic and Orientation polarization (qualitative) and calculation of polarizabilities, Internal fields in Solid, Clausius-Mossotti relation, Piezo-electricity and Ferro-electricity.
Magnetism: Introduction, Classification of Dia, Para, Ferro magnetic materials based on magnetic moment, Properties of Anti-Ferro and Ferri magnetic materials, Hysteresis curve based on domain theory, Soft and Hard magnetic materials.

COURSE OUTCOMES:
2 Can apply the principles of laser to understand various lasers and fiber optic systems.
3 Basic principles of quantum mechanics can be used to analyze the microscopic behavior of a particle.
4 Classification of solids can be made by understanding the band structure of solids.
5 Concepts of semiconductors can be applied to predict the importance of electronic devices relevant to engineering domains.
6 Examine dielectric, magnetic properties of the materials and apply them in material technology.

TEXT BOOKS:
1. Engineering Physics by Kshirsagar & Avadhanulu, S. Chand publications.
2. Modern Engineering Physics-Dr K Vijaya Kumar & Dr S Chandralingam, S. Chand Publications.

3. Engineering Physics- B.K.Pandey, S.Chaturvedi, Cengage Learning.

REFERENCES:
1. Engineering Physics – R.K. Gaur and S.L. Gupta, DhanpatRai Publishers.
2. Engineering Physics, S Mani Naidu- Pearson Publishers.
3. Engineering physics 2nd edition –H.K. Malik and A.K. Singh.
4. Engineering Physics – P.K. Palaniswamy, Scitech publications.
5. Physics by Resnick and Haliday.

MALLA REDDY COLLEGE OF ENGINEERING ANDTECHNOLOGY

I Year B. TECH -I-SEM

L/T/P/C
2/0/0/2

(R22A0022) ENGINEERING CHEMISTRY

COURSE OBJECTIVES: The students will be able to

1. Acquire the knowledge of electrochemistry and batteries which are essential for the engineers and in industry.
2. Analyze engineering problems related to corrosion and develop different corrosion control techniques.
3. Identify different types of polymers, composites and their applications in various engineering fields.
4. Gain knowledge on wide variety of advanced materials like nano and smart materials which have excellent engineering properties.
5. Analyze water for its various parameters and its significance in industrial and domestic applications.

Unit I   Electrochemistry (8 hours)
Introduction - Types of cells - Electrolytic and Electrochemical cells (construction and working of Galvanic Cell) - Electrode potential- Cell potential (EMF); Nernst equation and its applications; Electrochemical series and its applications. Batteries - Classification of batteries - primary, secondary and fuel cells with examples. Primary cells - Lithium cells; Secondary cells - Lead acid battery and Lithium ion battery; Fuel cells - Differences between battery and a fuel cell; Construction, working and applications of H_2-O_2 fuel cell.

Unit II   Corrosion: (8 hours)
Causes and effects of corrosion – Theories of corrosion - Chemical (oxidation) and Electrochemical corrosion – mechanism of electrochemical corrosion (Evolution of Hydrogen and Absorption of Oxygen); Corrosion control methods - Cathodic protection - Sacrificial anode and Impressed current cathodic methods; Surface coatings – methods of application - Electroplating (Cu-plating) and Electroless plating (Ni-plating) - advantages and applications of electroplating/electroless plating.

Unit III Water and its treatment: (8 hours)
Introduction – hardness of water – causes of hardness; Types of hardness - temporary and permanent – expression and units of hardness-numerical problems; Potable water and its specifications; Disinfectation of water by chlorination and ozonization. Boiler troubles - caustic embrittlement, scales and sludges; External treatment of water – Ion exchange process; Desalination of water – Reverse osmosis.

Unit IV Polymers: (10 hours)
Introduction - Classification of polymers; Types of polymerization - addition and condensation polymerisation with examples. **Plastics** - thermoplastic and thermosetting resins; preparation, properties and engineering applications of Polyvinylchloride (PVC), Teflon (PTFE), and Bakelite. **Rubbers -** Natural rubber and its vulcanization. **Conducting polymers** - classification of conducting polymers – mechanism of conduction in trans-Polyacetylene and applications of conducting polymers. **Bio-degradable polymers** – preparation, properties and applications of Poly-Lactic acid.**Composite materials:** Introduction - Fibre reinforced plastics (FRPs) - Glass fibre reinforced, Carbon fibre reinforced plastics and their applications.

Unit V Advanced Materials: (8 hours)
Nanomaterials: Introduction and classification of nanomaterials; preparation of nanomaterials - Sol-gel method; applications of nanomaterials (industrial and medicinal); Carbon nanotubes (CNTs)-applications.
Smart materials: Introduction - Types of smart materials - examples and applications of piezoelectric materials and shape memory alloys.
Suggested Text Books:

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

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

COURSE OUTCOMES: The student will be able to

1. Relate the knowledge of operating principles of various types of electrochemical cells, including batteries, to optimize the need for sustainable development.
2. Analyze and develop technically sound, economic and sustainable solutions for complex engineering problems related to corrosion and its effects.
3. Identify, formulate and develop polymeric compounds used in various engineering materials for futuristic engineering applications.
4. Apply the knowledge of nanotechnology and smart materials to find solutions for various engineering problems.
5. Familiarize with the fundamentals of water treatment technologies and the considerations for its design and implementation in water treatment plants.

MALLA REDDY COLLEGE OF ENGINEERING ANDTECHNOLOGY
I Year B. TECH -II-SEM   **L/T/P/C**
                                                                              3/-/-/3
(R22A0502)PROBLEM SOLVING USING PYTHON PROGRAMMING

COURSE OBJECTIVES:
This course will enable students
1. To read and write simple Python programs.
2. To develop Python programs with conditionals and loops.
3. To develop Python programs with using arrays and functions.
4. To use Python data structures—-lists, tuples, dictionaries.
5. To do input/output with files in Python.

UNIT-I
Introduction to Python Programming Language: Introduction to Python Language, Features of Python, Python Installation, Python Input and Output Statements, Numeric Data Types: int, float, boolean, complex and string and its operations, Standard Data Types: List, Tuples, Sets and Dictionaries, Data Type conversions, Comments in Python.

UNIT-II
Variables and Operators: Understanding Python variables, multiple variable declarations, Operators in Python: Arithmetic operators, Assignment operators, Comparison operators, Logical operators, Identity operators, Membership operators, Bitwise operators, Precedence of operators, Expressions.
Control Flow and Loops: Indentation, if statement, if-else statement, chained conditional if- elif -else statement, Loops: While loop, for loop using ranges, Loop manipulation using break, continue and pass.

UNIT- III
Arrays: Advantages of Arrays, Creating an Array, Importing the Array Module, Indexing and Slicing on Arrays, Types of arrays, working with arrays using numpy.

UNIT-IV
Functions: Defining a function, Calling Functions, Passing parameters and arguments, Python Function arguments: Positional Arguments, Keyword Arguments, Default Arguments, Variable-length arguments, Scope of the Variables in a Function–Local and Global Variables, Fruitful Functions, Anonymous functions or Lambda functions, Powerful Lambda functions in Python.

UNIT-V
File Handling in Python: Introduction to files, Text files and Binary files, Access Modes, Writing Data to a File, Reading Data from a File, File input / output functions.
Error Handling in Python: Introduction to Errors and Exceptions: Compile-Time Errors, Logical Errors, Runtime Errors, Types of Exceptions, Python Exception Handling Using try, except and finally statements.

COURSE OUTCOMES:
Upon completion of the course, students will be able to
1. Read, write, execute by hand simple Python programs.
2. Structure simple Python programs for solving problems.
3. Decompose a Python program into arrays and functions.
4. Represent compound data using Python lists, tuples, dictionaries.
5. Read and write data from/to files in Python programs.

TEXT BOOKS
1. R.NageswaraRao,"Core Python Programming",dream tech.
2. Allen B. Downey,``Think Python: How to Think Like a Computer Scientist" 2nd edition,Updated for Python3, Shroff/O'Reilly Publishers,2016.
3. Python Programming: A Modern Approach,VamsiKurama,Pearson.

REFERENCEBOOKS:
1. Core Python Programming,W.Chun,Pearson.
2. Introduction to Python,Kenneth A. Lambert, Cengage.
3. Learning Python,MarkLutz,Orielly.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

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

(R22A0082) APPLIED PHYSICS LAB/ENGINEERING CHEMISTRY LAB

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

LIST OF EXPERIMENTS:
1. Melde's experiment –Frequency of electrical vibrator.
2. Newton's Rings –Radius of curvature of Plano convex lens.
3. Laser -Wave length of light by using Diffraction grating.
4. CR circuit – Time constant of RC circuit.
5. LCR Circuit- Quality factor and resonance frequency of LCR circuit.
6. LED -Characteristics of LED.
7. Solar cell -Characteristics of Solar cell.
8. Optical fiber- Numerical aperture of an optical fiber.
9. Torsional pendulum- Rigidity modulus of given wire (demonstrative).
10. Hall Effect – Hall coefficient of semiconducting samples (demonstrative).

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

COURSE OUTCOMES:
1. Students can compare the elastic constants of different metallic wires, and also determine the ac frequency of vibrating bar.
2. Students can illustrate the interference of light phenomena.
3. Wavelength of the given laser can be determined by using diffraction phenomenon
4. By understanding electrical principles, Time constant of RC and resonance phenomenon of LCR circuits can be analyzed.
5. V-I characteristics of various semiconductor devices can be illustrated.

(R22A0082) ENGINEERING CHEMISTRY LAB

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

List of Experiments
Titrimetry:
1. Estimation of Hardness of water by EDTA method.
2. Estimation of Ferrous ion by Dichrometry
Instrumental Methods
Conductometry:
3. Estimation of concentration of HCl by Conductometric titrations.
4. Estimation of concentration of Acetic acid by Conductometric titrations.
Potentiometry:
5. Estimation of concentration of HCl by Potentiometric titrations.
6. Estimation of amount of Fe^{2+} by Potentiometric titration using $KMnO_4$.
Colorimetry:
7. Estimation of Copper by Colorimetric method.
Preparation
8. Preparation of a Polymer-**Bakelite**
Physical Property
9. Determination of Surface Tension of a given liquid by Stalagmometer.
Corrosion control method
10. Electroplating of Copper on an Iron object.

Text Book:
1. Inorganic quantitative analysis, Vogel
2. A text book on experiments and calculation in Engineering Chemistry by S.S. Dara

Suggested Readings:
1. Practical Engineering Chemistry by K. Mukkanti, etal, B.S. Publications, Hyderabad.
2. Text Book of engineering chemistry by R. N. Goyal and HarrmendraGoel, Ane Books Private Ltd.

COURSE OUTCOMES:
The students will be able:

1. To estimate the total hardness present in a sample of water.
2. To know the strength of an acid by conductometric and potentiometric methods.
3. To find the amount of Cu^{2+} present in unknown sample using colorimetric method.
4. To prepare a thermosetting polymer.
5. To determine the surface tension of a given liquid.
6. To understand the electroplating method for corrosion protection of metals.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

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

(R22A0582)PROBLEM SOLVING USING PYTHON PROGRAMMING LAB

COURSE OBJECTIVES
This course will enable the students:

1. Able to understand Syntax and Semantics and create Arrays and Functions in Python.
2. Able to learn different data types Lists, Dictionaries in Python.
3. Able to know how to execute the programs using loops and control statements.
4. Able to learn decision making and Functions in Python.
5. Able to know how to handle Files and exceptions in Python.

Week 1:
A) Write python program to print HelloWorld.
B) Write a python program to get string,int,float input from user.
C) Write a python program to add 2 numbers.

Week 2:
A) Create a list and perform the following methods
       1)insert()   2)remove()   3)append()   4)len()   5)pop()   6) clear()
B) Write a python program to find the length of list.
C) Write a python program to find the smallest and largest number in the list.

Week 3:
A) Create a tuple and perform the following methods
      1) Add items   2) len()   3)check for item in tuple   4)Access iems
B) Write a python program using the following methods:1)count2)index
C) Write a python program using "+" and "*" operations which resulting a new tuple.

Week 4:
A) Create a dictionary and apply the following methods
      1) Print the dictionary items   2)access items 3)use get() 4)change values 5)use len()
B) Write a python code to convert list of tuples into dictionaries.
C) Write python program to store data in list, tuple, set, dictionary and then try to print them.

Week 5:
A) Write a python program to perform arithmetic, assignment, logical and comparison operators.
B) Write a Python program to add two positive integers without using the '+' operator. (use bitwise operator)
C) Write a Python program to perform the basic four operators(+,-,*,/).

Week 6:
A) Write a simple python program to declare a variable in different possible ways.
B) Write a python program to show precedence of operators using the expression:z=(v+w)*x/y
C) Write a python program to check whether the values of a list exist or not (use membership operator) and also perform identity operation.

Week 7:
A) Write a python program to print a number is positive/negative using if-else.
B) Write a python program to find largest number among three numbers.
C) Write a python Program to read a number and display corresponding day using if-elif-else.
D)Write a python program to print list of numbers using range and for loop.

Week 8:
A) Write a python code to print the sum of natural numbers using while loop.
B) Write a python program to print the factorial of given number.
C) Write a python program to find the sum of all numbers stored in a list using for loop.

Week 9:
A) Using a numpy module create an array and check the following:

    1. Type of array   2. Axes of array   3. Shape of array   4. Type of elements in array

B) Using a numpy module create array and check the following:

1. List with type float 2. 3*4 array with all zeros 3. From tuple 4. Random values

Week10:

A) Write python program in which a function is defined and calling that function prints Hello World.

B) Write python program in which a function (with single string parameter) is defined and calling that function prints the string parameters given to function.

C) Write a python program using with any one of python function argument.

Week11:

A) Write a program to double a given number and add two numbers using lambda().

B) Write a program for filter() to filter only even numbers from a given list.

C) Write a program for map() function to double all the items in the list?

D) Write a program to find sum of the numbers for the elements of the list by using reduce().

Week12:

A) Write a python program to open and write "hello world" into a file.

B) Write a python program to write the content "hi python programming" for the existing file.

C) Write a python program to read the content of a file.

Week 13:

A) Write a python program to append data to an existing file and then displaying the entire file.

B) Write a python program to open a new file, add some data into it and display the contents of that file.

Week 14:

A) Write a python program to handle the Zero Divison Error exception.

B) Write a python program to demonstrate multiple except block with a single try block.

TEXT BOOKS:

1. R.NageswaraRao,"Core Python Programming",dream tech.
2. Allen B. Downey,"Think Python: How to Think Like a Computer Scientist",SecondEdition,Updated for Python3,Shroff /O' Reilly Publishers,2016.

COURSE OUTCOMES:

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

1. Evaluate Problem solving and programming capability.
2. Describe the Numbers, Math functions, Strings, List, Tuples and Dictionaries in Python.
3. Implement conditional and loop for python programs.
4. Express different Decision Making statements, Arrays and Functions.
5. Understand and summarize different File handling operations and exceptions.

MALLA REDDY COLLEGE OF ENGINEERING ANDTECHNOLOGY

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

(R22A0083) ENGINEERING AND COMPUTING HARDWARE WORKSHOP

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

COURSE OBJECTIVES:

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

Part I: COMPUTING HARDWARE WORKSHOP

Task- 1: PC HARDWARE
Identification of the peripherals of a computer, components in a CPU and its functions.
Block diagram of the CPU along with the configuration of each peripheral. Functions of
Motherboard. Assembling and Disassembling of PC. Installation of OS. Basic Linux commands.

Task- 2: TROUBLESHOOTING
Hardware Troubleshooting: Students are to be given a PC which does not boot due to proper assembly or defective peripherals and the students should be taught to identify and correct the problem.
Software Troubleshooting: Students have to be given a malfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition.

Task 3: INTERNET
Web Browsers, Access of websites, Surfing the Web, Search Engines, Customization of web browsers, proxy settings, bookmarks, search toolbars, pop-up blockers. Antivirus downloads, Protection from various threats.

MS OFFICE
Task 4: MICROSOFT WORD
Overview of MS word features. Usage of Hyperlink, Symbols, Spell Check, Track Changes. Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge in word. Using Word to create Project Certificate, Project Abstract, News Letter, Resume.

Task 5: MICROSOFT EXCEL
Overview of Excel Features Excel formulae & Functions, conditional formatting, Charts, Hyper linking, Renaming and Inserting worksheets, Data Analysis functions.
Creating a Scheduler (Features: - Gridlines, Format Cells, Summation, auto fill, Formatting)
Calculating GPA (Features: - Cell Referencing, Formulae and functions in excel

Task 6: MICROSOFT POWER POINT
Overview of PowerPoint features, Insertion of images, slide transition, Custom animation, Hyperlinks.

Task 7: GOOGLE FORMS
Google forms introduction, opening Google forms, editing forms, add questions, copy duplicate questions, delete questions, required questions, more button, form color and themes, preview form, advance form settings, send form, view responses, close form

PART II: ENGINEERING WORKSHOP

A.   List of Experiments:
1. Residential house wiring using switches, fuse, indicator, lamp and energy meter.
2. Fluorescent lampwiring
3. Stair casewiring
4. Soldering and Desoldering practice – components, devices and circuits using general

2. Purpose PCB.

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

B.TRADES FOR EXERCISES:
At least two exercises from each trade:
4. Carpentry:
To prepare T-Lap Joint, Dovetail Joint.
To prepare Mortise & Tenon Joint.

5. Fitting:
To prepare V-Fit, Dovetail Fit & Semi-circular fit.
6. Tin-Smithy:
To make Square Tin, Rectangular Tray & Conical Funnel.
Note: Minimum ONE experiment need to be conducted in each trade

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

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

TEXT BOOKS – IT WORKSHOP

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

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

COURSE OUTCOMES:

- Ability to identify, assemble and troubleshoot the major components of a computer and perform the installation of Operating System.
- Capacity to make effective usage of the internet for academics and develop professional documents, spreadsheets and presentations.
- Students will be able to understand the domestic, illumination, stair-case wiring procedures and soldering de soldering practice
- The student will have hands-on experience on manufacturing of components using different trades of engineering processes
- The student will be able to perform in a team, adhering to industrial safety practices and follow professional working standards.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

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

(R20A0003) HUMAN VALUES AND PROFESSIONAL ETHICS

COURSE OBJECTIVES:

This introductory course input is intended:

1. To help the students appreciate the essential complementarily between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.

2. To facilitate the development of a holistic perspective among students towards life, profession and happiness, based on a correct understanding of the Human reality and the rest of Existence. Such a holistic perspective forms the basis of value based living in a natural way.

3. To highlight plausible implications of such a holistic understanding in terms of ethical human conduct, trustful and mutually satisfying human behavior and mutually enriching interaction with Nature.

UNIT - I:

Course Introduction - Need, Basic Guidelines, Content and Process for Value Education: Understanding the need, basic guidelines, content and process for Value Education.Self-Explorjation - what is it? - its content and process; 'Natural Acceptance' and Experiential Validation - as the mechanism for self-exploration. Continuous Happiness and ProsperityA look at basic Human Aspirations- Right understanding, Relationship and Physical Facilities- the basic requirements for fulfillment of aspirations of every human being with their correct priority. Understanding Happiness and Prosperity correctly - A critical appraisal of the current scenario. Method to fulfill the above human aspirations: understanding and living in harmony at various levels.

UNIT - II:

Understanding Harmony in the Human Being - Harmony in Myself! : Understanding human being as a co-existence of the sentient 'I' and the material 'Body'.

Understanding the needs of Self ('I') and 'Body' - Sukh and Suvidha. Understanding the Body as an instrument of 'I' (I being the doer, seer andenjoyer).

Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal of Physical needs, meaning of Prosperity in detail. Programs to ensure Sanyam and Swasthya.

UNIT - III:

Understanding Harmony in the Family and Society - Harmony in Human - Human Relationship: Understanding harmony in the Family the basic unit of human interaction. Understanding values in human - human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti; Trust (Vishwas) and Respect (Samman) as the foundational values of relationship.

Understanding the meaning of Vishwas; Difference between intention and competence. Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values inrelationship.

Understanding the harmony in the society (society being an extension of family):Samadhan, Samridhi, Abhay, Sah-astiva as comprehensive Human Goals. Visualizing a universal harmonious order in society - Undivided Society (Akhand Samaj), Universal Order (SarvabhaumVyawastha) - from family to worldfamily!

UNIT - IV:

Understanding Harmony in the nature and Existence - Whole existence as Coexistence: Understanding the harmony in the Nature. Interconnectedness and mutual fulfillment among the four orders of nature - recyclability and self-regulation in nature.

Understanding Existence as Co-existence (Sah-astitva) of mutually interacting units in all- pervasive space. Holistic perception of harmony at all levels of existence.

UNIT - V:

Implications of the above Holistic Understanding of Harmony on Professional Ethics: Natural acceptance of human values, Definitiveness of Ethical Human Conduct, Basic for Humanistic Education, Humanistic Constitution and Humanistic Universal Order. Competence in professional ethics:

a. Ability to utilize the professional competence for augmenting universal human order.

b. Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems.

c. Ability to identify and develop appropriate technologies and management patterns for above production systems.

TEXT BOOKS:

1. R. R. Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course in Human Values and ProfessionalEthics.

2. Prof. K. V. Subba Raju, 2013, Success Secrets for Engineering Students, Smart Student Publications, 3rdEdition.

REFERENCE BOOKS:

1. Ivan IIlich, 1974, Energy & Equity, The Trinity Press, Worcester, and HarperCollins, USA

2. E. F. Schumancher, 1973, Small is Beautiful: a study of economics as if people mattered. Blond & Briggs,Britain.

3. A Nagraj, 1998 Jeevan Vidya ek Parichay, Divya Path Sansthan,Amarkantak.

4. Sussan George, 1976, How the Other Half Dies, Penguin Press, Reprinted 1986,1991.

5. P. L. Dhar, R. R. Gaur, 1990, Science and Humanism, CommonwealthPublishers.

    A. N. Tripathy, 2003, Human Values, New Age InternationalPublishers.

6. Subhas Palekar, 2000, How to practice Natural Farming, Pracheen(Vaidik) Krishi Tantra Shodh,Amravati.

7.   Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, Limits to Growth - Club of Rome's report, UniverseBooks.

8.   E G Seebauer& Robert L.Berry, 2000, Fundamentals of Ethics for Scientists & Engineers, Oxford UniversityPress.

9.   M Govindrajan, S Natrajan& V. S Senthil kumar, Engineering Ethics (includingHumna Values), Eastern Economy Edition, Prentice Hall of IndiaLtd.

Relevant CDs, Movies, Documentaries & Other Literature:

1. Value Education website, http://www.uptu.ac.in

2. Story of Stuff,http://www.storyofstuff.com

3. AI Gore, An Inconvenient Truth, Paramount Classics,USA

4. Charle Chaplin, Modern Times, United Artists,USA

5. IIT Delhi, Modern Technology - the UntoldStory

COURSE OUTCOMES:

1. The students will be able to obtain happiness and prosperity in their life.

2. They will develop harmony at all levels.

3. They can have satisfying human behavior throughout their life

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

B.Tech. II Year I Sem. CSE (AI&ML)

L	T	P	C
3	0	0	3

(R22A0027) Statistical Inference and Stochastic Process

Prerequisites: Mathematics courses of first year of study.

Course Objectives:
- To understand a random variable that describes randomness or an uncertainty in certain realistic situation. It can be either discrete or continuous type.
- To learn important probability distributions like: in the discrete case, study of the Binomial and the Poisson Distributions and in the continuous case the Normal Distributions.
- To understand linear relationship between two variables and also to predict how a dependent variable changes based on adjustments to an independent variable.
- To learn the types of sampling, sampling distribution of means and variance, Estimations of statistical parameters.
- Use of probability theory to make inferences about a population from large and small samples.
- To understand Stochastic process and Markov chains.

UNIT-I: Random Variables
Concept of a Random Variable, Discrete Probability Distributions, Continuous Probability Distributions.Expectation-Mean of a Random Variable, Variance and Covariance of Random Variables, Means and Variances of Linear Combinations of Random Variables. Moments and Moment Generating Functions.

UNIT-II: Probability Distributions
Discrete Probability Distributions: Binomial Distribution, Poisson distribution,Normal Distribution, Areas under the Normal Curve, Applications of the Normal Distribution, Normal Approximation to the Binomial Distributions

UNIT-III: Correlation and Regression
Correlation- Karl Pearson Correlation Coefficient, Rank correlation, Repeated Rank Correlation, Introduction to Linear Regression-The Simple Linear Regression Model, the lines of regression, properties of regression coefficients, angles between two regression lines, interpretation of regression coefficients.

UNIT-IV: Sample Estimation & Test of Hypotheses
Sampling: Definitions ,Standard error . Estimation - Point estimation and Interval estimation.

Testing of hypothesis: Null and Alternative hypothesis - Type I and Type II errors, Critical region - confidence interval - Level of significance, One tailed and Two tailed test.

Large sample Tests: Test of significance - Large sample test for single mean, difference of means, single proportion, difference of proportions.

Small samples: Test for single mean, difference of means, paired t-test, test for ratio of variances (F-test) ,Chi- square test for goodness of fit and independence of attributes.

UNIT-V: Stochastic Processes and Markov Chains
Introduction to Stochastic processes- Markov process. Transition Probability, Transition Probability Matrix, First order and Higher order Markov process, n-step transition probabilities, Markov chain, Steady state condition, Markov analysis.

Suggested Text Books:

i)   Fundamental of Statistics by S.C. Gupta,7thEdition,2016.
ii)   Fundamentals of Mathematical Statistics by SC Gupta and V.K.Kapoor
iii) Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers, 35th Edition,2000.
iv)   R. A. Johnson, Miller and Freund's "Probability and Statistics for Engineers", Pearson Publishers, 9th Edition, 2017.

References:
i)   Introduction to Probability and Statistics for Engineers and Scientists by Sheldon M.Ross.
ii)   Probability and Statistics for Engineers by Dr. J. Ravichandran.

Course Outcomes: After learning the contents of this paper the student must be able to
1. Describe randomness in certain realistic situation which can be either discrete or continuous type and compute statistical constants of these random variables.
2. Provide very good insight which is essential for industrial applications by learning probability distributions.
3. Make objective, data-driven decisions by using correlation and regression.
4. *Draw statistical inference* using samples of a given size which is taken from a population.
5. Understand the Stochastic processes-Markov process

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
(R22A0503) DATA STRUCTURES

B.Tech. II Year I Sem. CSE (AI&ML)

L	T	P	C
3	0	0	3

Prerequisites: Programming for Problem Solving

COURSE OBJECTIVES:

This course will enable students to

1. Implement Object Oriented Programming concepts in Python.
2. Understand Lists, Dictionaries and Regular expressions in Python.
3. Understanding how searching and sorting is performed in Python.
4. Understanding how linear and non-linear data structures works.
5. To learn the fundamentals of writing Python scripts.

UNIT – I

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

UNIT – II

Data Structures – Definition, Linear Data Structures, Non-Linear Data Structures, Python Specific Data Structures, List, Tuples, Set, Dictionaries, Comprehensions and its Types, Strings, slicing.

UNIT - III

Arrays - Overview, Types of Arrays, Operations on Arrays, Arrays vs List.
Searching - Linear Search and Binary Search.
Sorting - Bubble Sort, Selection Sort, Insertion Sort, Merge Sort, Quick Sort.

UNIT - IV

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

UNIT -V

Graphs - Introduction, Directed vs Undirected Graphs, Weighted vs Unweighted Graphs, Representations, Breadth First Search, Depth First Search.
Trees - Overview of Trees, Tree Terminology, Binary Trees: Introduction, Implementation, Applications. Tree Traversals, Binary Search Trees: Introduction, Implementation, AVL Trees: Introduction, Rotations, Implementation.

TEXTBOOKS:

1. Data structures and algorithms in python by Michael T. Goodrich
2. Data Structures and Algorithmic Thinking with Python by Narasimha Karumanchi

REFERENCE BOOKS:

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

COURSE OUTCOMES:

The students should be able to:

1. Examine Python syntax and semantics and apply Python flow control and functions.
2. Create, run and manipulate Python Programs using core data structures like Lists,
3. Apply Dictionaries and use Regular Expressions.
4. Interpret the concepts of Object-Oriented Programming as used in Python.
5. Master object-oriented programming to create an entire python project using objects and classes

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
(R22A0561) COMPUTER ORGANIZATION AND ARCHITECTURE

B.Tech. II Year I Sem. CSE (AI&ML)   **L   T   P   C**
                                                    3   1   0   4

Co-requisite: A Course on "Digital Electronics".

OBJECTIVES*:*

The students will be able to:
1. To understand the working of a Computer System and its basic principles.
2. To learn the architecture and design of 8086 processor.
3. To know the concepts of Memory and corresponding technologies.
4. To understand the functional aspects of various peripheral devices.
5. To acquire knowledge about parallel processors.

UNIT - I:

Functional blocks of a computer: CPU, memory, input-output subsystems, control unit. Computer Organization and Architecture - Von Neumann

Data representation: signed number representation, fixed and floating point Representations, Character representation. Computer arithmetic – integer addition and Subtraction, Ripple carry adder, carry look-ahead adder. Multiplication – shift-and add, Booth multiplier.

UNIT – II:

Introduction to x86 architecture.

Instruction set architecture of a CPU: Registers, instruction execution cycle, RTL Interpretation of instructions, addressing modes, instruction set.

CPU Control unit design: Micro-programmed design approaches.

UNIT – III:

Memory system design: Semiconductor memory technologies, memory organization. **Memory organization:** Memory interleaving, concept of hierarchical memory organization, Cache memory, cache size vs. block size, mapping functions, Replacement algorithms, write policies.

UNIT – IV:

Peripheral devices and their characteristics: Input-output subsystems, I/O device interface, I/O transfers – program controlled, interrupt driven and DMA, privileged and non-privileged instructions, software interrupts and exceptions. Programs and processes – role of interrupts in process state transitions.

UNIT – V:

Pipelining: Basic concepts of pipelining, throughput and speedup, pipeline hazards.

Parallel Processors: Introduction to parallel processors, Concurrent access to memory and cache coherency.

TEXT BOOKS:

1. **"**Computer Organization and Design: The Hardware/Software Interface", 5th Edition by David A. Patterson and John L. Hennessy, Elsevier.
2. "Computer Organization and Embedded Systems", 6th Edition by Carl Hamacher, McGraw Hill Higher Education.

REFERENCE BOOKS:

1. "Computer Architecture and Organization", 3rd Edition by John P. Hayes, WCB/McGraw- Hill
2. "Computer Organization and Architecture: Designing for Performance", 10th Edition by William Stallings, Pearson Education.
3. "Computer System Design and Architecture", 2nd Edition by Vincent P. Heuring and Harry F. Jordan, Pearson Education.

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

1. Illustrate the functional block diagram of a single bus architecture of a computer.
2. Analyze the various instruction sets and addressing modes.
3. Design a memory module and analyze its operation by interfacing with the CPU for a specific architecture.
4. Compare and contrast the peripherals and the related I/O transfers
5. Assess the performance, and apply design techniques to enhance performance using pipelining & parallelism.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
(R22A0505) SOFTWARE ENGINEERING

B.Tech. II Year I Sem. CSE (AI&ML)

L	T	P	C
3	0	0	3

Course Objectives
- The aim of the course is to provide an understanding of the working knowledge of the techniques for estimation, design, testing and quality management of large software development projects.
- Topics include process models, software requirements, software design, software testing, software process/product metrics, risk management, quality management and UML diagrams

Course Outcomes
- Ability to translate end-user requirements into system and software requirements, using e.g. UML, and structure the requirements in a Software Requirements Document (SRD).
- Identify and apply appropriate software architectures and patterns to carry out high level design of a system and be able to critically compare alternative choices.
- Will have experience and/or awareness of testing problems and will be able to develop a simple testing report

UNIT - I
Introduction to Software Engineering: The evolving role of software, changing nature of software, software myths. **A Generic view of process**: Software engineering- a layered technology, a process framework, the capability maturity model integration (CMMI). **Process models**: The waterfall model, Spiral model and Agile methodology

UNIT - II
Software Requirements: Functional and non-functional requirements, user requirements, system requirements, interface specification, the software requirements document.
Requirements engineering process: Feasibility studies, requirements elicitation and analysis, requirements validation, requirements management.

UNIT - III
Design Engineering: Design process and design quality, design concepts, the design model.
Creating an architectural design: software architecture, data design, architectural styles and patterns, architectural design, conceptual model of UML, basic structural modeling, class diagrams, sequence diagrams, collaboration diagrams, use case diagrams, component diagrams.

UNIT - IV
Testing Strategies: A strategic approach to software testing, test strategies for conventional software, black-box and white-box testing, validation testing, system testing, the art of debugging.
Metrics for Process and Products: Software measurement, metrics for software quality.

UNIT - V
Risk management: Reactive Vs proactive risk strategies, software risks, risk identification, risk projection, risk refinement, RMMM. **Quality Management:** Quality concepts, software quality assurance, software reviews, formal technical reviews, statistical software quality assurance, software reliability, the ISO 9000 quality standards.

TEXT BOOKS:
1. Software Engineering, A practitioner's Approach- Roger S. Pressman, 6th edition, McGraw Hill International Edition.
2. Software Engineering- Sommerville, 7th edition, Pearson Education.

REFERENCE BOOKS:

1. The unified modeling language user guide Grady Booch, James Rambaugh, Ivar Jacobson, Pearson Education.
2. Software Engineering, an Engineering approach- James F. Peters, Witold Pedrycz, John Wiley.
3. Software Engineering principles and practice- Waman S Jawadekar, The McGraw-Hill Companies.
4. Fundamentals of object-oriented design using UML Meiler page-Jones: Pearson Education.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
(R22A0509) OPERATING SYSTEMS

B.Tech. II Year I Sem. CSE (AI&ML)   L   T   P   C
                                                                          3   0   0   3

Prerequisites:
1.   A course on "Computer Programming and Data Structures".
2.   A course on "Computer Organization and Architecture".

COURSE OBJECTIVES:
1.   To understand the fundamental concepts and techniques of Operating Systems.
2.   To study the concepts of LINUX OS and process scheduling.
3.   To understand the concepts in deadlocks and process management.
4.   To understand the techniques in memory managements and IPC mechanism.
5.   To study file system concepts and sockets.

UNIT - I

Operating System-Introduction, Structures-Simple Batch, Multi-programmed, Time-shared, Personal Computer, Parallel, Distributed Systems, Real-Time Systems, System components, Operating System services.
Introduction to Linux operating system, Linux file system, Linux Utilities

UNIT - II

Linux: Introduction to shell, Types of Shell's, example shell programs.
Process and CPU Scheduling - Process concepts and scheduling, Operations on processes, Cooperating Processes, Threads, Scheduling Criteria, Scheduling Algorithms, Multiple - Processor Scheduling.

UNIT - III

Deadlocks - System Model, Deadlocks Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection and Recovery from Deadlock
Process Management and Synchronization - The Critical Section Problem, Synchronization Hardware, Semaphores, and Classical Problems of Synchronization, Critical Regions, Monitors.

UNIT - IV

Inter process Communication Mechanisms: IPC between processes on a single computer system, IPC between processes on different systems, using pipes, FIFOs, message queues, shared memory implementation in Linux. Corresponding system calls.
Memory Management and Virtual Memory - Logical versus Physical Address Space, Swapping, Contiguous Allocation, Paging, Segmentation, Segmentation with Paging, Demand Paging, Page Replacement, Page Replacement Algorithms.

UNIT - V

File System Interface and Operations -Access methods, Directory Structure, Protection, File System Structure, Allocation methods, kernel support for files, system calls for file I/O operations open, create, read, write, close, lseek, stat, ioctl
Disk Management: Disk Scheduling Algorithms-FCFS, SSTF, SCAN, C-SCAN

TEXT BOOKS:

1. Beginning Linux Programming –Neil Mathew, Richard Stones 4th Edition, Wiley
2. Operating System Principles- Abraham Silberschatz, Peter B. Galvin, Greg Gagne 7th Edition, John Wiley
3. Unix System Programming using C++, T. Chan, PHI.
4. Unix Concepts and Applications, 4th Edition, SumitabhaDas,TMH,2006.
5. Advanced programming in the UNIX environment, W.R. Stevens, Pearson education.

REFERENCE BOOKS:

1. Operating Systems – Internals and Design Principles 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.

COURSE OUTCOMES:

At the end of the course students should have:

1. Ability to apply concepts of operating system.
2. Ability to write shell programs and simulate process scheduling algorithms.
3. Skills to analyze memory management and deadlocks situations.
4. An ability to develop programs using system calls and utilities.
5. Capability to compare various file systems.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
(R22A0583) DATA STRUCTURES LAB

B.Tech. II Year I Sem. CSE (AI&ML)   **L T P C**
                                                                          0 0 2 1

Prerequisites: A Course on "Programming for problem solving".

COURSE OBJECTIVES:

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

WEEK 1: Write a Python program for class, Flower, that has three instance variables of type str, int, and float, that respectively represent the name of the flower, its number of petals, and its price. Your class must include a constructor method that initializes each variable to an appropriate value, and your class should include methods for setting the value of each type, and retrieving the value of each type.

WEEK 2: Develop an inheritance hierarchy based upon a Polygon class that has abstract methods area( ) and perimeter( ). Implement classes Triangle, Quadrilateral, Pentagon, that extend this base class, with the obvious meanings for the area( ) and perimeter( ) methods. Write a simple program that allows users to create polygons of the various types and input their geometric dimensions, and the program then outputs their area and perimeter.

WEEK 3: Write a python program to implement method overloading and method overriding.

WEEK 4: Write a Python program to illustrate the following comprehensions:
a) List Comprehensions   b) Dictionary Comprehensions
c) Set Comprehensions   d) Generator Comprehensions

WEEK 5: Write a Python program to generate the combinations of n distinct objects taken from the elements of a given list. **Example:** Original list: [1, 2, 3, 4, 5, 6, 7, 8, 9] Combinations of 2 distinct
objects: [1, 2] [1, 3] [1, 4] [1, 5] ..... [7, 8] [7, 9] [8, 9].

WEEK 6: Write a program for Linear Search and Binary search

WEEK 7: Write a program to implement Bubble Sort and

Selection Sort **WEEK 8:** Write a program to implement

Merge sort and Quick sort **WEEK 9:** Write a program to

implement Stacks and Queues

WEEK 10: Write a program to implement Singly Linked List

WEEK 11: Write a program to implement   Doubly Linked list

WEEK 12: Write a program to implement   Binary Search Tree

COURSE OUTCOMES:

The students should be able to:

1. Examine Python syntax and semantics and apply Python flow control and functions.
2. Create, run and manipulate Python Programs using core data structures like Lists
3. Apply Dictionaries and use Regular Expressions.
4. Interpret the concepts of Object-Oriented Programming as used in Python.
5. Master object-oriented programming to create an entire python project using objects and classes

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
(R22A0587) OPERATING SYSTEMS LAB

B.Tech. II Year I Sem. CSE (AI&ML)   **L T P C**
                                                          0 0 2 1

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

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

1.   To provide an understanding of the design aspects of operating system concepts through simulation
2. Introduce basic Linux   commands, system call interface for process management, inter-process communication and I/O in Unix.
3.   Student will learn various process and CPU scheduling Algorithms through simulation programs
4.   Student will have exposure to System calls and simulate them.
5. Student will learn deadlocks and process management &   Inter Process communication and simulate

WEEK1:

 Practice File handling utilities, Process utilities, Disk utilities, Networking commands, Filters, Text processing utilities and Backup utilities.

WEEK2:

Write a shell script that receives any number of file names as arguments checks if every argument supplied is a file or directory and reports accordingly. Whenever the argument is a file it reports no of lines present in it.

WEEK3:

Simulate the following CPU scheduling algorithms. a) FCFS b) SJF c) Round Robin
a) Priority.

WEEK4:

Simulate Bankers Algorithm for Dead Lock Avoidance; Simulate Bankers Algorithm for Deadlock Prevention.

WEEK5:

a) Write a C program to simulate the concept of Dining-philosophers problem.
b) Write a C program to simulate producer-consumer problem using Semaphores

WEEK6:

a) Write a C program to implement kill(),raise()and sleep()functions.
b) Write a C program to implement alarm(),pause()and abort()functions
c) Write a program that illustrate communication between two process using unnamed pipes

WEEK7:

a) Write a program that illustrates communication between two process using named pipes or FIFO.
b) Write a C program that receives a message from message queue and display them.

WEEK8:

Write a C program that illustrates two processes communicating using Shared memory.

WEEK9:

Simulate all page replacement algorithms a) FIFO b) LRU   c) OPTIMAL

WEEK10:

Write a C program that takes one or more file/directory names as command line input and reports following information A)File Type B)Number Of Links C)Time   of last Access D)Read, write and execute permissions

WEEK11

a) Implement In c language the following UNIX commands using system calls i)cat ii)ls iii) Scanning Directories(Ex: open dir(), read dir(),etc.)
b) Write a C program to create child process and allow parent process to display "parent" and the child to display "child" on the screen

WEEK12:

Write a C program to simulate disk scheduling algorithms. a) FCFS b) SCAN c) C-SCAN

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

<div align="center">

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

(R22A0585) SOFTWARE ENGINEERING LAB
</div>

B.Tech. II Year I Sem.   L   T   P   C
                                                                         0   0   2   1

Prerequisites
- A course on "Programming for Problem Solving".

Co-requisite
- A Course on "Software Engineering".

Course Objectives:
- To have hands on experience in developing a software project by using various software engineering principles and methods in each of the phases of software development.

Course Outcomes:
- Ability to translate end-user requirements into system and software requirements
- Ability to generate a high-level design of the system from the software requirements
- Will have experience and/or awareness of testing problems and will be able to develop a simple testing report

List of Experiments

Do the following seven exercises for any two projects given in the list of sample projects or any other Projects:

1. Development of problem statements.
2. Preparation of Software Requirement Specification Document, Design Documents and Testing Phase related documents.
3. Preparation of Software Configuration Management and Risk Management related documents.
4. Study and usage of any Design phase CASE tool
5. Performing the Design by using any Design phase CASE tools.
6. Develop test cases for unit testing and integration testing
7. Develop test cases for various white box and black box testing techniques.

Sample Projects:

1. Passport automation System
2. Book Bank
3. Online Exam Registration
4. Stock Maintenance System
5. Online course reservation system
6. E-ticketing
7. Software Personnel Management System
8. Credit Card Processing
9. E-book management System.
10. Recruitment system

TEXT BOOKS:

1. Software Engineering, A practitioner's Approach- Roger S. Pressman, 6th edition, McGraw Hill International Edition.
2. Software Engineering- Sommerville, 7th edition, Pearson Education.
3. The unified modeling language user guide Grady Booch, James Rambaugh, Ivar Jacobson, Pearson Education.

REFERENCE BOOKS:

1. Software Engineering, an Engineering approach- James F. Peters, Witold Pedrycz, John Wiley.
2. Software Engineering principles and practice- Waman S Jawadekar, The McGraw-Hill

M R C E T CAMPUS | AUTONOMOUS INSTITUTION - UGC, GOVT. OF INDIA

B.Tech III Year I Sem-CSE(AI&ML)   **L/T/P/C**

3/-/-/3

(R20A0066) PUBLIC POLICY AND GOVERNANCE

OPEN ELECTIVE - II

Course objectives:

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

Unit-I
Introduction of Public Policy: Definition, Nature, Scope and Importance of Public Policy, Evolution of Public Policy and Policy Sciences, Public Policy and Public Administration.**Approaches to Public Policy Analysis:** The Process Approach, The Logical Positivist Approach, The Phenomenological Approach, The Participatory Approach and Normative Approach

Unit-II
Theories and Process of Public Policy Making: Theories and Models of Policy Making, Perspectives of Policy Making Process, Institutions of Policy Making.

Unit-III
Policy Implementation and Evaluation: Concept of Policy Implementation, Techniques of Policy Implementation, Concept of Policy Evaluation, Constraints of Public Policy Evaluation

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

Unit-V
Citizen and Techniques of Governance: Rule of Law and Human Rights, Accountability, Participation, Representation. **Techniques of Governance**: Openness and Transparency, Citizen Charter, Social Audit. **Emerging Trends in Public and Private Governance:** An Overview, Market, Civil Society, Information and Communication Technology.

Text and Reference books

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

Course outcomes
After completion of the course, student will be able to
1. Understand public policy analysis and they will be able to understand policy evaluation and implementation.
2. Understand the public policy and governance on the largest gamut of its canvas.
3. Students will understand the what are emerging trends in public and private governance and various theories in public policy making
4. Understands various concepts, and techniques of governance and its policy-making decisions

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

(R22A0028) Discrete Mathematics

B.Tech. II Year II Sem. CSE (AIML)   **L   T   P   C**
                                                        3   1   0   3

Course Objectives:
● Introduces elementary discrete mathematics for computer science and engineering.
● Topics include formal logic notation, methods of proof, induction, sets, relations, algebraic structures, elementary graph theory, permutations and combinations, counting principles; recurrence relations and generating functions.

UNIT - I
Mathematical logic: Introduction, Statements and Notation, Connectives, Truth tables, Well formed formulas, Tautology, Contradiction, Contingency, Logical equivalence, Normal Forms, Theory of Inference for the Statement Calculus, The Predicate Calculus, Inference Theory of the Predicate Calculus.

UNIT - II
Set theory: Introduction, Basic Concepts of Set Theory, Representation of Discrete Structures, Relations, Types of relations, Partial order relation, POSET, External elements in POSET, Lattices, Functions, Types of functions, inverse of functions, invertible functions and Composition of functions

UNIT - III
Algebraic Structures: Introduction, Algebraic Systems, Semi groups, Monoids, Group, Abelian group, Some particular Groups-Klein 4- group, Additive group of modulo n, Multiplicative group of modulo p. Homomorphism and isomorphism in Groups.

UNIT - IV
Combinatorics: . Permutation and combination, Principle of Inclusion and Exclusion.
Recurrence relations, Generating functions,Solving of recurrence relations of first,second and higher order Homogeneous and Non homogeneous using characteristic equation and generating functions.

UNIT-V
Graph Theory: Basic Concepts, Types of graphs, Sub graphs, Isomorphism, Walk, Trail and Path, Hamiltonial and Eulerian Graphs, Planar Graphs, Euler's Formula, Multi-graph, Chromatic Numbers,The Four-Color Problem. Trees and their Properties, Spanning Trees, Directed Trees, BinaryTrees.

TEXT BOOKS:
1. Discrete Mathematical Structures with Applications to Computer Science: J.P. Tremblay, R. Manohar, McGraw-Hill, 1st ed.
2. Discrete Mathematics for Computer Scientists & Mathematicians: Joe l. Mott, Abraham Kandel, Teodore P. Baker, Prentis Hall of India, 2nd ed.

REFERENCE BOOKS:
1. Discrete and Combinatorial Mathematics - an applied introduction: Ralph.P. Grimald, Pearson education, 5th edition.
2. Discrete Mathematical Structures: Thomas Kosy, Tata McGraw Hill publishing co.

Course Outcomes:
● Understand and construct precise mathematical proofs
● Apply logic and set theory to formulate precise statements
● Analyze and solve counting problems on finite and discrete structures
● Describe and manipulate sequences
● Apply graph theory in solving computing problems

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
(R22A1201) AUTOMATA THEORY AND COMPILER DESIGN

B.Tech. II Year II Sem.   **L   T   P   C**
                                                                             3   1   0   4

Prerequisite: Nil

COURSE OBJECTIVES:

1. To provide an understanding of automata ,grammars and language translators.
2. To describe the various techniques used in compiler construction
3. To have insight the process of semantic analysis
4. To understand the code optimization techniques
5. To apprehend the code generation techniques

UNIT - I

Formal Language and Regular Expressions**:** Languages, Definition Languages regular expressions, Finite Automata - DFA, NFA. Conversion of regular expressionto NFA, NFA to DFA. Context Free grammars and parsing, derivation, parse trees, Application of Finite Automata.

UNIT - II

Introduction To Compiler, Phases of Compilation, ambiguity LL(K) grammars andLL(1) parsing. Bottom up parsing, Handle pruning, LR Grammar Parsing, LALR parsing, parsing ambiguousgrammars, YACC programming specification.
Semantics: Syntax directed translation, S-attributed and L-attributed grammars.

UNIT - III

Intermediate code - abstract syntax tree, translation of simple statements and control flow statements.
Context Sensitive features -Chomsky hierarchy of languages and recognizers. Type checking, type conversions, equivalence of typeexpressions, overloading of functions and operations.

UNIT - IV

Run time storage: Storage organization, storage allocation strategies scope accessto now local names.
Code optimization: Principal sources of optimization, optimization of basic blocks,peephole optimization.

UNIT - V

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

TEXT BOOKS:

1. Introduction to Theory of computation. Sipser, 2nd Edition, Thomson.
2. Compilers Principles, Techniques and Tools Aho, Ullman, Ravi Sethi, PearsonEducation.

REFERENCE BOOKS:

1. Modern Compiler Implementation in C- Andrew N. Apple, CambridgeUniversityPress.
2. Lex & yacc – John R. Levine, Tony Mason, Doug Brown, O'Reilly
3. Modern Compiler Design- Dick Grune, Henry E. Bal, Cariel T. H. Jacobs, Wileydreamtech.
4. Engineering a Compiler-Cooper & Linda, Elsevier.

5. Compiler Construction, Louden, Thomson.
6. Introduction to Automat a Theory Languages and Computation". Hopcroft H.E. and Ullman J.D. Pearson Education.

COURSE OUTCOMES:

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

- Express the necessity and types of different language translators in use.
- Apply the techniques and design different components (phases)of a compiler.
- Implement practical aspects of automata theory.
- Classify the different optimization techniques
- Use the tools Lex, Yacc in compiler construction

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
(R22A0504) DATABASE MANAGEMENT SYSTEMS

B.Tech. II Year II Sem. CSE (AI&ML)   **L   T   P   C**
                                                                         3   0   0   3

Prerequisites: A course on "Data Structures".

COURSE OBJECTIVES:

- To study the physical and logical database designs, database modeling, relational, hierarchical, and network models
- To understand and use data manipulation language to query, update, and manage a database
- To develop an understanding of essential DBMS concepts such as: database security, integrity, concurrency, distributed database, and intelligent database, Client/Server(Database Server),Data Warehousing.
- To design and build a simple database system and demonstrate competence with the fundamental tasks involved with modeling, designing, and implementing a DBMS.
- Familiar with basic database storage structures and access techniques: file and page organizations

UNIT I:

Database System Applications, Purpose of Database Systems, View of Data–Data Abstraction – Instances and Schemas–Database Languages– database Access for applications Programs– Database Users and Administrator–Transaction Management–Database Architecture–Storage Manager–the Query Processor.

Data Models: Introduction to the Relational Model– Structure – Database Schema, Keys – Schema Diagrams. Database design– Other Models, ER diagrams – ER Model -Entities, Attributes and Entity sets – Relationships and Relationship sets – ER Design Issues – Concept Design – Conceptual Design with relevant Examples. Relational Query Languages, Relational Operations.

UNIT II:

Relational Algebra–Selection and projection set operations–renaming–Joins–Division Examples of Algebra overviews – Relational calculus – Tuple Relational Calculus (TRC) –Domain relational calculus(DRC).

Overview of the SQL Query Language – Basic Structure of SQL Queries, Set Operations, Aggregate Functions–GROUPBY–HAVING, Nested Subqueries, Views, Triggers, Procedures.

UNIT III:

Normalization – Introduction, Non loss decomposition and functional dependencies, First, Second, and third normal forms – dependency preservation, Boyce/Codd normal form. Higher Normal Forms - Introduction, Multi-valued dependencies and Fourth normal form, Join dependencies and Fifth normal form

UNIT IV:

Transaction Concept- Transaction State- Implementation of Atomicity and Durability – Concurrent Executions – Serializability- Recoverability – Implementation of Isolation – Testingforserializability-Lock–BasedProtocols–TimestampBasedProtocols-Validation- BasedProtocols– MultipleGranularity.

UNIT V:

Recovery and Atomicity– Log– Based Recovery – Recovery with Concurrent Transactions– CheckPoints-BufferManagement–Failurewithlossofnonvolatilestorage.

TEXTBOOKS:

1. DatabaseSystemConcepts,Silberschatz,Korth,McGrawhill,SixthEdition.(All units except IIIrd)
2. Database Management Systems, Raghu Ramakrishnan, Johannes Gehrke, TATA McGraw Hill 3rd Edition.

REFERENCEBOOKS:

1. Fundamentals of Database Systems, Elmasri Navathe Pearson Education.
2. An Introduction to Database systems, C.J. Date, A.Kannan, S.Swami Nadhan, Pearson, Eight Edition for UNITIII.

COURSE OUTCOMES:

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

1.	Demonstrate the basic elements of a relational database management system
2.	Ability to identify the data models for relevant problems
3.	Ability to design entity relationship and convert entity relationship diagrams into RDBMS and formulate SQL queries.
4.	Apply normalization for the given database
5.	Understand the various Recovery Mechanisms

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
(R22A6601) ARTIFICIAL INTELLIGENCE

B.Tech. II Year II Sem. CSE (AI&ML)

L T P C
3 0 0 3

Prerequisite: Knowledge on Data Structures.

COURSE OBJECTIVES:

1. To train the students to understand different types of AI agents.
2. To understand various AI search algorithms.
3. Fundamentals of knowledge representation, building of simple knowledge-based systems andto apply knowledge representation.
4. Fundamentals of reasoning
5. Study of Markov Models enable the student ready to step into applied AI.

UNIT- I:

Introduction: AI problems, Agents and Environments, Structure of Agents, Problem Solving Agents Basic Search Strategies: Problem Spaces, Uninformed Search (Breadth-First, Depth-First Search, Depth-first with Iterative Deepening), Heuristic Search (Hill Climbing, Generic Best-First, A*), Constraint Satisfaction (Backtracking, Local Search)

UNIT- II:

Advanced Search: Constructing Search Trees, Stochastic Search, A* Search Implementation, Minimax Search, Alpha-Beta Pruning Basic Knowledge Representation and Reasoning: Propositional Logic, First-Order Logic, Forward Chaining and Backward Chaining, Introduction to Probabilistic Reasoning, Bayes Theorem

UNIT- III:

Advanced Knowledge Representation and Reasoning: Knowledge Representation Issues, Nonmonotonic Reasoning, Other Knowledge Representation Schemes

Reasoning Under Uncertainty: Basic probability, acting under Uncertainty, Bayes' Rule, Representing Knowledge in an Uncertain Domain, Bayesian Networks

UNIT - IV:

Learning: What Is Learning? Rote Learning, Learning by Taking Advice, Learning in Problem Solving, Learning from Examples, Winston's Learning Program, Decision Trees.

UNIT - V:

Expert Systems: Representing and Using Domain Knowledge, Shell, Explanation, Knowledge Acquisition.

TEXT BOOKS:

1.Russell, S. and Norvig, P, Artificial Intelligence: A Modern Approach, Third Edition, PrenticeHall, 2010.

REFERENCES:

1.   Artificial Intelligence, Elaine Rich, Kevin Knight, Shivasankar B. Nair, The McGraw Hill publications, Third Edition, 2009. 2. George F. Luger,

2.   Artificial Intelligence: Structures and Strategies for Complex Problem Solving, Pearson Education, 6th ed., 2009.

COURSE OUTCOMES:

1.   Understand the informed and uninformed problem types and apply search strategies to solve them.

2.   Apply difficult real life problems in a state space representation so as to solve those using AI techniques like searching and game playing.

3.   Design and evaluate intelligent expert models for perception and prediction from intelligent environment.

4.   Formulate valid solutions for problems involving uncertain inputs or outcomes by using decision making techniques.

5.   Demonstrate and enrich knowledge to select and apply AI tools to synthesize information and develop models within constraints of application area

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
(R22A0507) OBJECT ORIENTED PROGRAMMING THROUGH JAVA

B.Tech. II Year II Sem. CSE (AI&ML)   **L T P C**
                                                                          3 0 0 3

COURSE OBJECTIVES:

1. To understand object oriented principles like abstraction, encapsulation, inheritance, polymorphism and apply them in solving problems.
2. To understand the implementation of packages and interfaces.
3. To understand the concepts of exception handling, multithreading and collection classes.
4. To understand how to connect to the database using JDBC.
5. To understand the design of Graphical User Interface using applets and swing controls.

UNIT-I

Java Programming- History of Java, comments, Java Buzz words, Data types, Variables, Constants, Scope and Lifetime of variables, Operators, Type conversion and casting, Enumerated types, Control flow- block scope, conditional statements, loops, break and continue statements, arrays, simple java stand alone programs, class, object, and its methods constructors, methods, static fields and methods, access control, this reference, overloading constructors, recursion, exploring string class, garbage collection.

UNIT – II

Inheritance – Inheritance types, super keyword, prevent inheritance, final classes and methods.
Polymorphism – method overloading and method overriding, abstract classes and methods**.**
Interfaces- Interfaces Vs Abstract classes, defining an interface, implement interfaces, accessing implementations through interface references, extending interface, inner class.
Packages- Defining, creating and accessing a package, importing packages.

UNIT-III

Exception handling-Benefits of exception handling, the classification of exceptions - exception hierarchy, checked exceptions and unchecked exceptions, usage of try, catch, throw, throws and finally, creating own exception subclasses.
Multithreading – Differences between multiple processes and multiple threads, thread life cycle, creating threads, interrupting threads, thread priorities, synchronizing threads, inter-thread communication, producer consumer problem.

UNIT-IV

Collection Framework in Java – Introduction to java collections, Overview of java collection framework, commonly used collection classes- Array List, Vector, Hash table, Stack, Lambda Expressions.
Files- Streams**-** Byte streams, Character streams, Text input/output, Binary input/output, File management using File class.

Connecting to Database – JDBC Type 1 to 4 drivers, connecting to a database, querying a database and processing the results, updating data with JDBC, Data Access Object (DAO).

UNIT-V

GUI Programming with Swing - The AWT class hierarchy, Introduction to Swing, Swing Vs AWT, Hierarchy for Swing components, Overview of some Swing components – Jbutton, JLabel, JTextField, JTextArea, simple Swing applications, Layout management – Layout manager types –border, grid and flow.
Event Handling- Events, Event sources, Event classes, Event Listeners, Delegation event model, Examples: Handling Mouse and Key events, Adapter classes.

TEXT BOOK:

1. Java Fundamentals–A Comprehensive Introduction, Herbert Schildt and Dale Skrien,TMH.
2. Core Java: An Integrated Approach – Dr R Nageswara Rao

REFERENCE BOOKS:

1. Java for Programmers, P.J.Deitel and H.M.Deitel, PEA (or) Java: How to Program ,P.J.Deiteland H.M.Deitel,PHI
2. Object Oriented Programming through Java,P.RadhaKrishna,UniversitiesPress.
3. Thinking in Java, Bruce Eckel,PE
4. Programming in Java, S. Malhotra and S. Choudhary, Oxford Universities Press.
5. Design Patterns Erich Gamma, Richard Helm, Ralph Johnson and John Vlissides.

COURSE OUTCOMES:

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

1. Understand the use of OOP's Concepts.
2. Implement Packages and interfaces in java
3. Develop and Understand exception handling ,multithreaded applications with synchronization
4. Understand the use of Collection Framework
5. Design GUI based applications using AWT and Swings

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
(R22A0584) DATABASE MANAGEMENT SYSTEMS LAB

B.Tech. II Year II Sem. CSE (AI&ML)   **L   T   P   C**
                                                            0   0   2   1

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
11. Installation of MySQL / MongoDB and practicing DDL, commands

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.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

(R22A0586) OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB

B.Tech. II Year II Sem. CSE (AI&ML)

L	T	P	C
0	0	2	1

COURSE OBJECTIVES:

1. To prepare students to become familiar with the Standard Java technologies ofJ2SE
2. To provide Students with a solid foundation in OOP fundamentals required to solve programming problems and also to learn Advanced Java topics like J2ME, J2EE, JSP, JavaScript
3. To train Students with good OOP programming breadth so as to comprehend, analyze, design and create novel products and solutions for the real life problems.
4. To inculcate in students professional and ethical attitude, multidisciplinary approach and an ability to relate java programming issues to broader application context.
5. To provide student with an academic environment aware of excellence, written ethical codes and guidelines and lifelong learning needed for a successful professional career

Week 1:

a) Write a java program to find the Fibonacci series using recursive and non-recursive functions
b) Write a   program to multiply two given matrices.
c) Write a   program for Method overloading and Constructor overloading

Week 2:

a) Write a program to demonstrate execution of static blocks ,static variables & static methods.
b) Write a program to display the employee details using Scanner class
c) Write a program for sorting a given list of names in ascending order

Week 3:

a) Write a program to implement single and Multi level inheritance
b) Write a program to implement Hierarchical Inheritance.
c) Write a program to implement method overriding.

Week 4:

a) Write a   program to create an abstract class named Shape that contains two integers and an empty method named printArea (). Provide three classes named Rectangle, Triangle and Circle such that each one of the classes extends the class Shape. Each one of the classes contains only the method printArea () that prints the area of the given shape.
b) Write a   program to implement Interface .
c) Write a program to implement multiple and Hybrid Inheritance

Week 5:

a) Write a program to create inner classes
b) Write a program to create user defined package and demonstrate various access modifiers.
c) Write a program to demonstrate the use of super and final keywords.

Week 6 :

a) Write a program if number is less than 10 and greater than 50 it generate the exception out of range. else it displays the square of number.
b) Write a program with multiple catch Statements.
c) write a program to implement nested try

Week 7:

a) Write a Program to implement simple Thread by extending Thread class and implementing runnable interface.
b) Write a program that implements a multi-thread application that has three threads
c) write a program to set and print thread priorities

Week 8:

Write a program to implement following collections
a) array List   b) Vector   c)Hash table   d)Stack

Week 9:

a) Write a program to demonstrate lambda expressions.
b) Write a program for producer and consumer problem using Threads

Week 10:

a) Write a program to list all the files in a directory including the files present in all its subdirectories.
b) Write a Program to Read the Content of a File Line by Line

Week 11:

a) Write a program that connects to a database using JDBC display all records in a table.
b) Write a program to connect to a database using JDBC and insert values into it.
c) Write a program to connect to a database using JDBC and delete values from it

Week 12:

Write a program that works as a simple calculator. Use a Grid Layout to arrange Buttons for digits and for the + - * % operations. Add a text field to display the result.

COURSE OUTCOMES*:*

Upon successful completion of this course, the students will be able to:
1. Analyze the necessity for Object Oriented Programming paradigm and over structured programming and become familiar with the fundamental concepts in OOP.
2. Demonstrate an ability to design and develop Java programs, analyze, and interpret object oriented data and report results.
3. Analyze the distinguish between various types of inheritance.
4. Demonstrate an ability to design an object oriented system, AWT components or multithreaded process as per needs and specifications.
5. Demonstrate an ability to visualize and work on laboratory and multidisciplinary tasks like console and windows applications for standalone programs.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

(R22A0005) FOREIGN LANGUAGE: FRENCH

B.Tech. II Year II Sem. CSE (AI&ML)

L	T	P	C
0	0	2	1

INTRODUCTION

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

OBJECTIVES

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

UNIT - I:

Speaking: Introduction to the French language and culture –Salutations - French alphabet -Introducing people

Writing: Understand and fill out a form

Grammar: The verbs "to be ' and "to have " in the present tense of the indicativeVocabulary: The numbers from 1 to 20 - Professions- Nationalities

UNIT - II:

Speaking: Talk about one's family – description of a person - express his tastes and preferences - express possession - express negation Writing: Write and understand a short message

Grammar: Nouns (gender and number) - Articles - The–erverbs in the present- Possessive adjectives - Qualifying adjectives

Vocabulary:The family – Clothes-Colors- The numbers from 1 to 100-The classroom

UNIT - III

Speaking:Talk about your daily activities - be in time - ask and indicate the date and time - talkabout sports and recreation - express the frequency

Writing:A letter to a friend

Grammar:The expression of time– The –ir verbs in the present- The verbs do, go, take, come,-Adverbs-Reflexive verbs

Vocabulary: The days and months of the year-The sports-Hobbies

UNIT - IV

Speaking: Express the quantity - ask and give the price - express the need, the will and thecapacity - compare (adjective) - speak at the restaurant / in the shops

Writing: A dialogue between a vendor and a customer at the market

Grammar: Verbs "to want", "to can"- Express capacity / possibility- Express will / desire – the future tense

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

UNIT - V

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

Writing: Descriptions

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

Vocabulary: Seasons – Holidays-The city– Furniture

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

REFERENCE BOOKS

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

COURSE OUTCOMES

1. The students will be able to communicate in French at A1 level.
2. The student will have an advantage in the competitive job market.
3. This course benefits the graduates when pursuing study *opportunities* in the countries whereFrench is the official language.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

B.Tech. III Year I Sem. CSE(AIML)   **L/T/P/C**
                                                                          3/0/0/3

(R22A6617) DESIGN AND ANALYSIS OF COMPUTER ALGORITHMS

COURSE OBJECTIVES:

1. To analyze performance of algorithms.
2. To choose the appropriate data structure and algorithm design method for a specified application.
3. To understand how the choice of data structures and algorithm design methods impacts the performance of programs.
4. To solve problems using algorithm design methods such as the greedy method, divide and conquer, dynamic programming, backtracking and branch and bound.
5. To understand the differences between tractable and intractable problems and to introduce P and NP classes.

UNITI

Introduction: Algorithms, Pseudocode for expressing algorithms, performance analysis-Space complexity, Time Complexity, Asymptotic notation- Big oh notation, omega notation, theta notation and little oh notation.

Divide and Conquer: General method. Applications- Binary search, Quick sort, merge sort, Strassen's matrix multiplication.

UNITII

Disjoint set operations, Union and Find algorithms, AND/OR graphs, Connected components, Bi-connected components.

Greedy method: General method, applications-Job sequencing with deadlines, Knapsack problem, Spanning trees, Minimum cost spanning trees, Single source shortest path problem.

UNITIII

Dynamic Programming: General method, applications-Matrix chained multiplication, Optimal binary search trees,0/1 Knapsack problem, All pairs shortest path problem, Traveling sales person problem.

UNIT IV

Backtracking: General method Applications-n-queues problem, Sum of subsets problem, Graph coloring, Hamiltonian cycles.

UNIT V

Branch and Bound: General method, applications- Travelling sales person problem,0/I k Knapsack problem LC branch and Bound solution, FIFO branch and bound solution.

NP-Hard and NP-Complete Problems: Basic concepts, Non deterministic algorithms, NP-Hard and NP-Complete classes, NP-Hard problems, Cook's theorem.

TEXTBOOKS:

1. Fundamentals of Computer Algorithms, Ellis Horowitz, Satraj Sahni and Rajasekharan, Universities press
2. Design and Analysis of Algorithms, P.h.Dave,2ndedition,PearsonEducation.

REFERENCES:

1. Introduction to the Design And Analysis of Algorithms ALevitin Pearson Education

2. Algorithm Design foundations Analysis and Internet examples, M.T.Goodrich and R Tomassia John Wiley and sons
3. Design and Analysis of Algorithms, S.Sridhar, Oxford Univ.Press
4. Design and Analysis of Algorithms, Aho,Ulman and Hopcraft, Pearson Education.
5. Foundations of Algorithms,R.NeapolitanandK.Naimipour,4thedition

COURSE OUTCOMES:
1. Ability to analyze the performance of algorithms.
2. Ability to choose appropriate algorithm design techniques for solving problems.
3. Ability to understand how the choice of data structures and the algorithm design methods to impact the performance of programs.
4. Describe the dynamic programming paradigm and explain when an algorithmic design situation calls for it. Synthesize dynamic programming algorithms and analyze them.
5. Describes NP hard and NP complete classes and also about the importance of Cook's theorem.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

B.Tech. III Year I Sem. CSE (AIML)   **L / T/ P/ C**
                                                                              3/- /- / 3

(R22A6602) MACHINE LEARNING

Course Objectives:

1. Recognize the basic terminology and fundamental concepts of machine learning.
2. Understand the concepts of Supervised Learning models with a focus on recent advancements.
3. Relate the Concepts of Neural Networks Models of supervised Learning
4. Discover unsupervised learning paradigms of machine learning
5. Understand the concepts of Reinforcement learning and Ensemble methods.

UNIT – I

Introduction: Introduction to Machine learning, Supervised learning, Unsupervised learning, Reinforcement learning. Deep learning. Feature Selection: Filter, Wrapper , Embedded methods. Feature Normalization:- min-max normalization, z-score normalization, and constant factor normalization

Introduction to Dimensionality Reduction: Principal Component Analysis (PCA), Linear Discriminant Analysis(LDA)

UNIT-II

Supervised Learning – I (Regression/Classification)

Regression models: Simple Linear Regression, multiple linear Regressions. Cost Function, Gradient Descent, and Performance Metrics: Mean Absolute Error (MAE), Mean Squared Error (MSE) R-Squared error, Adjusted R Square.

Classification models: Decision Trees-ID3,CART, Naive Bayes, K-Nearest-Neighbours (KNN), Logistic Regression, Multinomial Logistic Regression Support Vector Machines (SVM) - Nonlinearity and Kernel Methods

UNIT – III

Supervised Learning – II (Neural Networks) Neural Network Representation – Problems – Perceptrons, Activation Functions, Artificial Neural Networks (ANN), Back Propagation Algorithm.

Classification Metrics: Confusion matrix, Precision, Recall, Accuracy, F-Score, ROC curves.

UNIT – IV

Model Validation in Classification: Cross Validation - Holdout Method, K-Fold, Stratified K-Fold, Leave-One-Out Cross Validation. Bias-Variance tradeoff, Regularization, Overfitting, Underfitting.

Ensemble Methods: Boosting, Bagging, Random Forest.

UNIT – V

Unsupervised Learning: Clustering-K-means, K-Modes, K-Prototypes, Gaussian Mixture Models, Expectation-Maximization.

Reinforcement Learning: Exploration and exploitation trade-offs, non-associative learning, Markov decision processes, Q-learning

Text Book(s)

1. Machine Learning – Tom M. Mitchell, -MGH
2. Kevin Murphy, Machine Learning: A Probabilistic Perspective, MIT Press, 2012
3. R. S. Sutton and A. G. Barto. Reinforcement Learning - An Introduction. MIT Press.1998

Reference Books

1. Trevor Hastie, Robert Tibshirani, Jerome Friedman, The Elements of Statistical Learning, Springer2009
2. Christopher Bishop, Pattern Recognition and Machine Learning, Springer, 2007.
3. Machine Learning Yearning, AndrewNg.
4. Data Mining–Concepts and Techniques -Jiawei Han and Micheline Kamber, Morgan

Kaufmann
Expected Course Outcome:
1. Explain the concepts and able to prepare the dataset for different Machine learning models.
2. Identify and Apply appropriate Supervised Learning models.
3. Design Neural Network models for the given data.
4. Perform Evaluation of Machine Learning algorithms and Model Selection.
5. Devise un-supervised and Reinforcement learning models

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
B.Tech. III Year I Sem. CSE(AIML)   **L/T/P/C**
                                                                   3/0/0/3

(R22A0512) COMPUTER NETWORKS

COURSE OBJECTIVES:
1. To understand the fundamentals of computer networks, TCP/IP & OSI model.

2. To analyze Data link layer Issues, Protocols.

3. To explain Network layer Protocols, IP addressing.

4. To identify end to end communication & various things in Transport layer.

5. To describe various user services in a network.

UNIT – I:
Introduction: Network, Uses of Networks, Types of Networks, Reference Models: TCP/IP Model, The OSI Model, Comparison of the OSI and TCP/IP reference model. Physical Layer: Guided transmission media, Wireless transmission media.
UNIT – II:
Data Link Layer - Design issues, Error Detection & Correction, Elementary Data Link Layer Protocols, Sliding window protocols Multiple Access Protocols - ALOHA, CSMA,CSMA/CD, CSMA/CA, Collision free protocols, Ethernet- Physical Layer, Ethernet Mac Sub layer.
UNIT – III:
Network Layer: Network Layer Design issues, store and forward packet switching connection less and connection-oriented networks-routing algorithms-optimality principle, shortest path, flooding, Distance Vector Routing, Count to Infinity Problem, Link State Routing, Path Vector Routing, Hierarchical Routing; Congestion control algorithms, IP addresses, CIDR, Subnetting, SuperNetting, IPv4, Packet Fragmentation, IPv6 Protocol, Transition from IPv4 to IPv6, ARP, RARP.
UNIT – IV:
Transport Layer: Services provided to the upper layers elements of transport protocol addressing connection establishment, Connection release, Error Control & Flow Control, Crash Recovery. The Internet Transport Protocols: UDP, Introduction to TCP, The TCP Service Model, The TCP Segment Header, The Connection Establishment, The TCP Connection Release, The TCP Sliding Window, The TCP Congestion Control Algorithm.
UNIT – V:
Application Layer- Introduction, providing services, Applications layer paradigms: Client server model, HTTP, E-mail, WWW, TELNET, DNS.
TEXT BOOKS:
1.   Computer Networks - Andrew S Tanenbaum, 4th Edition, Pearson Education.

2.   Data Communications and Networking - Behrouz A. Forouzan, Fifth Edition TMH, 2013.

REFERENCE BOOKS:

1.   An Engineering Approach to Computer Networks - S. Keshav, 2nd Edition, Pearson Education.

2.   Understanding communications and Networks, 3rd Edition, W. A. Shay, Cengage Learning.

3.   Computer Networking: A Top-Down Approach Featuring the Internet, James F. Kurose, K. W. Ross, 3rd Edition, Pearson Education.

COURSE OUTCOMES:

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

1.   Understand basics of Computer Networks and Reference Models.

2.   Understand the Data link Layer Concepts

3.   Know allotment of IP addresses, best routing path calculations in network.

4.   Analyze TCP, UDP working and know how to handle congestion

5.   Get an idea of various things in Application Layer.

MRCET CAMPUS AUTONOMOUS INSTITUTION-UGC, GOVT.OF INDIA

B.Tech. III Year I Sem. CSE (AIML)   **L / T/ P/ C**
                                                            0 / 0/ 2 /1

(R22A6681) MACHINE LEARNING LAB

Lab Objectives:
- To introduce the basic concepts and techniques of Machine Learning and the need of Machine learning techniques in real-world problems.
- To provide understanding of various Machine Learning algorithms and the way to evaluate performance of the Machine Learning algorithms.
- To apply Machine Learning to learn, predict and classify the real-world problems in the Supervised Learning paradigms as well as discover the Unsupervised Learning paradigms of Machine Learning.
- To inculcate in students professional and ethical attitude, multidisciplinary approach and an ability to relate real-world issues and provide a cost effective solution to it by developing ML applications.

Week-1: Implementation of Python Basic Libraries such as Statistics, Math, Numpy and Scipy
a) Usage of methods such as floor(), ceil(), sqrt(), isqrt(), gcd() etc.
b) Usage of attributes of array such as ndim, shape, size, methods such as sum(), mean(), sort(), sin() etc.
c) Usage of methods such as det(), eig() etc.
d) Consider a list datatype (1D) then reshape it into2D, 3Dmatrix using numpy
e) Generater and ommatrices using numpy
f) Find the determinant of a matrix using scipy
g) Find eigen value and eigen vector of a matrix using scipy
Week 2: Implementation of Python Libraries for ML application such as Pandas and Matplotlib.
a) Create a Series using pandas and display
b) Access the index and the values of our Series
c) Compare an array using Numpy with a series using pandas
d) Define Series objects with individual indices
e) Access single value of a series
f) Load datasets in a Dataframe variable using pandas
g) Usage of different methods in Matplotlib.
Week 3:
a) Creation and Loading different types of datasets in Python using the required libraries.
i. Creation using pandas
ii. Loading CSV dataset files using Pandas
iii. Loading datasets using sklearn
b) Write a python program to compute Mean, Median, Mode, Variance, Standard Deviation using Datasets
c) Demonstrate various data pre-processing techniques for a given dataset. Write a python program to compute
i. Reshaping the data,
ii. Filtering the data,
iii. Merging the data
iv. Handling the missing values in datasets
v. Feature Normalization: Min-max normalization

Week 4: Implement Dimensionality reduction using Principle Component Analysis (PCA) method on a dataset (For example Iris).

Week 5: Write a program to demonstrate the working of the decision tree based ID3 algorithm by considering a dataset.

Week 6: Consider a dataset, use Random Forest to predict the output class. Vary the number of trees as follows and compare

the results: i.   20
- i. 50
- ii. 100
- iii. 200
- iv. 500

Week 7: Write a Python program to implement Simple Linear Regression and plot the graph.

Week 8: Write a Python program to implement Logistic Regression for iris using sklearn and plot confusion matrix

Week 9: Build KNN Classification model for a given dataset. Vary the number of k values as follows and compare the results:
- i. 1
- ii. 3
- iii. 5
- iv. 7
- v. 11

Week 10: Implement Support Vector Machine for a dataset and compare the accuracy by applying the following kernel

                functions: i. Linear
                    ii. Polynomial
                    iii. RBF

Week 11: Write a python program to implement K-Means clustering Algorithm. Vary the number of k values as follows and compare the results: i. 1 ii. 3 iii. 5

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

B.Tech. III Year I Sem. CSE (AIML) **L /T/ P/ C**
                                        0/ 0/ 2/ 1

(R22A0596) COMPUTER NETWORKS LAB

Course Objectives

- To understand the working principle of various communication protocols.
- To understand the network simulator environment and visualize a network topology and observe its performance
- To analyze the traffic flow and the contents of protocol frames

List of Experiments

1. Implement the data link layer framing methods such as character, character-stuffing and bit stuffing. 2. Write a program to compute CRC code for the polynomials CRC-12, CRC-16 and CRC CCIP
3. Develop a simple data link layer that performs the flow control using the sliding window protocol, and loss recovery using the Go-Back-N mechanism.
4. Implement Dijsktra's algorithm to compute the shortest path through a network
5. Take an example subnet of hosts and obtain a broadcast tree for the subnet.
6. Implement distance vector routing algorithm for obtaining routing tables at each node.
7. Implement data encryption and data decryption
8. Write a program for congestion control using Leaky bucket algorithm.
9. Write a program for frame sorting techniques used in buffers.
10. Wireshark

      i. Packet Capture Using Wire shark
      ii. Starting Wire shark

      iii. Viewing Captured Traffic

      iv. Analysis and Statistics & Filters.
11. How to run Nmap scan Operating System Detection using Nmap
Do the following using NS2 Simulator

      i.   NS2 Simulator-Introduction
      ii. Simulate to Find the Number of Packets Dropped
      iii. Simulate to Find the Number of Packets Dropped by TCP/UDP
      iv. Simulate to Find the Number of Packets Dropped due to Congestion
      v. Simulate to Compare Data Rate & Throughput.
      vi. Simulate to Plot Congestion for Different Source/Destination
      vii.Simulate to Determine the Performance with respect to Transmission of Packets

TEXTBOOK:

1. Computer Networks, Andrew S Tanenbaum, David. j. Wetherall, 5th Edition. Pearson Education/PHI.

REFERENCE BOOKS:

1. An Engineering Approach to Computer Networks, S. Keshav, 2nd Edition, Pearson Education. 2. Data Communications and Networking – Behrouz A. Forouzan. 3rd Edition, TMH

Course Outcomes

- Implement data link layer farming methods
- Analyze error detection and error correction codes.

- Implement and analyze routing and congestion issues in network design.
- Implement Encoding and Decoding techniques used in presentation layer
- To be able to work with different network tools

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
B.Tech. III Year II Sem. CSE(AIML)   L/T/P/C
                                                                 3/0/0/3

(R22A0517) BIG DATA ANALYTICS

COURSE OBJECTIVES:
The objectives of this course are,
1. To learn the need of Big Data and the various challenges involved and to acquire Knowledge about different analytical architectures.
2. To understand Hadoop Architecture and its ecosystems.
3. To acquire knowledge about the various databases such as NoSQL, MongoDB, Cassandra.
4. To imbibe the processing of Big Data with advanced architectures like Spark.
5. To perceive the various algorithms used in Machine learning along with Data Analytics

UNIT – I
Introduction to big data: Data, Characteristics of data and Types of digital data: Unstructured, Semi-structured and Structured - Sources of data. Big Data Evolution - Definition of big data- Characteristics and Need of big data-Challenges of big data. Big data analytics, Overview of business intelligence.

UNIT – II
Big data technologies and Databases: Hadoop – Requirement of Hadoop Framework - Design principle of Hadoop –Comparison with other system SQL and RDBMS- Hadoop Components – Architecture -Hadoop 1 vs Hadoop 2.

UNIT – III
MapReduce and YARN framework: Introduction to MapReduce, Processing data with Hadoop using MapReduce, Introduction to YARN, Architecture, Managing Resources and Applications with Hadoop YARN.
Big data technologies and Databases: NoSQL: Introduction to NoSQL - Features and Types-Advantages & Disadvantages -Application of NoSQL.

UNIT - IV
New SQL: Overview of New SQL - Comparing SQL, NoSQL and NewSQL.
Mongo DB: Introduction – Features – Data types – Mongo DB Query language – CRUD operations – Arrays – Functions: Count – Sort – Limit – Skip – Aggregate – Map Reduce. Cursors – Indexes – Mongo Import – Mongo Export.
Cassandra: Introduction – Features – Data types – CQLSH – Key spaces – CRUD operations – Collections – Counter – TTL – Alter commands – Import and Export – Querying System tables.

UNIT - V
(Big Data Frame Works for Analytics) Hadoop Frame Work: Map Reduce Programming: I/O formats, Map side join-Reduce Side Join-Secondary Sorting-Pipelining MapReduce jobs
Spark Frame Work: Introduction to Apache spark-How spark works, Programming with RDDs: Create RDD spark Operations-Data Frame.

TEXT BOOKS:
1. Seema Acharya and Subhashini Chellappan, "Big Data and Analytics", Wiley India Pvt. Ltd., 2016.

2. Mike Frampton, "Mastering Apache Spark", Packt Publishing, 2015.

REFERENCE BOOKS:
1. Tom White, "Hadoop: The Definitive Guide", O"Reilly, 4th Edition, 2015.
2. Mohammed Guller, "Big Data Analytics with Spark", Apress, 2015
3. Donald Miner, Adam Shook, "Map Reduce Design Pattern", O"Reilly, 2012

COURSE OUTCOMES:
On successful completion of the course, students will be able to,
1. Demonstrate knowledge of Big Data, Data Analytics, challenges and their solutions in Big Data.
2. Analyze Hadoop Framework and eco systems.
3. Compare and work on NoSQL environment and MongoDB and cassandra.
4. Apply the Big Data using Map-reduce programming in Both Hadoop and Spark framework.
5. Analyze the data Analytics algorithms in Spark

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

B.Tech III Year II Sem–CSE (AI&ML)   **L/T/P/C**

3/0/0/3

(R22A0513) FULL STACK DEVELOPMENT

COURSE OBJECTIVES:

1. To become knowledgeable about the most recent web development technologies.
2. Idea for creating two tier and three tier architectural web applications.
3. Students will become familiar to implement fast, efficient, interactive and scalable web applications using run time environment provided by the full stack components
4. Design and Analyze real time web applications. and Constructing suitable client and server side applications.
5. To learn core concept of both front end and back end programming.

UNIT - I

Web Development Basics: Understanding the Basic Web Development Framework- User, Browser, Webserver, Backend Services, **HTML Basics:** Headings, Paragraphs, Links, Images, Lists, Tables, Div Element, Forms, **Cascading Style Sheets**: Syntax, Types, Selectors, Background, Border, Font, Text, Table**,** box model, **Version Control:** Getting Started with Git, Git Basics, Git Branching and Merging, working with remote repositories.

UNIT - II

JavaScript and jQuery: JavaScript basics, Functions, form validation, OOPS Aspects of JavaScript, JQuery Framework, jQuery events, AJAX for data exchange with server, JSON data format.

UNIT - III

Angular: importance of Angular, Understanding Angular, creating a Basic Angular Application, Angular Components, Expressions, Data Binding, Built-in Directives, Custom Directives, Implementing Angular Services in Web Applications.

React:

Need of React, Simple React Structure, The Virtual DOM, React Components, Introducing React Components, Creating Components in React, Data and Data Flow in React, Rendering and Life Cycle Methods in React, Working with forms in React, integrating third party libraries, Routing in React.

UNIT – IV

Node js: Getting Started with Node.js, Using Events, Listeners, Timers, and Callbacks in Node.js, Handling Data I/O in Node.js, Accessing the File System from Node.js, Implementing Socket Services in Node.js.

UNIT - V

MongoDB:

Understanding NoSQL and MongoDB**,** Getting Started with MongoDB**,** Getting Started with MongoDB and Node.js**,** Manipulating MongoDB Documents from Node.js**,** Accessing MongoDB from Node.js**,** Using Mongoose for Structured Schema and Validation**,** Advanced MongoDB Concepts.

TEXT BOOKS:
1. Web Design with HTML, CSS, JavaScript and JQuery Set Book by Jon Duckett Professional JavaScript for Web Developers Book by Nicholas C. Zakas. **(Unit-I, II).**
2. ProGit, 2nd Edition, Apress publication by Scott Chacon and Straub. **(Unit I).**
3. Mark Tielens Thomas, React in Action, 1st Edition, Manning Publications. **(Unit-III).**
4. Brad Dayley, Brendan Dayley, Caleb Dayley., Node.js, MongoDB and Angular Web Development, 2nd Edition, Addison-Wesley, 2019. **(Unit-III, Unit-IV, Unit-V)**.

REFERENCE BOOKS:
1. Vasan Subramanian, Pro MERN Stack, Full Stack Web App Development with Mongo, Express, React, and Node, 2nd Edition, Apress, 2019.

2. Chris Northwood, The Full Stack Developer: Your Essential Guide to the Everyday Skills Expected of a Modern Full Stack Web Developer', 1st edition, Apress, 2018.

3. Kirupa Chinnathambi, Learning React: A Hands-On Guide to Building Web Applications Using React and Redux, 2nd edition, Addison-Wesley Professional, 2018.

COURSE OUTCOMES:
1. Understand Full stack components for developing web application.
2. Students are able to develop a dynamic webpage by the use of java script and jQuery.
3. Design faster and effective single page applications using Angular and Create interactive user interfaces with react components
4. Apply packages of NodeJS to work with Data, Files, Http Requests and Responses.
5. Use MongoDB data base for storing and processing huge data and connects with NodeJS application.

MRCET CAMPUS AUTONOMOUS INSTITUTION-UGC, GOVT.OF INDIA

B.TechIIIYearII Sem-CSE (AI&ML)   **L/T/P/C**
                                                        3/0/0/3

(R22A6604) KNOWLEDGE REPRESENTATION AND REASONING

Course Objectives:

1. To investigate the key concepts of Knowledge Representation (KR) techniques and different notations.
2. To integrate the KR view as knowledge engineering approach to model organizational knowledge.
3. To introduce the study of ontologies as a KR paradigm and applications of ontologies
4. To understand various KR techniques and process, knowledge acquisition and sharing of ontology.

UNIT – I: The Key Concepts: Knowledge, Representation, Reasoning, Why knowledge representation and reasoning, Role of logic Logic: Historical background, representing knowledge in logic, Varieties of logic, Name, Type, Measures, and Unity Amidst diversity

UNIT – II: Ontology: Ontological categories, Philosophical background, Top-level categories, Describing physical entities, Defining abstractions, Sets, Collections, Types and Categories, Space and Time

UNIT - III: Knowledge Representations: Knowledge Engineering, Representing structure in frames, Rules and data, Object-oriented systems, Natural language Semantics, Levels of representation

UNIT – IV: Processes: Times, Events and Situations, Classification of processes, Procedures, Processes and Histories, Concurrent processes, Computation, Constraint satisfaction, Change Contexts: Syntax of contexts, Semantics of contexts, First-order reasoning in contexts, Modal reasoning in contexts, Encapsulating objects in contexts.

UNIT - V :Knowledge Soup: Vagueness, Uncertainty, Randomness and Ignorance, Limitations of logic, Fuzzy logic, Nonmonotonic Logic, Theories, Models and the world, Semiotics Knowledge Acquisition and Sharing: Sharing Ontologies, Conceptual schema, Accommodating multiple paradigms, Relating different knowledge representations, Language patterns, Tools for knowledge acquisition

TEXT BOOKS:

1. Knowledge Representation logical, Philosophical, and Computational Foundations by John F. Sowa, Thomson Learning.
2. Knowledge Representation and Reasoning by Ronald J. Brachman, Hector J. Levesque, Elsevier.

Course Outcomes:

1. Analyze and design knowledge-based systems intended for computer implementation.
2. Acquire theoretical knowledge about principles for logic-based representation and reasoning.
3. Ability to understand knowledge-engineering process
4. Ability to implement production systems, frames, inheritance systems and approaches to handle uncertain or incomplete knowledge.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

B. Tech III Year II Sem-CSE(AI&ML)   **L/T/P/C**

0/-/2/1

(R22A0590) BIG DATA ANALYTICS LAB

COURSE OBJECTIVES:

The objectives of this course are,

1. To implement MapReduce programs for processing big data.
2. To realize storage of big data using MongoDB.
3. To analyze big data using machine learning techniques such as Decision tree classification and clustering.

LIST OF EXPERIMENTS:

Week 1&2. Install, configure and run python, numPy and Pandas.

Week 3. Install, configure and run Hadoop and HDFS.

Week 4. Visualize data using basic plotting techniques in Python.

Week5& 6. Implement NoSQL Database Operations: CRUD operations, Arrays using MongoDB.

Week 7. Implement Functions: Count – Sort – Limit – Skip – Aggregate using MongoDB.

Week8. Implement word count / frequency programs using MapReduce.

Week 9. Implement a MapReduce program that processes a dataset.

Week 11. Implement clustering techniques using SPARK

Week 12. Implement an application that stores big data in MongoDB / Pig using Hadoop / R.

TEXT BOOKS:

1. Mike Frampton, "Mastering Apache Spark", Packt Publishing, 2015.
2. Tom White, "Hadoop: The Definitive Guide", O"Reilly, 4thEdition, 2015.
3. Nick Pentreath, "Machine Learning with Spark", Packt Publishing, 2015.
4. Mohammed Guller, "Big Data Analytics with Spark", A press, 2015
5. Donald Miner, Adam Shook, "Map Reduce Design Pattern", O"Reilly, 2012

COURSE OUTCOMES:

On successful completion of the course, students will be able to,

1. Understand Configuration of various big data Frame Works.
2. Apply various visualization techniques to explore data.
3. Demonstrate data base operations using MongoDB.
4. Process big data using Hadoop framework.
5. Build and apply Map-Reduce & NoSQL Concepts.
6. Perform data analysis with machine learning methods.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

B. Tech III Year II Sem-CSE (AI&ML)   **L/T/P/C**
                                                             0/0/2/1

(R22A0589) FULL STACK DEVELOPMENT LAB

COURSE OBJECTIVES:

This course will enable the students:

 1. Usage of various front and back-end Tools

2. They can understand and create applications on their own

3. Demonstrate and Designing of Websites can be carried out.

4. Develop web-based application using suitable client side and server-side code.

5. Implement web-based application using effective database access.

PROGRAMS:

Week-1.

Write a program to create a simple webpage using HTML.

Week-2.

Write a program to create a website using HTML CSS and JavaScript?

Week-3.

Write a program to build a Chat module using HTML CSS and JavaScript?

Week-4.

Write a program to create a simple calculator Application using React JS

 Week-5.

Write a program to create a voting application using React JS

 Week-6.

Write a program to create and Build a Password Strength Check using Jquery. **Week-7.**

 Write a program to create and Build a star rating system using Jquery.

Week-8.

Create a Simple Login form using React JS

Week-9. Create a blog using React JS Using the CMS users must be able to design a web page using the drag and drop method. Users should be able to add textual or media content into placeholders that are attached to locations on the web page using drag and drop method.

Week-10.

Create a project on Grocery delivery application Assume this project is for a huge online departmental store. Assume that they have a myriad of grocery items at their godown. All items must be listed on the website, along with their quantities and prices. Users must be able to sign up and purchase groceries. The system should present him with delivery slot options, and the user must be able to choose his preferred slot. Users must then be taken to the payment page where he makes

the payment with his favourite method.

Week-11.

Connecting our TODO React js Project with Firebase.

 COURSE OUTCOMES:

Students will be able to understand

1. Usage of various front and back end Tools

2. They can understand and create applications on their own

3. Demonstrate and Designing of Websites can be carried out.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
III Year B.TECH-I-SEM   **L/T/P/C**
                                                                                    3/0/0/3

OPEN ELECTIVE I
(R22A0551) JAVA PROGRAMMING

COURSE OBJECTIVES:
   1. To create Java programs that leverage the object-oriented features of the Java language, such as encapsulation, inheritance and polymorphism; Use data types, arrays and strings.
   2. Implement error-handling techniques using exception handling,
   3. To know about Applets and Event Handling
   4. Create and event-driven GUI using AWT components.
   5. To learn Multithreading concepts.

UNIT I
Java Programming-OOP Concepts, History of Java, Java buzzwords, Data types, Variables, Constants, Scope and Life time of variables, Operators, Type conversion and casting, Control Flow Statements, simple java programs, concepts of classes, objects, arrays, strings, constructors, methods, access control, this keyword, overloading methods and constructors, garbage collection, recursion.

UNIT II
Inheritance – Types of Inheritance, super keyword, and preventing inheritance: final classes and methods. **Polymorphism** – Dynamic binding, method overriding, abstract classes and methods. Interfaces-Interfaces Vs Abstract classes, defining an interface, implement interfaces, extending interface. Packages- Defining, creating and accessing a package, importing packages.

UNIT III
Exception handling - Benefits of exception handling, exception hierarchy, Classification of exceptions - checked exceptions and unchecked exceptions, usage of try, catch, throw, throws and finally, built in exceptions. Multi-threading- Differences between multi-threading and multitasking, thread life cycle, creating threads, synchronizing threads.

UNIT IV
Applets – Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets, passing parameters to applets. Event Handling: Events, Handling mouse and keyboard events
Files- Streams, Byte streams, Character streams, Text input/output.

UNIT V
GUI Programming with Java – AWT class hierarchy, AWT controls - Labels, button, text field, check box, and graphics. Layout Manager – Layout manager types: border, grid and flow. Swing – Introduction, limitations of AWT, Swing vs AWT.

TEXT BOOKS:

   1. Java- The Complete Reference, 7th edition, Herbert schildt,TMH.
   2. Understanding OOP with Java, updated edition, T. Budd, Pearsoneducation.
   3. Core Java an integrated approach, dreamtech publication, Dr. R.NageswaraRao.

REFERENCE BOOKS:

1. Java for Programmers, P.J.Deitel and H.M.Deitel, PEA (or) Java: How to Program,P.J.Deitel and H.M.Deitel, PHI

2. Object Oriented Programming through Java, P. Radha Krishna, Universities Press.

COURSE OUTCOMES:

1. An understanding of the principles and practice of object-oriented programming and design in the construction of robust, maintainable programs which satisfy their requirements;

2. A competence to design, write, compile, test and execute straightforward programs using a high-level language;

3. An awareness of the need for a professional approach to design and the importance of good documentation to the finished programs.

4. Be able to make use of members of classes found in the Java   API.

5. Demonstrate the ability to employ various types of constructs and a hierarchy of Java classes to provide solution to a given set of requirements.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

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

OPEN ELECTIVE I
(R22A1251) WEB DEVELOPMENT

COURSE OBJECTIVES:

1. To learn the basics of web & html programming
2. To understand CSS and its style
3. To know about Java Scripting & Dynamic Html
4. To understand the concepts of XML
5. To gain knowledge about web server software PHP

UNIT I
Web Basics- Introduction, Concept of Internet- History of Internet, Protocols of Internet, World Wide Web, URL, Web Server, Web Browser, HTML-Introduction HTML-Basic Formatting Tags, HTML- Grouping Using Div Span, HTML-Lists, HTML-Images, HTML Hyperlink, HTML-Table, HTML- Frames, HTML – Forms, Form Elements, HTML – Meta Tags, HTML-Miscellaneous using tool Dreamweaver/ Visual studio.

UNIT II
CSS –Introduction, Syntax, CSS and page layout, CSS-Selectors, CSS-Attribute selectors, CSS-Color Background Cursor, CSS-Text Fonts, CSS-Lists Tables, CSS -Box Model, CSS-Display Positioning, CSS Floats. Using tool Visual studio, Net Beans.

UNIT III
Java Script: JavaScript characteristics, Objects in Java Script, Events-Handlers, Event objects, DOM, Advanced Java script and HTML Forms, Form Validation, Dynamic HTML with Java Script, DHTM-Events, CSS with JavaScript in DHTML.

UNIT IV
XML: Introduction to XML, Benefits, Holding Data, XML-DOM, Document Type Definition - DTD, XML Schema, Separates Structure from Formatting, Data Sharing XM, , XML HTTP Request, Accessing, Creating and Modifying XML Nodes, Loading XML Data into an HTML Page, Receiving XML Responses, Handling Response XML.

UNIT V
PHP: PHP Introduction, Structure of PHP, PHP Namespace, PHP Functions, PHP-File Handling, PHP Form-handling, PHP Form-validation, Connecting to database, Simple AJAX application.

TEXT BOOKS:

1. Web Programming, Building Internet Applications, CHRIS BATES II Edition, Wiley Dreamtech.
2. Programming world wide web, SEBESTA, PEARSON.

REFERENCE BOOKS:

1. Internet and World Wide Web – How to program, Dietel and Nieto PHI/Pearson
2. PHP: The Complete reference-steven Holzner Tata McGraw-Hill.
3. An Introduction to web Design and Programming –Wang-Thomson
4. Web Warrior Guide to Web Programming -Bai/Ekedaw-Thomas
5. Beginning Web Programming-Jon Duckett WROX.

COURSE OUTCOMES:

1. Ability to design a web application.
2. Ability to develop a specific style sheet.
3. Ability to build a java scripting web application.
4. Ability to create a web design using XML.
5. Ability to develop web pages using PHP.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

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

OPEN ELECTIVE I
(R22A2151) INTELLECTUAL PROPERTY RIGHTS

COURSE OBJECTIVES:

1. To understand the concepts IPR
2. To understand Trademarks, Trade Secretes and GI of goods.
3. To understand Copyrights, Patents and Industrial Designs.
4. To learn about how to manage IP rights and legal aspects.
5. To understand the concepts of Cyber laws in IPR.

UNIT I
Introduction: Introduction to Intellectual Property Rights, types of intellectual property, importance of intellectual property rights, Evolution of IP acts and treaties (WIPO & TRIPS), Agencies responsible for IPR registrations, Role and value of IP in international commerce, Issues affecting IP internationally.

UNIT II
Trade Marks: Purpose and function of trademarks, Acquisition of trade mark rights, transfer of rights, Selecting and evaluating trademark, registration of trademarks, claims. Trade Secrets: Trade secret law, determination of trade secret status, liability for misappropriation of trade secrets, trade secret litigation. Geographical Indications of Goods: Basic aspects and need for the registration

UNIT III
Copyrights: Fundamentals of copyright law, originality of material, right of reproduction, right to perform the work publicly, copyright ownership issues, notice of copyright. Patents: Foundation of patent law, patent searching process, Basic Criteria of Patentability Industrial Designs: Kind of protection provided in Industrial design

UNIT IV
 Managing IP Rights: Acquiring IP Rights: letters of instruction, joint collaboration agreement, Protecting IP Rights: non-disclosure agreement, cease and desist letter, settlement memorandum. Transferring IP Rights: Assignment contract, license agreement, deed of assignment.

UNIT V
Introduction to Cyber law: Information Technology Act, cybercrime and e-commerce, data security, confidentiality, privacy, international aspects of computer and online crime.

TEXT BOOKS:

1. Intellectual property right by Deborah E Bouchoux
2. Cyber law, Text and cases South western special topics collection. 3. Intellectual property rights by N.K Acharya.
3. Intellectual property rights by N.K Acharya
4. Fundamentals of IPR for engineers, BY komal bansal

REFERENCE BOOKS:

1. Intellectual property rights by P. Radhakrishnan.

COURSE OUTCOMES:
1. Learner should be able to demonstrate understanding of basic concepts of IPR.
2. Able to differentiate between Trademarks, Trade secrets and GI of goods.

3. Able to understand Copyrights, Patents and Industrial Designs.
4. Able to manage and protect IP 5. Will gain Knowledge on Cyber law

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
III Year B. TECH-I-SEM   **L/T/P/C**

3/0/0/3

OPEN ELECTIVE I
(R22A0351) ROBOTICS & AUTOMATION

COURSE OBJECTIVES:

1) To study the overview of Embedded Systems, Robots, Microprocessors &Microcontrollers.
2) To learn in detail about Robotics and sensors.
3) To understand AVR RISC Microcontroller architecture in detail.
4) To get an understanding of ARM Processor in detail.
5) To learn about Artificial Intelligence in Robotics.

UNIT -I:

Introduction to Embedded System Design, Categories of ES, Overview of Embedded System Architecture, Recent Trends in Embedded Systems, Hardware Architecture of Embedded System, Real-time Embedded Systems, Robots and Robotics, Microprocessors and Microcontrollers, Microcontroller or Embedded Controller

UNIT – II:

Robotics: Classification of Robots, Links and Joints, Degrees of freedom, Motors-DC motor, Stepper Motor, Servo Motor; Power Transmission-Type of Gears, Robotic Sensors, Applications of Robot, S/w used for Robot programming.

UNIT- III:

The AVR RISC microcontroller architecture: Introduction, AVR family architecture, register file, Pin diagram of AVR, Memory organization, I/O ports, timers, USART, Interrupt structure.

UNIT-IV:

ARM Processor: Fundamentals, Registers , current program status register , pipeline concept , Interrupts and the vector table.

UNIT V:

AI IN ROBOTICS: Robotic perception, localization, mapping- configuring space, planning uncertain movements, dynamics and control of movement, Ethics and risks of artificial intelligence in robotics.

TEXT BOOKS:

1) Subrata Ghoshal, "Embedded Systems & Robots", Cengage Learning
2) Stuart Russell, Peter Norvig, "Artificial Intelligence: A modern approch", Pearson Education,India2003.
3) ARM System Developer's Guide: Designing and Optimizing System Software- Andrew N.Sloss, Dominic Symes, Chris Wright, Elsevier Inc., 2007

REFERENCE BOOKS:

1. M.A. Mazidi, J.G. Mazidi, R.D. Mckinlay, "8051 Microcontroller and Embedded Systems",Pearson.
2. Dr. K.V.K. Prasad, "Embedded/Real-Time Systems: Concepts Design & Programming",Dreamtech.
3. Microcontrollers and applications, Ajay V Deshmukh , TMGH,2005

COURSE OUTCOMES:

At the end of the course, the students will be able to
1. Understand in detail the internal components of Embedded systems and various types of Embedded systems.
2. The usage and application of various sensors, actuators and Software tools for Programming a Robot
3. Write programs to interface various I/O devices to AVR Microcontroller.
4. Write simple programs on ARM processor.
5. Understand the implementation of Artificial Intelligence in Automating the Robots.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
III Year B. TECH-I-SEM   **L/T/P/C**
                                                                            3/0/0/3
OPEN ELECTIVE I

(R22A0451) ELECTRONICS FOR HEALTHCARE

COURSE OBJECTIVES:
1.To understand x-ray generation and biological effects.
2.To study different x-ray diagnostic methods.
3.To study CT imaging concepts, fundamental of Magnetic resonance imaging.
4. To study Generation and detection of ultrasound and its techniques.
5.To study the principles of Radio nuclide imaging

UNIT I
X-RAY IMAGING: Generation and Detection of X-rays – X-ray generation, X-ray generators, Filters, Beam restrictors and grids, Intensifying screens, fluorescent screens, and image intensifiers, X-ray detectors, X-ray image characteristics – Spatial resolution, Image noise, Image contrast, biological effects of ionizing radiation.

UNIT II
X-RAY DIAGNOSTIC METHODS: Conventional X-ray radiography, Fluoroscopy, Angiography, Mammography and Xeroradiography, Image subtraction.
COMPUTED TOMOGRAPHY: Conventional tomography, Computed tomography, Algorithms for image reconstruction: parallel and Fan beam data, Spiral CT. Recent developments – Digital radiography.

UNIT III
ULTRASOUND IMAGING: Generation and detection of Ultrasound- Piezoelectric effect, Ultrasonic transducers,
ULTRASONIC DIAGNOSTIC METHODS: Pulse echo systems- Amplitude mode(A-mode), Brightness mode(B-mode), Motion mode(M- mode), Constant depth mode (C-mode), Doppler methods, Duplex imaging, Tissue characterization, Colour Doppler flow imaging, Image characteristics – Ultrasonic texture or speckle, Speckle reduction, Compensation of phase aberration, Biological effects of ultrasound

UNIT IV
        RADIO NUCLIDE IMAGING: Generation & Detection of Nuclear Emission – Radionuclide generators, nuclear radiation detectors, Collimators, Radionuclide imaging systems-Gamma Camera, SPECT, PET.
BASICS OF MAGNETIC RESONANCE IMAGING: fundamentals of nuclear magnetic resonance- Angular momentum, magnetic dipole moment, magnetization, Larmor frequency, Rotating frame of reference and RF magnetic field, Free induction decay (FID), Fourier spectrum of the NMR signal, Spin density, Relaxation times, Pulse sequences.

UNIT V
MRI SYSTEM & IMAGING METHODS: Magnetic field gradients, NMR Coil/Probe, Transmitter, Receiver, Data acquisition. Imaging Methods- Introduction, slice selection, frequency encoding, phase encoding, Spin-Echo imaging- Characteristics of MRI images-

spatial resolution, image contrast. Functional MRI.

COURSE OUTCOMES:

On the completion of the course, the students will be able to

- Understand the X-ray fundamentals and its characteristics.
- Understand the X-ray diagnostic methods and CT imaging.
- Understand the Ultra sound imaging and diagnostics methods.
- Understand the properties of radio nuclides and its applications.
- Understand the MRI system and imaging methods.

TEXTBOOKS:

1. Principles of Medical Imaging, Kirk Shung, Michael B. Smith and Banjamin Tsui, Academic Press, 1992.
2. Handbook of Biomedical Instrumentation,R.S.Khandpur,TataMcGrawHill,2nd Edition,2003.

REFERENCE BOOK:

1. Fundamentals of Medical Imaging, Paul Suetens,Cambridge UniversityPress, 2002

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

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

3/0/0/3

OPEN ELECTIVE I

(R22A0251) RENEWABLE ENERGY SOURCES

COURSE OBJECTIVES:

1. To recognize the awareness of energy conservation in students
2. To identify the use of renewable energy sources for electrical power generation
3. To collect different energy storage methods and detect about environmental effects of energy conversion

UNIT-I

Introduction: Renewable Sources of Energy- Grid- Supplied Electricity- Distributed Generation-Renewable Energy Economics- Calculation of Electricity Generation

Wind Power Plants: Appropriate Location -Evaluation of Wind Intensity -Topography -Purpose of the Energy Generated – General Classification of Wind Turbines- Rotor Turbines-Multiple-Blade Turbines Drag Turbines- Lifting Turbines- Generators and Speed Control used in Wind Power Energy Analysis of Small Generating Systems.

UNIT-II

Photo voltaic Power Plants: Solar Energy- Generation of Electricity by Photo voltaic Effect- Dependence of a PV Cell Characteristic on Temperature- Solar cell Output Characteristics-Equivalent Models and Parameters for Photo voltaic Panels- Photo voltaic Systems-Applications of Photo voltaic Solar Energy- Economical Analysis of Solar Energy.

Fuel Cells: The Fuel Cell- Low and High Temperature Fuel Cells- Commercial and Manufacturing Issues Constructional Features of Proton Exchange- Membrane Fuel Cells– Reformers- Electrolyze Systems and Related Precautions- Advantages and Disadvantages of Fuel Cells-Fuel Cell Equivalent Circuit- Practical Determination of the Equivalent Model Parameters -Aspects of Hydrogen as Fuel.

UNIT-III

Induction Generators: Principles of Operation-Representation of Steady- State Operation-Power and Losses Generated-Self-Excited Induction Generator-Magnetizing Curves and Self-Excitation Mathematical Description of the Self-Excitation Process-Interconnected and Stand-alone operation-Speed and Voltage Control - Economical Aspects.

UNIT-IV

Storage Systems: Energy Storage Parameters-Lead-Acid Batteries-Ultra Capacitors- Flywheels–Super conducting Magnetic Storage System-Pumped Hydroelectric Energy Storage- Compressed Air Energy Storage-Storage Heat-Energy Storage as an Economic Resource**.**

UNIT-V

Integration of Alternative Sources of Energy: Principles of Power Injection-Instantaneous Active and Reactive Power Control Approach Integration of Multiple Renewable Energy Sources-Islanding and Interconnection Control-DG Control and Power Injection. Inter

connection Of Alternative Energy Sources with the Grid: Inter connection Technologies-Standards and Codes for Inter connection-Inter connection Considerations-Inter connection Examples for Alternative Energy Sources.

COURSE OUT COMES:

Costs- Demand side Management Options –Supply side Management Options-Modern Electronic Controls of Power Systems. At the end of the course the student will be able to:

1. Understand the principles of wind power and solar photo voltaic power generation, fuel cells.
2. Assess the cost of generation for conventional and renewable energy plants
3. Design suitable power controller for wind and solar applications and analyze the issues involved in the integration of renewable energy sources to the grid

TEXTBOOKS:

1. Felix A. Farret, M. Godoy Simoes, "Integration of Alternative Sources of Energy", John Wiley& Sons, 2006.

2. Solanki: Renewable Energy Technologies: Practical Guide For Beginners, PHI Learning Pvt. Ltd.,2008.

REFERENCE BOOKS:

1. D.Mukherjee: Fundamentals of Renewable Energy Systems, New Age International   publishers, 2007.
2. Remus Teodorescu, Marco Liserre, PedroRodríguez: Grid Converters for Photo voltaic and Wind Power Systems, John Wiley & Sons, 2011.
3. Gilbert M.Masters: Renewable and Efficient Electric Power Systems, John Wiley& Sons, 2004.
4. voltaic and Wind Power Systems, John Wiley & Sons, 2011.
5. Gilbert M.Masters: Renewable and Efficient Electric Power Systems, John Wiley& Sons, 2004.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

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

OPEN ELECTIVE I

(R22A6751) PRINCIPLES OF DATA SCIENCE

COURSE OBJECTIVES:

1 To gain knowledge in the basic concepts of Data Analysis
2 To acquire skills in data preparatory and preprocessing steps.
3 To understand the mathematical skills in statistics.
4 To understand the concepts of Artificial Intelligence Roles and Skills in Data Science.
5 To understand the role of Data Science in Real-time applications

UNIT I:
INTRODUCTION Need for data science – benefits and uses – facets of data – data science process – setting the research goal – retrieving data – cleansing, integrating, and transforming data – exploratory data analysis – building the models – presenting and building applications.

UNIT II:
DESCRIBING DATA - I Frequency distributions – Outliers – relative frequency distributions – cumulative frequency distributions – frequency distributions for nominal data – interpreting distributions – graphs – averages – mode – median – mean – averages for qualitative and ranked data – describing variability – range – variance – standard deviation – degrees of freedom – interquartile range – variability for qualitative and ranked data.

UNIT III:
DESCRIBING DATA - II Normal distributions – z scores – normal curve problems – finding proportions – finding scores – more about z scores – correlation – scatter plots – correlation coefficient for quantitative data – computational formula for correlation coefficient – regression – regression line – least squares regression line – standard error of estimate – interpretation of r2 – multiple regression equations – regression toward the mean.

UNIT IV:
AI: ROLES AND SKILLS AI: Cognitive Computing: Learning Perceptions – Terminologies - Machine Learning – Neural Networks – Deep Learning - NLP – Speech Processing – Big Data and AI – Ethics in AI Research - Advanced Applications – AI Myths – Data Science Roles Data Scientist, Data Architect, Data Analyst – Machine Learning Engineer – Skills.

UNIT V:
 DATA SCIENCE USE CASES Data Science Use cases Specifications and Discussion – Data Sources Identification – Data Types –Data Classification – Data Characteristics of Big V"s – Data Science P"s – Applications of AI: Domains: Customer Insights – Behavioral Analysis –– Marketing – Retails – Insurance – Risk and Security –Health care – Supply Chain Logistics.

TEXT BOOKS:

1. David Cielen, Arno D. B. Meysman, and Mohamed Ali, "Introducing Data Science", Manning Publications, 2016. (first two chapters for Unit I)
2. Robert S. Witte and John S. Witte, "Statistics", Eleventh Edition, Wiley Publications, 2017. (Chapters 1–7 for Units II and III)
3. Joel Grus, "Data Science from Scratch", 2nd Edition, O'Reilly Publisher, ISBN: 9781492041139, May 2019 (for Unit IV and V)

REFERENCE BOOKS:

1. Lillian Pierson, Jake Porway, "Data Science for Dummies", Second Edition, John Wiley & Sons, Publishers, ISBN: 9781119327639, 2017 (EBook)
2. Sinan Ozdemir, Sunil Kakade, "Principles of Data Science", Second Edition (EBook) E-Learning Resources: Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]

COURSE OUTCOMES:

On successful completion of this course, students would be able to

1. Understand the foundational concepts of Data Science.
2. Understand the nature of Data.
3. Determine the relationship between data dependencies using statistics.
4. Understand the concepts of Artificial Intelligence Roles and Skills in Data Science.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
III Year B. TECH-I-SEM   L/T/P/C
                                                                        3/0/0/3

OPEN ELECTIVE I

(R22A6752) BUSINESS ANALYTICS

COURSE OBJECTIVES:

▪   To help students in understanding how the managers use business analytics for managerial decision making.

Unit-I: Understanding Business Analytics

Introduction: Meaning of Analytics - Evolution of Analytics - Need of Analytics - Business Analysis vs. Business Analytics - Categorization of Analytical Models - Data Scientist vs. Data Engineer vs. Business Analyst - Business Analytics in Practice - Types of Data - Roleof Business Analyst.

Unit-II: Dealing with Data and Data Science

Data: Data Collection - Data Management - Big Data Management - Organization/Sources of Data - Importance of Data Quality - Dealing with Missing or Incomplete Data - Data Visualization - Data Classification.

Data Science Project Life Cycle: Business Requirement - Data Acquisition - Data Preparation
- Hypothesis and Modeling - Evaluation and Interpretation - Deployment - Operations -Optimization - Applications for Data Science

Unit-III: Data Mining and Machine Learning

Data Mining: The Origins of Data Mining - Data Mining Tasks - OLAP and Multidimensional Data Analysis - Basic Concept of Association Analysis and Cluster Analysis.

Machine Learning: History and Evolution - AI Evolution - Statistics vs. Data Mining vs. Data Analytics vs. Data Science - Supervised Learning - Unsupervised Learning - Reinforcement Learning - Frameworks for Building Machine Learning Systems.

Unit-IV: Applications of Business Analytics

Overview of Business Analytics Applications: Financial Analytics - Marketing Analytics - HR Analytics - Supply Chain Analytics - Retail Industry - Sales Analytics - Web & Social Media Analytics - Healthcare Analytics - Energy Analytics - Transportation Analytics - Lending Analytics - Sports Analytics - Future of Business Analytics.

Unit-V: Ethical, Legal and Organizational Issues
Issues & Challenges: Business Analytics Implementation Challenges - Privacy and Anonymizaiton - Hacking and Insider Threats - Making Customer Comfortable.

REFERENCE BOOKS:

- James R Evans, Business Analytics, Global Edition, Pearson Education
- U Dinesh Kumar, Business Analytics, Wiley India Pvt. Ltd., New Delhi
- Ger Koole, An Introduction to Business Analytics, Lulu.com, 2019
- J.D. Camm, J.J. Cochran, M. J. Fry, J.W. Ohlmann, D.R. Anderson, D.J. Sweeney, T.A.Williams - *Essentials of Business Analytics*, 2e; Cengage Learning.
- Vipin Kumar, Introduction to Data Mining, Pang-Ning Tan, Michael Steinbach, PearsonEducation India
- Bhimasankaram Pochiraju, Sridhar Seshadri, Essentials of Business Analytics: An Introduction to the Methodology and its Application, Springer

COURSE OUTCOMES:

- The students will be familiar with the practices of analyzing and reporting the business data useful for the insights of business growth and development.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
III Year B. TECH-II-SEM   **L/T/P/C**
                                                                       3/0/0/3

OPEN ELECTIVE-II
(R22A0553) DATABASE SYSTEMS

COURSE OBJECTIVES:

1. The purpose of the course is to enrich the previous knowledge of database systems and

   exposing the need for distributed database technology to confront with the deficiencies of the centralized database systems.
2. Introduce basic principles and implementation techniques of distributed database systems.
3. Equip students with principles and knowledge of parallel and object-oriented databases.
4. Topics include distributed DBMS architecture and design; query processing and optimization; distributed transaction management and reliability; parallel and object database management systems.

UNIT - I

Introduction: Distributed Data Processing, Distributed Database System, Promises of DDBSs, Problem areas.

Distributed DBMS Architecture: Architectural Models for Distributed DBMS, DDMBS Architecture. **Distributed Database Design:** Alternative Design Strategies, Distribution Design issues, Fragmentation, Allocation.

UNIT - II

Query processing and decomposition: Query processing objectives, characterization of query processors, layers of query processing, query decomposition, localization of distributed data.

Distributed query Optimization: Query optimization, centralized query optimization, distributed query optimization algorithms.

UNIT - III

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.

UNIT - IV

Distributed DBMS Reliability: Reliability concepts and measures, fault-tolerance in distributed systems, failures in Distributed DBMS, local & distributed reliability protocols, site failures and network partitioning.

Parallel Database Systems: Parallel database system architectures, parallel data placement, parallel query processing, load balancing, database clusters.

UNIT - V

Distributed object Database Management Systems: Fundamental object concepts and models,

object distributed design, architectural issues, object management, distributed object storage, objectquery Processing.

Object Oriented Data Model: Inheritance, object identity, persistent programming languages, persistence of objects, comparison OODBMS and ORDBMS

TEXT BOOKS:

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

REFERENCE BOOK:

1. Hector Garcia-Molina, Jeffrey D. Ullman, Jennifer Widom: "Database Systems: The Complete Book", Second Edition, Pearson International Edition

COURSE OUTCOMES:

1. Understand theoretical and practical aspects of distributed database systems.
2. Study and identify various issues related to the development of distributed databasesystem.
3. Understand the design aspects of object-oriented database system and relateddevelopment.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
III Year B. TECH-II-SEM   **L/T/P/C**
                                                                         3/0/0/3

OPEN ELECTIVE-II
(R22A6753) BIG DATA ARCHITECTURE

COURSE OBJECTIVES:
1.   The purpose of this course is to provide the students with the knowledge of Big data Analytics principles and techniques.
2.   This course is also designed to give an exposure of the frontiers of Big data Analytics
3.   To Understand the knowledge of Hadoop, HDFC and MapReduce Techniques
4.   To gain the acknowledge on Hadoop Architecture.
5.   To learn the machine learning approaches using R

UNIT - I:
Introduction to Big Data: Big Data and its Importance – Four V's of Big Data – Drivers for Big Data – Introduction to Big Data Analytics – Big Data Analytics applications.

UNIT - II:
Big Data Technologies: Hadoop's Parallel World – Data discovery – Open-source technology for Big Data Analytics – cloud and Big Data –Predictive Analytics – Mobile Business Intelligence and Big Data

UNIT - III:
Introduction Hadoop: Big Data – Apache Hadoop & Hadoop Eco System – Moving Data in and out of Hadoop – Understanding inputs and outputs of MapReduce - Data Serialization

UNIT - IV:
Hadoop Architecture: Hadoop: RDBMS Vs Hadoop, Hadoop Overview, Hadoop distributors, HDFS, HDFS Daemons, Anatomy of File Write and Read., Name Node, Secondary Name Node, and Data Node, HDFS Architecture, Hadoop Configuration, Map Reduce Framework, Role of HBase in Big Data processing, HIVE, PIG.

UNIT - V:
Data Analytics with R Machine Learning: Introduction, Supervised Learning, Unsupervised Learning,
Collaborative Filtering, Social Media Analytics, Mobile Analytics, Big Data Analytics with BigR.

TEXT BOOKS:
1. Big Data Analytics, Seema Acharya, Subhasini Chellappan, Wiley 2015.

2. Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Business, Michael Minelli, Michehe Chambers, 1st Edition, Ambiga Dhiraj, Wiely CIO Series, 2013

3. Hadoop: The Definitive Guide, Tom White, 3rd Edition, O"Reilly Media, 2012.

REFERENCE BOOKS:

1. Big Data and Business Analytics, Jay Liebowitz, Auerbach Publications, CRC press (2013).
2. Professional Hadoop Solutions, Boris lublinsky, Kevin t. Smith, Alexey Yakubovich, Wiley, ISBN:
   9788126551071, 2015.
3. Understanding Big data, Chris Eaton, Dirk deroos et al. McGraw Hill, 2012.

COURSE OUTCOMES:

1. Ability to explain the foundations, definitions, and challenges of Big Data and various Analytical tools
2. Ability to program using HADOOP and Map reduce, NOSQL
3. Ability to understand the importance of Big Data in social media and Mining.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
III Year B. TECH-II-SEM L/T/P/C
3/0/0/3

OPEN ELECTIVE-II
(R22A0352) DESIGN THINKING

COURSE OBJECTIVES:

1. To understand the engineering design process and identification of customer need.
2. To understand innovative problem-solving concepts.
3. To understand the principles of Design for Manufacturing and FMEA.
4. To know about the design for assembly principles.
5. To know about the concepts of design for environment and design for recycling.

UNIT-I

Introduction: Innovations in Design, Engineering Design Process, Prescriptive and integrativemodels of design, Design Review and societal considerations.

Identification of Customer Need: Evaluating Customer requirements and survey on customer needs, Conversion of customer needs into technical Specifications, Information sources.

UNIT-II

Theory of Inventive Problem solving (TRIZ), Creativity and Problem solving, Functional Decomposition of the problem for innovative concept development, Introduction to Axiomatic Design, Concept evaluation and decision making.

UNIT-III

Design for Manufacturing: Technical estimating, design of experiments, design for manufacturability, statistical process control, Introduction to FMEA (failure modes and effects analysis), and Case study of design for manufacturing: Manufacturing System Design Based on Axiomatic Design: Case of Assembly Line

UNIT-IV

Design for Assembly: Assembly Principles, Process, Worksheet, Assumptions. Case study of design for Assembly: Manufacturing System Design Based on Axiomatic Design: Case of Assembly Line

UNIT-V

Design for Environment: Design for recycling; Design for disassembly, Design for energy Efficiency, Design for remanufacture, Design for disposability, Hazardous material minimization. Case study of design for Environment.

TEXT BOOKS:

1. Nigel Cross, Engineering Design Methods, John Wiley, 2009.
2. George E. Dieter, Engineering Design, McGraw-Hill, 2009.
3. GenrichAltshuller, The Innovation Algorithm, Technical Innovation Centre, 2011.

REFERENCE BOOKS

1. The Art of Innovation, by Tom Kelley.
2. Design Thinking, by Nigel Cross.
3. The Design of Business: by Roger Martin.

COURSE OUTCOMES:

1. The importance of design in innovation.
2. Design tools and processes can generate innovative new ideas.
3. Design and design thinking to innovative in areas such as engineering, software development and business operations.
4. Strengthen students' individual and collaborative capabilities to identify customer needs, create sound concept hypotheses, collect appropriate data, and develop a prototype that allows for meaningful feedback in a real-world environment.
5. To describe the various case studies for design for environment

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

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

OPEN ELECTIVE-II
(R22A0552) PRINCIPLES OF CLOUD COMPU

COURSE OBJECTIVES:

1. To understand the various distributed system models and evolving computingparadigms
2. To gain knowledge in virtualization of computer resources
3. To realize the reasons for migrating into cloud
4. To introduce the various levels of services that can be achieved by a cloud.
5. To describe the security aspects in cloud and the services offered by a cloud

UNIT - I

Cloud Computing Fundamentals: Definition of Cloud computing, Roots of Cloud Computing , Layers and Types of Clouds, Desired Features of a Cloud, Cloud Infrastructure Management, Infrastructure as a Service Providers, Platform as a Service Providers. **Computing Paradigms**: High-Performance Computing, Parallel Computing, Distributed Computing, Cluster Computing, Grid Computing.

UNIT- II

Migrating into a Cloud: Introduction, Broad Approaches to Migrating into the Cloud, theSeven-Step Model of Migration into a Cloud.
Virtualization: Virtual Machines and Virtualization of Clusters and data centers- Implementation Levels of Virtualization -Virtualization Structures/Tools and Mechanisms- Virtualization of CPU, Memory, and I/O Devices-Virtual Clusters and Data Centers

UNIT- III

Infrastructure as a Service (IAAS) & Platform (PAAS): Virtual machines provisioning and Migration services, Virtual Machines Provisioning and Manageability, Virtual Machine Migration Services, VM Provisioning and Migration in Action. On the Management of Virtual machines for Cloud Infrastructures- Aneka—Integration of Private and Public Clouds.

UNIT- IV

Software as a Service (SAAS) &Data Security in the Cloud: Software as a Service SAAS), Google App Engine – Centralizing Email Communications- Collaborating via Web- Based Communication Tools-An Introduction to the idea of Data Security.

UNIT- V

SLA Management in cloud computing: Traditional Approaches to SLO Management,Types of SLA, Life Cycle of SLA, SLA Management in Cloud.

TEXT BOOKS:

1. Cloud Computing Principles and Paradigms, by Rajkumar Buyya

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

3. Michael Miller, Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online, Que Publishing, August 2008.

REFERENCE BOOKS:

1. Cloud Computing : A Practical Approach, Anthony T.Velte, Toby J.Velte, RobertElsenpeter, Tata McGraw Hill,rp2011.

2. Enterprise Cloud Computing, Gautam Shroff, Cambridge University Press,2010.

3. Cloud Computing: Implementation, Management and Security, John W.Rittinghouse,James F.Ransome, CRC Press,rp2012.

4. Cloud Application Architectures: Building Applications and Infrastructure in the Cloud,George Reese, O'reilly, SPD,rp2011.

5. Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance, Tim Mather, Subra Kumaraswamy, Shahed Latif, O'Reilly, SPD, rp2011.

COURSE OUTCOMES:

1. Ability to analyze various service delivery models of cloud computing

2. Ability to interpret the ways in which the cloud can be programmed and deployed.

3. Ability to comprehend the virtualization and cloud computing concepts

4. Assess the comparative advantages and disadvantages of Virtualization technology

5. Analyze security issues in cloud computing

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

'ear B. TECH-II-SEM   **L/T/P/C**
3/0/0/3

OPEN ELECTIVE-II
(R22A6951) INTERNET OF THINGS & ITS APPLICATIONS

COURSE OBJECTIVES:
1. To study IoT Networking Core
2. To study IoT related network fundamentals
3. To study IoT Architecture.
4. To study IoT Application Development procedure
5. To study various case studies and IoT applications.

UNIT I: FUNDAMENTALS OF IoT- Evolution of Internet of Things, EnablingTechnologies, M2M Communication, IoT World Forum (IoTWF) standardized architecture, Simplified IoT Architecture, Core IoT Functional Stack, Fog, Edge and Cloud in IoT, Functional blocks of an IoT ecosystem, Sensors, Actuators, Smart Objects and Connecting Smart Objects.

UNIT II: IoT PROTOCOLS- IoT Access Technologies: Physical and MAC layers, topology and Security of IEEE 802.15.4, 802.11ah and Lora WAN, Network Layer: IP versions, Constrained Nodes and Constrained Networks,6LoWPAN, Application Transport Methods: SCADA, Application Layer Protocols: CoAP and MQTT.

UNIT III: DESIGN AND DEVELOPMENT- Design Methodology, Embedded computing logic, Microcontroller, System on Chips, IoT system building blocks IoT Platform overview: Overview of IoT supported Hardware platforms such as: Raspberry pi, Arduino Board details

UNIT IV: DATA ANALYTICS AND SUPPORTING SERVICES: Data Analytics:
Introduction, Structured Versus Unstructured Data, Data in Motion versus Data at Rest, IoT Data Analytics Challenges, Data Acquiring, Organizing in IoT/M2M, Supporting Services: Computing Using a Cloud Platform for IoT/M2M Applications/Services, Everything as a service and Cloud ServiceModels.

UNIT V: CASE STUDIES/INDUSTRIAL APPLICATIONS: IoT applications in home, infrastructures, buildings, security, Industries, Home appliances, other IoT electronic equipment, Industry 4.0 concepts

TEXT BOOKS:
1.   6LoWPAN:TheWirelessEmbeddedInternet,ZachShelby,CarstenBormann,Wiley
2.   Internet of Things: Converging Technologies for Smart Environments and IntegratedEco systems,Dr.Ovidiu Vermesan, Dr.Peter Friess, RiverPublishers
3.   Interconnecting Smart Objects with IP: The Next Internet, Jean-Philippe Vasseur, Adam Dunkels, Morgan Kuffmann

REFERENCE BOOKS:

1.   The Internet of Things: From RFID to the Next-Generation Pervasive Networked
Lu Yan, Yan Zhang,Laurence T.Yang, Huansheng Ning
2.   Internet of Things (A Hands-on-Approach), Vijay Madisetti, Arshdeep Bahga
3.   Designing the Internet of Things, Adrian McEwen (Author),Hakim Cassimally
4.   Asoke K Talukder and Roopa R Yavagal, "MobileComputing,"Tata Mc Graw Hill, 2010.
5.   Vijay Madisetti and Arshdeep Bahga, "Internet of Things (A Hands-on-Approach)", 1st Edition,VPT, 2014
6.   Computer Networks; By: Tanenbaum, AndrewS; Pearson Education Pte.Ltd., Delhi, 4thEdition
7.   Data and Computer Communications; By: Stallings, William; Pearson Education Pte.Ltd., Delhi, 6thEdition

COURSE OUTCOMES:

          At the end of the course, the student will be able to
1)   Understand IoT Networking Core
2)   Understand IoT related network fundamentals
3)   Understand IoT Architecture.
4)   Understand IoT Application Development procedure
5)   Understand various case studies and IoT applications.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III Year B. TECH-II-SEM   **L/T/P/D**
                                                         3/0/0/3

OPEN ELECTIVE II
(R22A2152) NANO TECHNOLOGY

Course objectives

1. To provide a comprehensive overview of synthesis and characterization of nanoparticles, Nano composites and hierarchical materials with Nano scale features.

2. To provide the engineering students with necessary background for understanding various nanomaterial's characterization techniques

3. To develop an understanding of the basis of the choice of material for device applications

4. To give an insight into complete systems where nanotechnology can be used to improve our everyday life.

UNIT I: Introduction to Nanomaterials
Nanotechnology, Frontier of future - an overview, Length Scales, Variation of physical properties from bulk to thin films to nanomaterials, Confinement of electron in 0D, 1D, 2D and 3D systems, Synthesis of Nanomaterials: Bottom-Up approach: Chemical Routes for Synthesis of nanomaterials-Sol-gel, Precipitation, Solution Combustion synthesis, Hydrothermal, Top-Down approach- Ball milling technique, Sputtering, Laser Ablation.

UNIT II: Characterization of Nanomaterials
Basic principles and instrumentations of Electron Microscopy –Transmission Electron Microscope, Scanning Electron Microscope, Scanning Probes- Scanning Tunneling microscope, Atomic Force Microscope –different imaging modes, comparison of SEM and TEM, AFM and STM, AFM and SEM.

UNIT III: Carbon Based Materials
Introduction, Synthesis, Properties (electrical, Electronic and Mechanical), and Applications of Graphene, SWCNT, MWCNT, Fullerenes and other Carbon Materials: Carbon nanocomposites, nanofibers, nano discs, nanodiamonds.

UNIT IV: Nanotechnology in Energy storage and conversion
Solar cells: First generation, Second generation and third generation solar cells: Construction and working of Dye sensitized and Quantum dot sensitized solar cells.
Batteries: Nanotechnology in Lithium ion battery- working, Requirements of anodic and cathodic materials.
Fuel Cells: Introduction, construction, working of fuel cells and nanotechnology in hydrogen storage and proton exchange membranes

UNIT V: Applications of Nanotechnology
Nanotech Applications and Recent Breakthroughs: Introduction, Significant Impact of Nanotechnology and Nanomaterial, Electronic Applications (Nano electronics), Computing Applications (Nano computers), Chemical Applications (Nano chemistry), Optical Applications (Nano photonics).

TEXT BOOKS:
1. Nano Materials – A.K. Bandyopadhyay/ New Age Publishers
2. Nanocrystals: Synthesis, Properties and Applications – C.N.R. Rao, P. John Thomas and G. U. Kulkarni, Springer Series in Materials Science
3. Nano Essentials- T. Pradeep/TMH

REFERENCES:
1.   Introduction to Nanotechnology, C. P. Poole and F. J. Owens, Wiley, 2003
2.   Understanding Nanotechnology, Scientific American 2002
3.   Nanotechnology, M. Ratner and D. Ratner, Prentice Hall 2003

OUTCOMES:
1.   Demonstrate the synthesis of nanoparticles by various techniques.

2. Explain working of basic instruments used in characterization of nanoparticles.
3. Discuss the application of nanotechnology to mechanical and civil domains

4.   Classify the nanomaterials based on the dimensions.

5.   Assess the suitability of nanomaterials for various device applications.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
III Year B. TECH-II-SEM

L/T/P/C
3/0/0/3

OPEN ELECTIVE II
(R22A0252) ELECTRICAL AND HYBRID VEHICLES

COURSE OBJECTIVES:

- To understand the fundamentals of Electric Vehicles (EVs), especially in Indian Context.
- To examine technology associated with each element of EV drive-train;
- To get in to the economics of EVs in India v is-à-v is petrol vehicles.

UNIT-I:

Introduction Overview of Electric Vehicles in India, India's EV program, Charging and Swapping Infrastructure, brief introduction of batteries, Lithium for batteries, EV Subsystems.

UNIT-II:

Vehicle Dynamics: Forces acting when a vehicle move, Aerodynamic drag, Rolling Resistance and Uphill Resistance, Power and Torque to accelerate.

Drive Cycle: Concept of Drive Cycle, Drive Cycles and Energy used per km.

UNIT-III:

EV Power train: Design of EV Drive Train, Introduction to Battery Parameters, Why Lithium Ion Battery? Batteries in Future, Li-Ion Battery Cells, SoH and SoC estimation and Self Discharge, Battery Pack Development, Computation of Effective cost of battery, Charging Batteries.

Fundamentals of EV Battery Pack design: Mechanical, Thermal and Electrical Design, BMS Design of Electric Vehicle.

UNIT-IV:

EV Motors and Controllers: Fundamentals and Design, Understanding Flow of Electricity, Magnetism and Heat, Power and Efficiency, Torque Production, Speed and Back EMF, the d-q Equivalent circuit, Field-oriented Control, Understanding Three phase AC and DC to AC conversion systems, Understanding the thermal design of the motors, Engineering Considerations, Future Frontiers.

UNIT-V:

EV Charging: Introduction, Slow or Fast EV Chargers, Battery Swapping, Standardization and On board Chargers, Public Chargers, Bulk Chargers/Swap Stations, Economics of Public Chargers in context, Analytics and Tools for EV systems.

TEXT BOOKS:

1. Electric Power train- Energy Systems, Power electronics and drives for Hybrid, electric and fuel cell vehicles by John G. Hayes and A. Goodarzi, Wiley Publication

2. MehrdadEhsani,YimiGao,SebastianE.Gay,AliEmadi,ModernElectric,Hybrid Electric and Fuel Cell Vehicles: Fundamentals, Theory and Design, CRC Press, 2004

3. Iqbal Hussein, Electric and Hybrid Vehicles: Design Fundamentals, CRCPress,2003

REFERENCE BOOKS:

1. James Larminie, John Lowry, Electric Vehicle Technology Explained, Wiley,2003

2. Chris Mi, M.Abul Masrur, David Wenzhong Gao, Hybrid Electric Vehicles:Principles and Applications with Practical Perspectives, John Wiley & Sons Ltd., 2011

3. Fundamentals of Electric Vehicles: technology and economics https://onlinecourses.nptel.ac.in/noc20_ee99/previewhttps://archive.nptel.ac.in/courses/ 10 8/106/108106170/

COURSE OUTCOMES:

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

1. Understand the fundamentals of Electric Vehicles.

2. Design of batteries, EV motors and Power electronic controllers for EV systems.Analyze the economics of EV market and E data using Analytical tools.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
III Year B. TECH-II-SEM   **L/T/P/C**
                                                                               3/0/0/3

OPEN ELECTIVE II
(R22A6251) CYBER GOVERNANCE

COURSE OBJECTIVES:
1. To learn Principles of Cyber Security.
2. To learn various types of attacks and the precautions.
3. To gain the knowledge of security and governance measurements
4. To learn the analytical and various security compliance in Cyber Security through
5. governance.
6. To gain the knowledge of various countries Cyber Security Principles and Governance.

UNIT - I

Principles of cyber-security governance, Assessment of cyber security maturity, Theories of governance – introduction, Governance – definitions and typologies, Tools, methods and processes

UNIT - II

Vulnerability management, Threat management, Endpoint management, Intrusion detection and prevention (IDPS), Security incident management, Security operations center (SOC) and related concepts.

UNIT - III

Measurement of governance: Metrics – concepts, Application security metrics, Network security metrics, Security incident metrics, Vulnerability metrics, Service level objectives / agreement (SLO / SLA), NIST metrics

UNIT - IV

Basics of security analytics, Threat intelligence and governance, Data driven security governance, Impact of cognitive security on security governance, Industry specific security compliance

UNIT - V

Cyber security governance India and Other countries, NIST mandates for compliance, Security reporting basics, CISO – role and organization structure

TEXT BOOKS:

1. Hayden, Lance. IT Security Metrics: A Practical Framework for Measuring Security &Protecting Data. McGraw-Hill Education Group, 2010.
2. Jacobs, Jay, and Bob Rudis. Data-driven security: analysis, visualization and dashboards.John Wiley & Sons, 2014
3. Collins, Michael. Network Security Through Data Analysis: From Data to Action. "O'Reilly Media, Inc.", 2017.
4. Jaquith, Andrew. Security metrics: replacing fear, uncertainty, and doubt. PearsonEducation, 2007.

REFERENCE BOOKS:

1. Cybersecurity, Critical Infrastructure. "Framework for Improving Critical Infrastructure Cybersecurity." Framework 1 (2014): 11.

Course Outcomes:

1. Students will be able to understand the basis of cyber-security.
2. Students will be able to know various governance principles
3. Students will learn about various types of attacks and threats in Security
4. Students will gain the knowledge of other countries standards, methods in governance