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	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	R220585	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	EXT
1	R22A0028	Discrete Mathematics	3	0	0	3	40	60
2	R22A1201	Automata 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	R22A0506	Design and Analysis of Algorithms	3	1	0	4	40	60
2	R22A6602	Machine Learning	3	0	0	3	40	60
3	R22A0512	Computer Networks	3	0	0	3	40	60
4	R22A0566 R22A6702 R22A0515 R22A0568	Professional Elective-I 1. Web Programming 2. Introduction to Data Science 3. Image Processing 4. Computer Graphics	3	0	0	3	40	60
5		Open Elective-I	0	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	100	-
		Total	**15**	**1**	**8**	**20**	**460**	**540**

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

III Year B. Tech – II Semester

S.No	Subject Code	SUBJECT	L	T	P	C	MAX. MARKS INT	EXT
1	R22A0518	Big Data Analytics	3	0	0	3	40	60
2	R22A6603	Natural Language Processing	3	0	0	3	40	60
3	R22A6604	Knowledge Representation and Reasoning	3	1	0	4	40	60
4	R22A6609 R22A1206 R22A0519 R22A6612	Professional Elective-II 1. Data Warehousing and Business Intelligence 2. Mobile Application Development 3. Scripting Languages 4. Speech and Video Processing	3	0	0	3	40	60
5	R22Axxxx	Open Elective-II	3	0	0	3	40	60
6	R22A0590	Big Data Analytics Lab	0	0	2	1	40	60
7	R22A6682	Natural Language Processing Lab	0	0	2	1	40	60
8	R22A6693	Application Development-II	0	0	4	2	40	60
		Total	**15**	**0**	**12**	**20**	**460**	**540**

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

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	R22A0513	Full Stack Development	3	0	0	3	40	60
3	R22A6201	Cyber Security Essentials	3	0	0	3	40	60
4	R22A6606 R22A0517 R22A0569 R22A6614	Professional Elective-III 1. Computer Vision 2. Augmented Reality & Virtual Reality 3. Web Security 4. Nature Inspired Computing	3	0	0	3	40	60
5	R22A0521 R22A0532 R22A6607 R22A6214	Professional Elective-IV 1. Cloud Computing 2. Game Theory 3. Expert Systems 4. Database Security	0	0	0	3	40	60
6	R22A0589	Full Stack Development Lab	0	0	2	1	40	60
7	R22A6694	Mini Project	0	0	6	3	100	-
		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	R22A0529 R22A6608 R22A0564 R22A6610	Professional Elective-V 1. Quantum Computing 2. Text Analytics 3. Mobile Computing 4. Social Network Analysis	3	0	0	3	40	60
2	R22A6613 R22A6611 R22A6705 R22A6615	Professional Elective-VI 1. Cognitive Computing 2. Generative AI 3. Data Visualization Techniques 4. Federated Machine Learning	3	0	0	3	40	60
3	R22Axxxx	Innovation, Start-Up & Entrepreneurship	4	0	0	4	40	60
4	R22A6695	Major Project	0	0	20	10	80	120
		Total	**10**	**0**	**20**	**20**	**200**	**300**

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

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(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 writtencommunication
4. Enrich their grammatical accuracy and fluency to be adept at both the active and passiveskills
5. Represent old conventions with a set of the new by professional verbal communicativeability.

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(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.

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(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. Electric Circuits-A.Chakrabarhty,Dhanipat Rai & Sons.
3. Electrical Machines–P.S.Bimbra,Khanna Publishers.
4. "Electronic Devices & Circuits", SpecialEdition–MRCET,McGraw Hill Publications,2017.
5. Integrated Electronics Analog Digital Circuits,Jacob Millman and D.Halkias,McGrawHill.
6. Electronic Devices and Circuits, S.Salivahanan, N.Sureshkumar, McGrawHill.

REFERENCEBOOKS
1. Network analysis by M.Evan Valkenburg,PHI learning publications.
2. Network analysis-N.C Jaganand C.Lakhminarayana,B S publications.
3. Electrical Circuits byA.Sudhakar,Shyammohanand S Palli,McGraw Hill Companies.
4. Electrical Machines by I.J.Nagrath&D.P.Kothari,TataMcGraw-HillPublishers.
5. Electronic Devices and Circuits, K.Lal Kishore, 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

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

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(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

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(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 toProgramming:
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.

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(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

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(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.

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(R22A0581)PROGRAMMING FOR 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.(Usetheformula$s=ut+(1/2)at^2$where u and a are the initial velocity in m/sec(=0) and acceleration in m/sec^2 (=9.8m/s^2)).
b. WriteaCprogram,whichtakestwointegeroperandsandoneoperatorfromtheuser,perform

sthe 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.   WriteaCprogramtofindthesumofindividualdigitsofapositiveintegerandtestgivennumberi spalindrome.

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 nameand 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. Brian W.Kernighan and DennisM.Ritchie,The C Programming Language,PHI.

2. E.Balagurusamy,Computer fundamentals and C,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.

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(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.

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(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.

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(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

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(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	- Small Talks
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

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I Year B. TECH -II-SEM   **L/T/P/C**
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(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 $1/3^{rd}$ and Simpson's $3/8^{th}$ rules.

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

UNIT III: 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.

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

TEXT BOOKS:
2. Engineering Physics by Kshirsagar & Avadhanulu, S. Chand publications.
3. Modern Engineering Physics-Dr K Vijaya Kumar & Dr S Chandralingam, S. Chand Publications.
4. 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**

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(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**

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(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**
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(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**
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(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-Exploration - what is it? - its content and process; 'Natural Acceptance' and Experiential Validation - as the mechanism for self-exploration. Continuous Happiness and Prosperity A 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. AIML **L T P C**

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(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(AIML)   **L/T/ P/ C**

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COURSE OBJECTIVES: This course will enable students to

1. Learn Object Oriented Programming concepts in Python.
2. Illustrate how searching and sorting is performed in Python.
3. Understanding how linear data structures works.
4. Implement Dictionaries and graphs in Python.
5. Understanding how Non linear data structures works.

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
Searching - Linear Search and Binary Search.
Sorting - Bubble Sort, Selection Sort, Insertion Sort, Merge Sort, Quick Sort.

UNIT – III
Data Structures –Definition, Linear Data Structures, Non-Linear Data Structures,
Stacks - Overview of Stack, Implementation of Stack (List), Applications of Stack
Queues: Overview of Queue, Implementation of Queue (List), Applications of Queues, Priority Queues
Linked Lists – Implementation of Singly Linked Lists, Doubly Linked Lists, Circular Linked Lists. Implementation of Stack and Queue using Linked list.

UNIT – IV
Dictionaries: linear list representation, skip list representation, operations - insertion, deletion and searching.
Graphs - Introduction, Directed vs Undirected Graphs, Weighted vs Unweighted Graphs, Representations, Breadth First Search, Depth First Search.

UNIT -V
Trees - Overview of Trees, Tree Terminology, Binary Trees: Introduction, Implementation, Applications. Tree Traversals, Binary Search Trees: Introduction, Implementation, AVL Trees: Introduction, Rotations, Implementation B-Trees and B+ Trees.

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. Interpret the concepts of Object-Oriented Programming as used in Python.
2. Know the usage of   various searching and sorting techniques
3. Implement Linear data structures like stack ,Queue and Linked Lists
4. Illustrate the concepts of Dictionaries and graphs
5. Implement various types of trees.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

B.Tech. II Year I Sem. CSE(AIML)   **L T P C**

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(R22A0561) COMPUTER ORGANIZATION AND ARCHITECTURE

Course Objectives
- The purpose of the course is to introduce principles of computer organization and the basicarchitectural concepts.
- It begins with basic organization, design, and programming of a simple digital computer andintroduces simple register transfer language to specify various computer operations.
- Topics include computer arithmetic, instruction set design, microprogrammed control unit,pipelining and vector processing, memory organization and I/O systems, and multiprocessors

UNIT - I

Digital Computers: Introduction, Block diagram of Digital Computer, Definition of Computer Organization, Computer Design and Computer Architecture.

Register Transfer Language and Micro operations: Register Transfer language, Register Transfer, Busand memory transfers, Arithmetic Micro operations, logic micro operations, shift micro operations, Arithmetic logic shift unit.

Basic Computer Organization and Design: Instruction codes, Computer Registers Computer instructions, Timing and Control, Instruction cycle, Memory Reference Instructions, Input – Output andInterrupt.

UNIT - II

Microprogrammed Control: Control memory, Address sequencing, micro program example, design of control unit.

Central Processing Unit: General Register Organization, Instruction Formats, Addressing modes, DataTransfer and Manipulation, Program Control.

UNIT - III

Data Representation: Data types, Complements, Fixed Point Representation, Floating Point Representation.

Computer Arithmetic: Addition and subtraction, multiplication Algorithms, Division Algorithms, Floating

– point Arithmetic operations. Decimal Arithmetic unit, Decimal Arithmetic operations.

UNIT - IV

Input-Output Organization: Input-Output Interface, Asynchronous data transfer, Modes of Transfer,Priority Interrupt Direct memory Access.

Memory Organization: Memory Hierarchy, Main Memory, Auxiliary memory, Associate Memory, CacheMemory.

UNIT - V

Reduced Instruction Set Computer: CISC Characteristics, RISC Characteristics.

Pipeline and Vector Processing: Parallel Processing, Pipelining, Arithmetic Pipeline, InstructionPipeline, RISC Pipeline, Vector Processing, Array Processor.

Multi Processors: Characteristics of Multiprocessors, Interconnection Structures, Interprocessor arbitration, Interprocessor communication and synchronization, Cache Coherence.

TEXT BOOK:

1. Computer System Architecture – M. Morris Mano, Third Edition, Pearson/PHI.

REFERENCE BOOKS:

1. Computer Organization – Carl Hamacher, Zvonks Vranesic, SafeaZaky, V th Edition, McGrawHill.
2. Computer Organization and Architecture – William Stallings Sixth Edition, Pearson/PHI.
3. Structured Computer Organization – Andrew S. Tanenbaum, 4 th Edition, PHI/Pearson.

Course Outcomes

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

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B.Tech. II Year I Sem. CSE(AIML)   **L T   P C**

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(R22A0505) SOFTWARE ENGINEERING

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 designof 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 simpletesting 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, sequencediagrams, 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, softwarereliability, the ISO 9000 quality standards.

TEXT BOOKS:
1. Software Engineering, A practitioner's Approach- Roger S. Pressman, 6th edition, McGraw HillInternational 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-HillCompanies.
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(AIML)   **L   T   P   C**

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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(AIML)   **L T P C**

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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 program for Linear Search and Binary search

WEEK 5: Write a program to implement Bubble Sort and Selection Sort

WEEK 6: Write a program to implement Merge sort and Quick sort

WEEK 7: Write a program to implement Stacks and Queues.

WEEK 8: Write a program to implement Singly Linked List

WEEK 9: Write a program to implement Doubly Linked List

WEEK 10: Write a python program to implement DFS & BFS graph traversal Techniques.

WEEK 11: Write a program to implement Binary Search Tree

WEEK 12: Write a program to implement B+ Tree

COURSE OUTCOMES:

The students should be able to:
1. Interpret the concepts of Object-Oriented Programming as used in Python.
2. Illustrate how searching and sorting can be done.
3. Implement stacks , queues and linked list.
4. Implement Non-Linear data structures like graphs
5. Solve problems using various trees .

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

(R22A0587) OPERATING SYSTEMS LAB

B.Tech. II Year I Sem. CSE(AIML)   **L   T   P   C**

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OBJECTIVES:

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
d) 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

WEEK 6:

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.

WEEK 7:

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

WEEK 8:

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

WEEK 9:

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

WEEK10:

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

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

(R22A0585) SOFTWARE ENGINEERING LAB

B.Tech. II Year I Sem. CSE(AIML)   **L T P C**

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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 asimple testing report

List of Experiments

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

1. Development of problem statements.
2. Preparation of Software Requirement Specification Document, Design Documents and TestingPhase 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, McGrawHill 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, JohnWiley.
2. Software Engineering principles and practice- Waman S Jawadekar, The McGraw-Hill

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

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(R20A0061) PUBLIC POLICY AND GOVERNANCE

Course objectives:

➢ To make the students understand in-depth analysis of public policy and 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

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B.Tech. II Year II Sem. CSE(AIML)　　　　　　　　　　　**L/T/P/C**
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(R22A0028) Discrete Mathematics

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, 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 and Ordering, Functions.

UNIT - III

Algebraic Structures: Introduction, Algebraic Systems, Semi groups and Monoids, Lattices as Partially Ordered Sets, Boolean Algebra.

UNIT - IV

Elementary Combinatorics: Basics of Counting, Combinations and Permutations, Enumeration of Combinations and Permutations, Enumerating Combinations and Permutations with Repetitions, Enumerating Permutation with Constrained Repetitions, Binomial Coefficient, The Binomial and Multinomial Theorems, The Principle of Exclusion.

UNIT - V

Graph Theory: Basic Concepts, Isomorphism and Subgraphs, Trees and their Properties, Spanning Trees, Directed Trees, Binary Trees, Planar Graphs, Euler's Formula, Multi-graphs and Euler Circuits, Hamiltonian Graphs, Chromatic Numbers, The Four-Color Problem.

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 AND COMPILER DESIGN

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

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Course Objectives

1. To provide an understanding of automata, grammars and language translators.
2. To learn the various techniques used in compiler construction
3. To have insight into the process of semantic analysis
4. To study the various 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 expression to 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 and LL(1)parsing. Bottom up parsing, Handle pruning, LR Grammar Parsing, LALR parsing, parsing ambiguous grammars, YACC programming specification.
Semantics: Syntax directed translation, S-attributed and L-attributed grammars.

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 type expressions , overloading of functions and operations.

UNIT-IV

Run time storage: Storage organization, storage allocation strategies scope access to non local names.
Code optimization: Principal sources of optimization, optimization of basic blocks, peep hole 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.

TEXTBOOKS:

1. IntroductiontoTheoryofcomputation.Sipser,2ndEdition,Thomson.
2. CompilersPrinciples,TechniquesandToolsAho,Ullman,RaviSethi,PearsonEducation.

REFERENCEBOOKS:

1. Modern Compiler Implementation in C-Andrew N.Apple, Cambridge University Press.
2. Lex & yacc–JohnR.Levine, Tony Mason, Doug Brown,O'Reilly
3. Modern Compiler Design-Dick Grune, HenryE.Bal, CarielT.H.Jacobs, Wiley dreamtech.
4. Engineering a Compiler-Cooper & Linda, Elsevier.
5. Compiler Construction, Louden, Thomson.
6. Introduction to Automata Theory Languages and Computation".Hopcroft H.E.and Ullman J.D.Pearson Education.

COURSEOUTCOMES:

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

- 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.
- Build various LR Parsing tables for a given grammar.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

(R22A0504) DATABASE MANAGEMENT SYSTEMS

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

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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-Buffer Management–Failure with loss of non volatile storage.

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(AIML)   **L   T   P   C**

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OBJECTIVES:

1. To Learn the significance of intelligence systems.

2. To understand the concepts of heuristic search techniques & logic programming.

3. To know the various knowledge representation techniques

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 BOOK:

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

REFERENCE BOOKS:

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

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

Course Outcomes:

1. Ability to formulate an efficient problem space for a problem expressed in natural language.

2. Select a search algorithm for a problem and estimate its time and space complexities.

3. Possess the skill for representing knowledge using the appropriate technique for a given problem.

4. Possess the ability to apply AI techniques to solve problems of game playing

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

(R22A0507) OBJECT ORIENTED PROGRAMMING THROUGH JAVA

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

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COURSE OBJECTIVES:

1.　　To understand object oriented principles like abstraction, encapsulation, inheritance, and 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, preventing 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 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.   ObjectOrientedProgrammingthroughJava,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(AIML)

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COURSE OBJECTIVES:

1. Introduce ER data model, database design and normalization
2. Learn SQL basics for data definition and data manipulation
3. To enable students to use Non-Relational DBMS and understand the usage of document oriented and distributed databases.
4. To enable the students to use TCL and DCL Commands and perform all states of Transaction operations.
5. To familiarize issues of concurrency control and transaction management

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, 3 rd 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.

COURSE OUTCOMES:

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

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

(R22A0586) OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB

B.Tech. II Year II Sem. CSE(AIML)   L T P C
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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 overstructured 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(AIML) L T P C

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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, Frenchprogram is introduced to develop the linguistic and communicative skills of engineering students andto 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 in their vocation
3. To form simple sentences that aids in day-to-day communication
4. To prepare the students towards DELF A1
5. To develop in the student an interest towards learning languages.

UNIT - I:

Speaking:Introduction to the French language and culture –Salutations - French alphabet - Introducing people
Writing:Understand and fill out a form
Grammar:The verbs "to be ' and "to have '' in the present tense of the indicative Vocabulary: The numbers from 1 to 20 - Professions- Nationalities

UNIT - II:

Speaking:Talk about one's family – description of a person - express his tastes and preferences
- express possession - express negation Writing:Write and understand a short message
Grammar:Nouns (gender and number) - Articles - The–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 the capacity - compare (adjective) - speak at the restaurant / in the shops

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

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

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

UNIT - V

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

Writing: Descriptions

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

Vocabulary: Seasons – Holidays-The city– Furniture

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

REFERENCE BOOKS

1.   Apprenons le 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 Eveline
   Charvier-Berman, Anne C. Cummings.

COURSE OUTCOMES

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

   French is the official language.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

B.Tech. III Year I Sem. CSE(AIML)

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(R22A0506)DESIGN AND ANALYSIS OF 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-queens 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'stheorem.

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.

MRCET CAMPUS AUTONOMOUS INSTITUTION-UGC, GOVT.OF INDIA

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

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(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 Regression. Cost Function, Gradient Descent, 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**
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(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.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

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

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(R22A0566)WEB PROGRAMMING
(Professional Elective – I)

Course Objectives:
1. Understand the technologies used in Web Programming.
2. Know the importance of object-oriented aspects of Scripting.
3. Understand creating database connectivity using JDBC.
4. Learn the concepts of web-based application using sockets.

UNIT – I Client side Programming
HTML- Basic Tags- List, Tables, Images, Forms, Frames, CSS
JAVA Script -Web page Designing using HTML, Scripting basics- Client side and server side scripting. Java Script Object, names, literals, operators and expressions- statements and features- events - windows -documents - frames - data types - built-in functions- Browser object model - Verifying forms.- HTML5-CSS3- HTML 5 canvas - Web site creation using tools.

UNIT – II JAVA
Introduction to object-oriented programming-Features of Java – Data types, variables and arrays – Operators – Control statements – Classes and Methods – Inheritance. Packages and Interfaces – Exception Handling – Multithreaded Programming – Input/Output – Files – Utility Classes – StringHandling.

UNIT – III JDBC
JDBC Overview – JDBC implementation – Connection class – Statements - Catching Database
Results, handling database Queries. Networking– InetAddress class – URL class- TCP sockets – UDP sockets, Java Beans –RMI.

UNIT – IV APPLETS
Java applets- Life cycle of an applet – Adding images to an applet – Adding sound to an applet. Passing parameters to an applet. Event Handling. Introducing AWT: Working with Windows Graphics and Text. Using AWT Controls, Layout Managers and Menus. Servlet – life cycle of a servlet. The Servlet API, Handling HTTP Request and Response, using Cookies, Session Tracking. Introduction to JSP.

UNIT – V XML AND WEB SERVICES
Xml – Introduction-Form Navigation-XML Documents- XSL – XSLT- Web services-UDDI WSDL-Javaweb services – Web resources.

TEXT BOOKS:
1. Harvey Deitel, Abbey Deitel, Internet and World Wide Web: How To Program 5th Edition.
2. Herbert Schildt, Java - The Complete Reference, 7th Edition. Tata McGraw- Hill Edition.

3. Michael Morrison XML Unleashed Tech media SAMS.

REFERENCE BOOKS:
1. John Pollock, Javascript - A Beginners Guide, 3rd Edition –- Tata McGraw-Hill Edition.
2. Keyur Shah, Gateway to Java Programmer Sun Certification, Tata McGraw Hill, 2002.

Course Outcomes:
1. Design web pages.
2. Use technologies of Web Programming.
3. Apply object-oriented aspects to Scripting.
4. Create databases with connectivity using JDBC.
5. Build web-based application using sockets.

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

3/0/0/3

(R22A6702)Introduction to Data Science
(Professional Elective – I)

COURSE OBJECTIVES:

The course will enable the students to:

1. Understand of the data operations
2. Here an overview of simple statistical models and the basics of machine learning techniques of regression.
3. Understand good practices of data science
4. Learn tools such as python, IDE
5. Understand the basics of the Supervised learning

UNIT-1

Introduction, Toolboxes: Python, fundamental libraries for data Scientists. Integrated development environment (IDE). Data operations: Reading, selecting, filtering, manipulating, sorting, grouping, rearranging, ranking, and plotting.

UNIT-2

Descriptive statistics, data preparation. Exploratory Data Analysis data summarization, data distribution, measuring asymmetry. Sample and estimated mean, variance and standard score. Statistical Inference frequency approach, hypothesis testing using confidence intervals, using p-values

UNIT-3

Supervised Learning: First step, learning curves, training-validation and test. Learning models generalities, support vector machines, random forest. Examples

UNIT-4

Regression analysis, Regression: linear regression simple linear regression, multiple & Polynomial regression, Sparse model. Unsupervised learning, clustering, similarity and distances, quality measures of clustering, case study.

UNIT-5

Network Analysis, Graphs, Social Networks, centrality, drawing centrality of Graphs, PageRank, Ego-Networks, community Detection

TEXT/REFERENCES BOOK:

1. Introduction to Data Science a Python approach to concepts, Techniques and Applications, Igual, L;Seghi', S. Springer, ISBN:978-3-319-50016-4
2. Data Analysis with Python A Modern Approach, David Taieb, Packt Publishing, ISBN- 9781789950069
3. Python Data Analysis, Second Ed., Armando Fandango, Packt Publishing, ISBN: 9781787127487

REFERENCES

1.　　Jojo Moolayil, "Smarter Decisions : The Intersection of IoT and Data Science", PACKT, 2016.
2.　　Cathy O'Neil and Rachel Schutt , "Doing Data Science", O'Reilly, 2015.
3.　　Data Science & Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data Published by John Wiley & Sons, Inc

COURSE OUTCOMES:

The students should be able to:

1. Describe what Data Science is and the skill sets needed to be a data scientist

2. Explain the significance of exploratory data analysis (EDA) in data science

3. Construct the supervised learning, SVM

4. Apply basic machine learning algorithms (Linear Regression)

5. Explore the Network Analysis like PageRank

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                                                                               3/0/0/3

Professional Elective-I
(R22A0515) Image Processing

COURSE OBJECTIVES:

1. Provide a theoretical and mathematical foundation of fundamental Digital Image Processing concepts.
2. Provides the knowledge of image acquisition; sampling and quantization.
3. Preprocessing and enhancement.
4. Image restoration, and segmentation.
5. Knowledge of different image compression techniques.

UNIT - I
Digital Image Fundamentals: Digital Image through Scanner, Digital Camera. Concept of Gray Levels, Gray Level to Binary Image Conversion, Sampling and Quantization, Relationship between Pixels. Imaging Geometry. 2D Transformations-DFT, DCT, KLT and SVD.

UNIT - II
Image Enhancement in Spatial Domain Point Processing, Histogram Processing, Spatial Filtering, Enhancement in Frequency Domain, Image Smoothing, Image Sharpening.

UNIT - III
Image Restoration Degradation Model, Algebraic Approach to Restoration, Inverse Filtering, Least Mean Square Filters, Constrained Least Squares Restoration, Interactive Restoration.

UNIT - IV
Image Segmentation Detection of Discontinuities, Edge Linking and Boundary Detection, Thresholding, Region Oriented Segmentation.

UNIT - V
Image Compression Redundancies and their Removal Methods, Fidelity Criteria, Image Compression Models, Source Encoder and Decoder, Error Free Compression, Lossy Compression.

TEXT BOOKS:
1. Digital Image Processing: R.C. Gonzalez & R. E. Woods, Addison Wesley/ Pearson Education, 2 Ed,2004.

REFERENCES:
1. Fundamentals of Digital Image Processing: A. K. Jain ,PHI.
2. Digital Image Processing using MAT LAB: Rafael C. Gonzalez, Richard E. Woods, Steven L. Eddins: Pearson Education India,2004.
3. Digital Image Processing: William K. Pratt, John Wilely, 3 rdEdition,2004.

4. Image Processing, Analysis and Machine Vision, Second Edition, Milan Sonka, aclav Hlavac and Roger Boyle, Cengage learning.
5. Digital Image Processing, W.K.Pratt, 4th edition John wiley &sons.
6. Digital Image Processing, S.Jayaraman, S.Esakkirajan, T.Veera kumar, TMH.
7. Digital Image Processing, S.Sridhar, Oxford University Press

COURSE OUTCOMES:
1. Understand the theoretical and mathematical foundations of Digital Image Processing.
2. Explain different image acquisition, sampling and quantization methods;
3. Perform Preprocessing and image enhancement operations on given images
4. Apply different Image restoration, and segmentation techniques.
5. Perform different image compression techniques.

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(R22A0568)COMPUTER GRAPHICS
(Professional Elective – I)

Course Objectives
- Provide the basics of graphics systems including Points and lines, line drawing algorithms, 2D,
- 3D objective transformations

UNIT - I
Introduction: Application areas of Computer Graphics, overview of graphics systems, video-display devices, raster-scan systems, random-scan systems, graphics monitors and work stations and input devices
Output primitives: Points and lines, line drawing algorithms (DDA and Bresenham's Algorithm) circle generating algorithms and ellipse - generating algorithms
Polygon Filling: Scan-line algorithm, boundary-fill and flood-fill algorithms

UNIT - II
2-D geometric transformations: Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms, transformations between coordinate systems
2-D viewing: The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, clipping operations, point clipping, Line clipping-Cohen Sutherland algorithms, Polygon clipping-Sutherland Hodgeman polygon clipping algorithm.

UNIT - III
3-D object representation: Polygon surfaces, quadric surfaces, spline representation, Hermite curve, Bezier curve and B-Spline curves, Bezier and B-Spline surfaces, Polygon rendering methods, color models and color applications.

UNIT - IV
3-D Geometric transformations: Translation, rotation, scaling, reflection and shear transformations, composite transformations.
3-D viewing: Viewing pipeline, viewing coordinates, projections, view volume and general projection transforms and clipping.

UNIT - V
Computer animation: Design of animation sequence, general computer animation functions, raster animations, computer animation languages, key frame systems, motion specifications.
Visible surface detection methods: Classification, back-face detection, depth-buffer method, BSPtree method, area sub-division method and octree method.

TEXT BOOKS:
1. "Computer Graphics C version", Donald Hearn and M. Pauline Baker, Pearson Education

REFERENCE BOOKS:

1. Procedural elements for Computer Graphics, David F Rogers, Tata Mc Graw hill, 2nd edition.
2. Principles of Interactive Computer Graphics", Neuman and Sproul, TMH.
3. Principles of Computer Graphics, Shalini Govil, Pai, 2005, Springer.
4. "Computer Graphics Principles & practice", second edition in C, Foley, Van Dam, Feiner and Hughes, Pearson Education.
5. Computer Graphics, Steven Harrington, TMH.

Course Outcomes

1. Explore applications of computer graphics
2. Understand 2D, 3D geometric transformations and clipping algorithms
3. Understand 3D object representations, curves, surfaces, polygon rendering methods, color models
4. Analyze animation sequence and visible surface detection methods

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B.Tech. III Year I Sem. CSE(AIML)   **L / T/ P/ C**
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(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
                ii. 50
                iii. 100
                iv. 200
                v.   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

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(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

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                                                                         3/0/0/3

(R22A0518) 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

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

3/0/0/3

(R22A6603)NATURAL LANGUAGE PROCESSING

COURSE OBJECTIVES:

1. Introduce to some of the problems and solutions of NLP and their relation to linguistics and statistics.
2. To understand linguistic phenomena and learn to model them with formal grammars.
3. To understand and carry out proper experimental methodology for training and evaluating empirical NLP systems.
4. To learn how to manipulate probabilities, construct statistical models over strings and trees
5. To estimate parameters using supervised and unsupervised training methods.
6. To design, implement, and analyze NLP algorithms. Able to design different language modeling Techniques.

UNIT –I:

Natural Language processing (NLP) : Introduction,Applications or Use cases of NLP, Components of NLP, Steps in NLP, Finding the Structure of Words: Words and Their Components, Lexemes, Morphemes, Morphology, Problems in morphological processing, Typology, Morphological Typology, **Natural Language Processing with python NLTK package (Text Preprocessing Tasks):** Word Tokenization, Sentence Tokenization, Filtering Stop words, Stemming, Tagging Parts of Speech, Lemmatization, Chunking, Chinking, Named Entity Recognition.

UNIT–II:

Syntax Analysis: Parsing Natural Language, Tree banks: A Data-Driven Approach to Syntax, **Representation of Syntactic Structure:** Syntax Analysis using Dependency Graph, Syntax Analysis using Phrase Structure Trees, **Parsing Algorithms:** Shift Reduce Parsing, Hyper Graphs and Chart Parsing (CYK Parsing), **Models for ambiguity Resolution in Parsing**: Probabilistic Context Free Grammar, Generative Models, Discriminative models for Parsing.

UNIT-III:

Language Modeling: Introduction, N-Gram Models, Language Model Evaluation, Parameter Estimation, Language Model Adaptation, Types of Language Models, Language-Specific ModelingProblems.
Word Embedding techniques: Bag of words (BOW), Continuous Bag of Words (CBOW), Term Frequency and Inverse Document Frequency (TF-IDF).

UNIT–IV:

Semantic Parsing: Introduction, Semantic Interpretation, System Paradigms, Word Sense Systems,

Software.

Word Embedding Techniques for semantic analysis: Word2Vec, Global Vector for word representation (GloVe), Bidirectional encoder representations from transformers (BERT).

UNIT–V:

Predicate- Argument Structure, Meaning Representation Systems, Software.

Discourse Processing: Cohesion, Reference Resolution, Discourse Cohesion and Structure.

TEXTBOOKS:

1.   MultilingualnaturalLanguageProcessingApplications:FromTheorytoPractice–Daniel M.Bikel and Imed Zitouni, Pearson Publication.

2.   Speech and Natural Language Processing-Daniel Jurafsky& JamesH Martin,   Pearson Publications.

REFERENCEBOOKS:

1.   Natural Language Processing and Information Retrieval: Tanvier Siddiqui, U.S.Tiwary.

COURSEOUTCOMES:

1.   Show sensitivity to linguistic phenomena and an ability to model them with formal grammars.

2.   Understand and carry out proper experimental methodology for training and evaluating empirical NLP systems.

3.   Able to manipulate probabilities, construct statistical models over strings and trees

4.   Will be able to estimate parameters using supervised and unsupervised training methods.

5.   Able to design, implement, and analyze NLP algorithms. Able to design different language modeling Techniques.

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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 a 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, 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.

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

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(R22A6609) DATA WAREHOUSING AND BUSINESS INTELLIGENCE
(Professional Elective – II)

Course Objectives:

1. This course is concerned with extracting data from the information systems that deal with the day-to-day operations and transforming it into data that can be used by businesses to drive high-level decision making

2. Students will learn how to design and create a data warehouse, and how to utilize the process of extracting, transforming, and loading (ETL) data into data warehouses.

UNIT - I : Data Warehouse, Data Warehouse Modelling, OLAP operations, Data Qube Computation methods

UNIT - II : Business Intelligence Introduction – Definition, Leveraging Data and Knowledge for BI, BI Components, BI Dimensions, Information Hierarchy, Business Intelligence and Business Analytics. BI Life Cycle. Data for BI - Data Issues and Data Quality for BI.

UNIT – III: BI Implementation - Key Drivers, Key Performance Indicators and Performance Metrics, BI Architecture/Framework, Best Practices, Business Decision Making, Styles of BI-vent-Driven alerts-A cyclic process of Intelligence Creation. The value of Business Intelligence-Value driven and Information use.

UNIT - IV : Advanced BI – Big Data and BI, Social Networks, Mobile BI, emerging trends, Description of different BI-Tools (Pentaho, KNIME)

UNIT – V: Business Intelligence and integration implementation-connecting in BI systems- Issues of legality Privacy and ethics- Social networking and BI.

TEXT BOOKS:

1. Data Mining – Concepts and Techniques - JIAWEI HAN & MICHELINE KAMBER, Elsevier, 4th Edition.

2. Rajiv Sabherwal "Business Intelligence" Wiley Publications, 2012.

REFERENCE BOOKS:

1. Efraim Turban, Ramesh Sharda, Jay Aronson, David King, Decision Support and Business Intelligence Systems, 9th Edition, Pearson Education, 2009.

2. David Loshin, Business Intelligence - The Savy Manager's Guide Getting Onboard with Emerging IT, Morgan Kaufmann Publishers, 2009.

3. Philo Janus, Stacia Misner, Building Integrated Business Intelligence. Solutions with SQL Server, 2008 R2 & Office 2010, TMH, 2011. R22 B.Tech. CSE (AI and ML) Syllabus JNTU Hyderabad Page 97 of 147

4. Business Intelligence Data Mining and Optimization for decision making [Author: Carlo-Verellis] [Publication: (Wiley)]

5. Data Warehousing, Data Mining & OLAP- Alex Berson and Stephen J. Smith- Tata McGrawHill Edition, Tenth reprint 2007

6. Building the Data Warehouse- W. H. Inmon, Wiley Dreamtech India Pvt. Ltd.

7. Data Mining Introductory and Advanced topics – Margaret H Dunham, PEA.

Course Outcomes:

- Understand architecture of data warehouse and OLAP operations.

- Understand Fundamental concepts of BI

- Application of BI Key Performance indicators

- Understand Utilization of Advanced BI Tools and their Implementation.

- Implementation of BI Techniques and BI Ethics.

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3/0/0/3

(R22A1206) Mobile Application Development
(Professional Elective – II)

Course Objectives:

1. To understand the basics of Android Operating System
2. To illustrate the essentials of mobile app development using Android Operating System.
3. To understand the core modules like designing, developing, testing, signing, packaging which helps in distributing high-quality mobile apps.
4. To illustrate mobile app development using Android as the development platform.
5. To demonstrate their ability to deploy database to mobile devices using Android

UNIT-I

Introduction to Android Operating System : Android OS and Features–Android development framework , Installing and running applications on Android Studio, Creating AVDS , Types of Android Application , Creating Activities, Activity Life Cycle, Activity states, monitoring state changes

UNIT-II

Android application components– Android Manifest file, Gradle, Externalizing resources like Simple Values , Drawable Layouts, Menus, etc.,

Building User Interfaces: Fundamental Android UI design, Form Widgets, Layouts – Linear, Relative, Grid and Table Layouts. User Interface (UI)Components.

UNIT-III

Fragments – Creating fragments, Lifecycle of fragments, Fragment states, adding fragments to Activity, adding, removing and replacing fragments with fragment transactions, interfacing between fragments and Activities.

UNIT-IV

Intents and Broadcasts: Using intents to launch Activities, Types of Intents, passing data to Intents, getting results from Activities, Broadcast Receivers – Using Intent filters to service implicit Intents, Resolving Intent filters.

UNIT-V

Database: Introduction to SQLite database, creating and opening a database, creating tables, inserting retrieving and deleting data.

TEXTBOOKS:

1. Professional Android 4 Application Development, RetoMeier,WileyIndia,(Wrox),2012
2. Android Application Development for Java Programmers, James C Sheusi, Cengage Learning,2013

REFERENCEs:

1. Beginning Android 4 Application Development, Wei-Meng Lee, Wiley India (Wrox),2013
2. Android Application Development (with Kitkat Support), Black Book, PradeepKothari,2014,Dreamtech Press publisher, Kogent Learning Inc.,2014
3. Android Programming: Pushing the Limits, Erik Hellman, 1st Edition,WileyPublications,2014

CourseOutcomes:

1. Install and configure Android studio
2. Analyze architecture of android and current trends in mobile operating systems.
3. Apply suitable software tools and APIs for the development of User Interface for a particular mobile application.
4. Apply intents and broadcast receivers in android application.
5. Develop and design apps for mobile devices using SQLite Database.

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Professional Elective-II

(R22A0519) Scripting Languages

COURSE OBJECTIVES:

Student should be able:

1. To study the basics of scripting languages like Java script, Perl, PHP and Ruby

2. To understand the requirements of Scripting Languages

3. To identify the uses of Scripting Languages

4. To introduce in-depth knowledge of programming features of Perl and PHP.

5. To state the implementation and applications of Scripting.

UNIT- I

Introduction to Scripts and Scripting Languages: Scripts and Programs, Uses for Scripting Languages, Web Scripting.

JavaScript: Variables, Data Types, Operators, Conditional statements, Loops, Arrays, Functions, Objects-Predefined objects, Accessing objects, Object Methods.

UNIT- II

JavaScript programming of reactive web pages elements: JavaScript Events- Mouse events, Keyboard events, Form events, window events, Event handlers, Frames, Form object, JavaScript Form Validation.

UNIT- III

PERL : Data Types, Variables, Scalars, Operators, Conditional statements ,Loops, Arrays , Strings , Hashes , Lists , Built-in Functions, Pattern matching and regular expression operators.

UNIT -IV

PHP : Data Types, Variables, Operators, Conditional statements ,Loops ,Arrays - Indexed Array, Associative Array, String Functions, Functions- Parameterized Function, Call By Value, Call By Reference , File Handling, PHP Form handling.

UNIT- V

Ruby : Introduction to Ruby, Feature of Ruby, Data types, Variables, Operators, Conditional statements, Loops, , Arrays, Strings, Hashes, working on Methods, Blocks, and Modules.

TEXT BOOKS:

1. The World of Scripting Languages, David Barron, Wiley Publications.

2. Learning PHP, MySQL, JavaScript, CSS & HTML5: A Step-by-Step Guide to Creating Dynamic Websites 3rd

Edition, O'Reilly Publications

REFERENCE BOOKS:

1. The Ruby Programming Language, David Flanagan and Yukihiro Matsumoto, O'Reilly Publications.
2. Beginning JavaScript with Dom scripting and AJAX, Russ Ferguson, Christian Heilmann, Apress.
3. Programming Perl, Larry Wall, T. Christiansen and J. Orwant, O'Reilly, SPD.
4. Open Source Web Development with LAMP using Linux Apache, MySQL, Perl and PHP, J. Lee and B. Ware (Addison Wesley) Pearson Education.

COURSE OUTCOMES:

The students will be able:

1. Comprehend the differences between typical scripting languages and typical system and application programming languages.
2. To implement the design of programs for simple applications.
3. To write and apply Perl & PHP scripts.
4. Gain knowledge of the strengths and weakness of Perl, and Ruby.
5. To create software systems using scripting languages such as Perl, PHP, and Ruby.

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(R22A6612)SPEECH AND VIDEO PROCESSING
(Professional Elective – II)

Course Objectives:
1. To make students understand speech and video processing techniques

UNIT - I
Speech processing concepts: The speech production mechanism, Discrete time speech signals, Pole-Zero modeling of speech, relevant properties of the fast Fourier transform for speech recognition, convolution, linear and non linear filter banks, spectral estimation of speech using DFT. Linear Prediction analysis of speech.

UNIT - II
Speech recognition: Feature extraction for speech, static and dynamic feature for speech recognition, MFCC, LPCC, Distance measures, vector quantization models, Gaussian Mixture model, HMM.

UNIT - III
Multi-Dimensional Signals and Systems: Multi-Dimensional Signals, Multi-Dimensional Transforms, Multi-Dimensional Systems, Multi-Dimensional Sampling Theory, Sampling Structure Conversion Digital Images and Video: Human Visual System and Color, Digital Video

UNIT - IV
Motion Estimation: Image Formation, Motion Models, 2D Apparent-Motion Estimation, Differential Methods, Matching Methods, Nonlinear Optimization Methods, Transform-Domain Methods, 3D Motion and Structure Estimation

UNIT - V
Video Segmentation and Tracking
Image Segmentation, Change Detection, Motion Segmentation, Motion Tracking, Image and Video Matting, Performance Evaluation

TEXT BOOKS:
1. Fundamentals of Speech recognition – L. Rabiner and B. Juang, Prentice Hall signal processing series
2. Digital Video processing, A Murat Tekalp, 2nd edition,Prentice Hall.

REFERENCE BOOKS:
1. Discrete-time speech signal processing: principles and practice, Thomas F. Quatieri, Coth.
2. Video Processing and Communications, Yao Wang, J. Osternann and Qin Zhang, Pearson

Education

3. "Speech and Audio Signal Processing", B.Gold and N. Morgan, Wiley.

4. "Digital image sequence processing, Compression, and analysis", Todd R. Reed, CRC Press

5. "Handbook of Image and Video processing", Al Bovik, Academic press, second Edition.

Course Outcomes:

- Describe the mechanisms of human speech production systems and methods for
- speech feature extraction.
- Understand basic algorithms of speech analysis and speech recognition.
- Explain basic techniques in digital video processing, including imaging characteristics
- and sensors.
- Apply motion estimation and object tracking algorithms on video.

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(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.

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(R22A6682) NATURAL LANGUAGE PROCESSING LAB

Course Objectives:

1.   Be able to discuss the current and likely future performance of several NLP applications;
2.   Be able to describe briefly a fundamental technique for processing language for several subtasks, such as morphological processing.
3.   Implement parsing, word sense disambiguation and etc.;
4.   understand how these techniques draw on and relate to other areas of computer science;
5.   Understand the basic principles of designing and running an NLP experiment.

LIST OF EXPERIMENTS:

WEEK 1

Implement latent semantic indexing. Work on British National Corpus. Link: http://www.natcorp.ox.ac.uk/ Construct the term document incidence matrix for this corpus. Now do the SVD using some inbuilt function/code/library. There is facility available in mat lab. You can do the assignment in any language. Java also has some package for the same.

WEEK-2

Use the Stanford named Entity recognizer to extract entities from the documents. Use it programmatically and output for each document which named entities it contains and of which type. You may first try the command line or demo version.

WEEK-3

Choose any corpus available on the internet freely. For the corpus, for each document, count how many times each stop word occurs and find out which are the most frequently occurring stop words. Further, calculate the term frequency and inverse document frequency as (Log of no of documents / no of documents having the term). The motivation behind this is basically to find out how important a document is to a given query. For e.g.: If the query is say: "The brown crow". "The" is less important. "Brown" and "crow" are relatively more important. Since "the" is a more common word, its tf will be high. Hence we multiply it by idf, by knowing how common it is to reduce its weight.

WEEK-4

Use lucene for indexing the documents in a corpus. Choose any corpus available on the internet freely. Please get your corpus approved from me before working on it. Fire a query and get the output as to whether the term is present in the document or not present in the document i.e. in other words documents containing the term as output.

WEEK 5

Read what is N-gram retrieval. Generate character 5 grams from the tokens extracted out of a corpus. Choose any corpus available on the internet freely. Generate a log-log plot of frequency vs rank order. Do the 5-grams follow Zipf's law? If so, what is the approximate value of alpha?

WEEK 6

Suppose that we are designing a program to simulate the search in a dictionary. Words appear with different frequencies, however and it may be the case that a frequently used word which is in the stop list like "the" appear far from the root if they are sorted lexicographically while a rarely used word such as consciousness appears near the root. We want that the words that occur frequently in the text to be placed nearer to the root. Moreover, there may be words in the dictionary for which there is no definition. Organize an optimal binary search tree that simulates the storage and search of words in a dictionary.

WEEK 7

Study and use the Stanford Part of speech tagger on a suitable corpus available freely. The corpus should be of decent size and get it approved before proceeding with experiments.

WEEK 8

Solve the following text classification problem: Given a sentence identify whether the preposition used in it has a spatial sense or not. Use appropriate features.

WEEK 9

You are given sets of questions in pairs. You have to identify whether the two questions are semantically same or not using supervised learning. Contact me for the dataset for this problem.

WEEK 10

Choose any corpus available on the internet freely. Not necessary to create an inverted index. Just generate the vocabulary. Download and run Porter Stemmer. Execute the stemmer over terms in the vocabulary to create sets of equivalent terms, all of which stem to the same root form. Which set is largest? Identify a few sets that are inappropriately conflated by the stemmer.

COURSE OUTCOMES

1.   Student will be able to implement LSI,NER

2.   Student will be able to implement TD-IDF method and Ngram models

3.   Develop a Part of speech tagger.

4.   Student can able classify the text based on part of speech tagger

5.   Student can able to implement several NLP applications

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(R22A6605) DEEP LEARNING

COURSE OBJECTIVES:

1. To understand the basic concepts and techniques of Deep Learning and the need of Deep Learning techniques in real-world problems
2. To understand CNN algorithms and the way to evaluate performance of the CNN architectures.
3. To apply RNN and LSTM to learn, predict and classify the real-world problems in the paradigms of Deep Learning.
4. To understand, learn and design GANs for the selected problems.
5. To understand the concept of Auto-encoders and enhancing GANs using auto-encoders.

UNIT-I:

INTRODUCTION TO DEEP LEARNING: Historical Trends in Deep Learning, Why DL is Growing, Artificial Neural Network, Non-linear classification example using Neural Networks: XOR/XNOR, Single/Multiple Layer Perceptron, Feed Forward Network, Deep Feed- forward networks, Stochastic Gradient –Based learning, Hidden Units, Architecture Design, Back- Propagation.

UNIT-II:

CONVOLUTION NEURAL NETWORK (CNN): Introduction to CNNs and their applications in computer vision, CNN basic architecture, Activation functions-sigmoid, tanh, ReLU, Leaky ReLU, Softmax layer, Types of pooling layers, Training of CNN in TensorFlow, various popular CNN architectures: VGG, Google Net, ResNet etc, Dropout, Normalization, Data augmentation.

UNIT-III

RECURRENT NEURAL NETWORK (RNN): Introduction to RNNs and their applications in sequential data analysis, Back propagation through time (BPTT), Vanishing Gradient Problem, gradient clipping Long Short Term Memory (LSTM) Networks, Gated Recurrent Units, Bidirectional LSTMs, Bidirectional RNNs.

UNIT- IV

GENERATIVE ADVERSARIAL NETWORKS (GANS): Generative models, Concept and principles of GANs, Architecture of GANs (generator and discriminator networks), Comparison between discriminative and generative models, Generative Adversarial Networks (GANs), Applications of GANs

UNIT- V

AUTO-ENCODERS: Auto-encoders, Architecture and components of auto-encoders (encoder and decoder), Training an auto-encoder for data compression and reconstruction, Relationship between Autoencoders and GANs, Hybrid Models: Encoder-Decoder GANs.

TEXT BOOKS:

1. Deep Learning : An MIT Press Book by Ian Goodfellow and Yoshua Bengio Aaron Courville.
2. Michael Nielson,Neural Networks and Deep Learning,Determination Press,2015.
3. Satish kumar,Neural networks:A classroom Approach,Tata McGraw-Hill Education,2004

REFERENCES:

1. Deep Learning with Python, Francois Chollet, Manning publications 2018
2. Advanced Deep Learning with Keras, Rowel Atienza, PACKT Publications 2018

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(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. Design and Analyse real time web applications.

4. 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: Web development Basics - HTML & Web servers Shell - UNIX CLI Version control - Git & Github HTML, CSS

UNIT - II

Frontend Development: Javascript basics OOPS Aspects of JavaScript Memory usage and Functions in JS AJAX for data exchange with server jQuery Framework jQuery events, UI components etc. JSON data format.

UNIT - III

REACT JS: Introduction to React React Router and Single Page Applications React Forms, Flow Architecture and Introduction to Redux More Redux and Client-Server Communication

UNIT - IV

Java Web Development: JAVA PROGRAMMING BASICS, Model View Controller (MVC) Pattern MVC Architecture using Spring RESTful API using Spring Framework Building an application using Maven

UNIT - V

Databases & Deployment: Relational schemas and normalization Structured Query Language (SQL) Data persistence using Spring JDBC Agile development principles and deploying application in Cloud

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
2. Learning PHP, MySQL, JavaScript, CSS & HTML5: A Step-by-Step Guide to Creating Dynamic Websites by Robin Nixon
3. Full Stack JavaScript: Learn Backbone.js, Node.js and MongoDB. Copyright © 2015 BY AZAT MARDAN

REFERENCE BOOKS:

1. Full-Stack JavaScript Development by Eric Bush.
2. Mastering Full Stack React Web Development Paperback – April 28, 2017 by Tomasz Dyl , Kamil Przeorski , Maciej Czarnecki

COURSE OUTCOMES:

1. Develop a fully functioning website and deploy on a web server.

2. Gain Knowledge about the front end and back end Tools

3. Find and use code packages based on their documentation to produce working results in a project.

4. Create web pages that function using external data.

5. Implementation of web application employing efficient database access.

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(R22A6201) CYBER SECURITY ESSENTIALS

Course objectives:

1. To understand various types of cyber-attacks and cyber-crimes

2. To learn threats and risks within context of the cyber security

3. To have an overview of the cyber laws & concepts of cyber forensics

 4. To study the defensive techniques against these attacks

5. To understand various cyber security privacy issues

UNIT - I Introduction to Cyber Security: Basic Cyber Security Concepts, layers of security, Vulnerability, threat, Harmful acts, Internet Governance – Challenges and Constraints, Computer Criminals, CIA Triad, Assets and Threat, motive of attackers, active attacks, passive attacks, Software attacks, hardware attacks, Cyber Threats-Cyber Warfare, Cyber Crime, Cyber terrorism, Cyber Espionage, etc., Comprehensive Cyber Security Policy.

 UNIT - II Cyberspace and the Law & Cyber Forensics: Introduction, Cyber Security Regulations, Roles of International Law. The INDIAN Cyberspace, National Cyber Security Policy. Introduction, Historical background of Cyber forensics, Digital Forensics Science, The Need for Computer Forensics, Cyber Forensics and Digital evidence, Forensics Analysis of Email, Digital Forensics Lifecycle, Forensics Investigation, Challenges in Computer Forensics

UNIT - III Cybercrime: Mobile and Wireless Devices: Introduction, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit card Frauds in Mobile and Wireless Computing Era, Security Challenges Posed by Mobile Devices, Registry Settings for Mobile Devices, Authentication service Security, Attacks on Mobile/Cell Phones, Organizational security Policies and Measures in Mobile Computing Era, Laptops.

UNIT- IV Cyber Security: Organizational Implications: Introduction, cost of cybercrimes and IPR issues, web threats for organizations, security and privacy implications, social media marketing: security risks and perils for organizations, social computing and the associated challenges for organizations

UNIT - V Privacy Issues: Basic Data Privacy Concepts: Fundamental Concepts, Data Privacy Attacks, Data linking and profiling, privacy policies and their specifications, privacy policy languages, privacy in different domains- medical, financial, etc

TEXT BOOKS:

1. Nina Godbole and Sunit Belpure, Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives, Wiley

2. B.B. Gupta, D.P. Agrawal, Haoxiang Wang, Computer and Cyber Security: Principles, Algorithm, Applications, and Perspectives, CRC Press, ISBN 9780815371335,2018.

 REFERENCE BOOKS:

 1. Cyber Security Essentials, James Graham, Richard Howard and Ryan Otson, CRC Press.

2. Introduction to Cyber Security, Chwan-Hwa(john) Wu,J. David Irwin, CRC Press T&F Group.

Course Outcomes:

1. Analyze and evaluate the cyber security needs of an organization.

2. Understand Cyber Security Regulations and Roles of International Law.

3. Design and develop a security architecture for an organization.

4. Understand fundamental concepts of data privacy attack

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(R22A6606) Computer Vision
(PROFESSIONAL ELECTIVE-III)

COURSE OBJECTIVES

1.　　　　　To introduce various components of image processing techniques for computer vision.
2.　　　　　To understand filters and computing Image Gradient.
3.　　　　　To understand segmentation, model fitting and tracking
4.　　　　　To impart knowledge about object registration and object matching
5.　　　　　To implement various techniques available for object recognition.

UNIT-I

IMAGE FORMATION: Geometric Camera Models, Intrinsic and Extrinsic Parameters, Geometric Camera Calibration – Linear and Non – linear approach, Light and Shading - Inference from, Modeling Inter reflection, Human Color Perception.

UNIT-II

EARLY VISION: Linear Filters - Convolution, Fourier Transforms, Sampling and Aliasing, Filters as Templates, Correlation, Local Image Features - Computing the Image Gradient, Gradient-Based Edge Detectors, Orientations, Texture - Local Texture Representations Using Filters, Shape from Texture.

UNIT-III

MID-LEVEL VISION: Segmentation by Clustering - Basic Clustering Methods, The Watershed Algorithm, Segmentation Using K-means, Grouping and Model Fitting - Fitting Lines with the Hough Transform, Fitting Curved Structures, Tracking - Tracking by Detection, Tracking Translations by Matching, Tracking Linear Dynamical Models with Kalman Filters.

UNIT-IV

HIGH-LEVEL VISION: Registration, Registering Rigid and Deformable Objects, Smooth Surfaces and Their Outlines - Contour Geometry, Koenderink's Theorem, The Bitangent Ray Manifold, Object Matching using Interpretation Trees and Spin Images, Classification, Error, and Loss.

UNIT-V

OBJECT DETECTION AND RECOGNITION: Detecting Objects in Images - The Sliding Window Method, Face Detection, Detecting Humans, Boundaries and Deformable Objects, Object Recognition – Categorization, Selection, Applications – Tracking People, Activity Recognition.

TEXT BOOKS:

1.   Forsyth, Jean Ponce David A. "Computer Vision: A Modern Approach", Second Edition, Pearson Education Limited 2015.

2.   Szeliski, Richard, "Computer vision: algorithms and applications", Springer Science & Business Media, 2010.

REFERENCE BOOKS:

1. Hau, Chen Chi, "Handbook of pattern recognition and computer vision", World Scientific, FifthEdition, 2015.
2.   Muhammad Sarfraz, "Computer Vision and Image Processing in Intelligent Systems and Multimedia Technologies", IGI Global, 2014.
3. Theo Gevers, ArjanGijsenij, Joost van de Weijer, Jan-Mark Geusebroek "Color in Computer Vision:Fundamentals and Applications", Wiley, 2012.
4.   Kale, K. V, Mehrotra S.C, Manza. R.R., "Advances in Computer Vision and Information Technology",IK International Pvt Ltd, 2013.

COURSE OUTCOMES:

1.   Understand various image formation models.

2.   Extract shape, texture and edge based features.

3.   Detect region of interest using image segmentation and object localization techniques.

4.   Identify and recognize objects using image registration and classification.

5.   Explore various case studies on vision based applications.

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(R22A0517)Augmented Reality & Virtual Reality
(PROFESSIONAL ELECTIVE-III)

COURSE OBJECTIVES:

This course will enable the students:

1. To understand the concepts of Virtual Reality and its applications.
2. To perceive the concepts in Augmented Reality and Virtual Reality (AR &VR).
3. To imbibe the basic concept and framework of virtual reality.
4. To gain an understanding in the fundamental issues of virtual reality.
5. To study about Virtual Hardware and Software.

Unit I

Introduction of Virtual Reality: Fundamental Concept and Components of Virtual Reality. Primary Features and Present Development on Virtual Reality.

Multiple Models of Input and Output Interface in Virtual Reality: Input -- Tracker, Sensor, Digital Glove, Movement Capture, Video-based Input, 3D Menus & 3DScanner etc. Output --Visual /Auditory / Haptic Devices

Unit II

Visual Computation in Virtual Reality: Fundamentals of Computer Graphics. Software and Hardware Technology on Stereoscopic Display.

Advanced Techniques in CG: Management of Large Scale Environments & Real Time Rendering.

Interactive Techniques in Virtual Reality: Body Track, Hand Gesture, 3D Manus, Object Grasp.

Unit III

Development Tools and Frameworks in Virtual Reality: Frameworks of Software Development Tools in VR. X3D Standard; Vega, MultiGen, Virtools etc.

Application of VR in Digital Entertainment: VR Technology in Film & TV Production. VR Technology in Physical Exercises and Games. Demonstration of Digital Entertainment by VR.

Unit IV

Augmented and Mixed Reality, Taxonomy, technology and features of augmented reality, difference between AR and VR, Challenges with AR, AR systems and functionality.

Unit V

Augmented reality methods, visualization techniques for augmented reality, wireless displays in educational augmented reality applications, mobile projection interfaces, marker-less tracking for augmented reality, enhancing interactivity in AR environments,evaluating AR systems.

TEXT BOOKS:
1. Burdea, G. C. and P. Coffet. Virtual Reality Technology, Second Edition. Wiley-IEEE Press,2003/2006.
2. Alan B. Craig, Understanding Augmented Reality, Concepts and Applications, Morgan Kaufmann,2013.

REFERENCE BOOKS:
1. Alan Craig, William Sherman and Jeffrey Will, Developing Virtual Reality Applications, Foundations of Effective Design, Morgan Kaufmann, 2009.

COURSE OUTCOMES:
　　　　The students will be able:
1. To create geometric modeling and Virtual environment.
2. To realize the virtual reality experience.
3. To develop Virtual Reality applications.
4. To differentiate Augmented Reality and Virtual Reality (AR &VR).
5. To comprehend the Augmented reality methods.

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(R22A0569) Web Security
(PROFESSIONAL ELECTIVE-III)

COURSE OBJECTIVES:

This course will enable the students:

  i.   To understand the concepts of Virtual Reality and its applications.
  ii. To perceive the concepts in Augmented Reality and Virtual Reality (AR &VR).
  iii. To imbibe the basic concept and framework of virtual reality.
  iv. To gain an understanding in the fundamental issues of virtual reality.
  v.   To study about Virtual Hardware and Software.

Unit I

Introduction of Virtual Reality: Fundamental Concept and Components of Virtual Reality. Primary Features and Present Development on Virtual Reality.

Multiple Models of Input and Output Interface in Virtual Reality: Input -- Tracker, Sensor, Digital Glove, Movement Capture, Video-based Input, 3D Menus & 3DScanner etc. Output --Visual /Auditory / Haptic Devices

Unit II

Visual Computation in Virtual Reality: Fundamentals of Computer Graphics. Software and Hardware Technology on Stereoscopic Display.

Advanced Techniques in CG: Management of Large Scale Environments & Real Time Rendering.

Interactive Techniques in Virtual Reality: Body Track, Hand Gesture, 3D Manus, Object Grasp.

Unit III

Development Tools and Frameworks in Virtual Reality: Frameworks of Software Development Tools in VR. X3D Standard; Vega, MultiGen, Virtools etc.

Application of VR in Digital Entertainment: VR Technology in Film & TV Production. VR Technology in Physical Exercises and Games. Demonstration of Digital Entertainment by VR.

Unit IV

Augmented and Mixed Reality, Taxonomy, technology and features of augmented reality, difference between AR and VR, Challenges with AR, AR systems and functionality.

Unit V

Augmented reality methods, visualization techniques for augmented reality, wireless displays in educational augmented reality applications, mobile projection interfaces, marker-less tracking for augmented reality, enhancing interactivity in AR environments,evaluating AR systems.

TEXT BOOKS:

3. Burdea, G. C. and P. Coffet. Virtual Reality Technology, Second Edition. Wiley-IEEE

Press,2003/2006.

4. Alan B. Craig, Understanding Augmented Reality, Concepts and Applications, Morgan Kaufmann,2013.

REFERENCE BOOKS:

2. Alan Craig, William Sherman and Jeffrey Will, Developing Virtual Reality Applications, Foundations of Effective Design, Morgan Kaufmann, 2009.

COURSE OUTCOMES:

The students will be able:

1. To create geometric modeling and Virtual environment.
2. To realize the virtual reality experience.
3. To develop Virtual Reality applications.
4. To differentiate Augmented Reality and Virtual Reality (AR &VR).
5. To comprehend the Augmented reality methods.

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(R22A6614)Nature Inspired Computing
(PROFESSIONAL ELECTIVE-III)

Course Objectives:
1. Knowledge on significance of evolutionary computing, neuro computing and swarm intelligence

UNIT - I
Evolutionary Computing
Problem Solving as a Search Task, Hill Climbing and Simulated Annealing, Evolutionary Biology, Evolutionary Computing, The Other Main Evolutionary Algorithms, From Evolutionary Biology to Computing, Scope of Evolutionary Computing

UNIT - II
Neurocomputing
The Nervous System, Artificial Neural Networks, Typical ANNS and Learning Algorithms, From Natural to Artificial Neural Networks, Scope of Neurocomputing

UNIT - III
Swarm Intelligence
Ant Colonies, Swarm Robotics, Social Adaptation of Knowledge

UNIT - IV
Immunocomputing
The Immune System, Artificial Immune Systems, Bone Marrow Models, Negative Selection Algorithms, Clonal Selection and Affinity Maturation, Artificial Immune Networks, From Natural to Artificial Immune Systems, Scope of Artificial Immune Systems

UNIT - V
Case Studies- Bioinformatics, Information Display

TEXT BOOKS:
1. Leandro Nunes de Castro - " Fundamentals of Natural Computing, Basic Concepts, Algorithms and Applications", Chapman & Hall/ CRC, Taylor and Francis Group, 2007
2. Albert Y.Zomaya - "Handbook of Nature-Inspired and Innovative Computing", Springer, 2006

REFERENCE BOOKS:
1. Floreano, D. and C. Mattiussi -"Bio-Inspired Artificial Intelligence: The oriesethods, and Technologies" IT Press, 2008
2. Marco Dorrigo, Thomas Stutzle -" Ant Colony Optimization", Prentice Hall of India, New Delhi, 2005
3. Vinod Chandra S S, Anand H S - "Machine Learning: A Practitioner's Approach", Prentice Hall of India, New Delhi, 2020

Course Outcomes:

- Familiar with Evolutionary Computing algorithms
- Understand scope of neurocomputing
- Compare different Ant Colony Optimization algorithmic models.
- Understand the scope of artificial immune systems
- Tackle different real world problems

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(R22A0521)Cloud Computing
(PROFESSIONAL ELECTIVE-IV)

COURSE OBJECTIVES

1. To understand the cloud computing fundamentals and evolving computing paradigms
2. To realize the reasons for migrating into cloud
3. To gain knowledge in virtualization of computer resources
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: Parallel Computing, Distributed Computing, Cluster Computing, Grid Computing, Quantum Computing.

UNIT- II Migrating into a Cloud: Introduction, Broad Approaches to Migrating into the Cloud, the Seven-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. The Current State of Data Security in the Cloud - Cloud Computing and Data Security Risk -Cloud Computing and Identity.

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.

4. Cloud Computing, A Practical Approach, Anthony T Velte, Toby J Velte, Robert Elsenpeter, TMH

REFERENCE BOOKS:

1. Cloud Computing : A Practical Approach, Anthony T.Velte, Toby J.Velte, Robert Elsenpeter, 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.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

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

3/0/0/3

(R22A0532)GAME THEORY

(PROFESSIONAL ELECTIVE-IV)

COURSE OBJECTIVES:

1. Introduce to some of the problems and solutions of NLP and their relation to linguistics and statistics.
2. To understand linguistic phenomena and learn to model them with formal grammars.
3. To Understand and carry out proper experimental methodology for training and evaluating empirical NLP systems.
4. To learn how to manipulate probabilities, construct statistical models over strings and trees
5. To estimate parameters using supervised and unsupervised training methods.
6. To design, implement and analyze NLP algorithms. Able to design different language modelling Techniques.

UNIT – I:

Introduction:
Game Theory, Games and Solutions Game Theory and the Theory of Competitive Equilibrium, Rational Behavior, The Steady State and Deductive Interpretations, Bounded Rationality Terminology and Notation Nash Equilibrium- Strategic Games, Nash Equilibrium Examples Existence of a Nash Equilibrium, Strictly Competitive Games, Bayesian Games: Strategic Games with Imperfect Information

UNIT – II:

Mixed, Correlated, and Evolutionary Equilibrium -Mixed Strategy Nash Equilibrium Interpretations of Mixed Strategy Nash Equilibrium Correlated Equilibrium Evolutionary Equilibrium Rationalizability and Iterated Elimination of Dominated Actions-Rationalizability Iterated Elimination of Strictly Dominated Actions, Iterated Elimination of Weakly Dominated Actions

UNIT – III:
Knowledge and Equilibrium – A Model of Knowledge Common Knowledge, Can People Agree to Disagree? , Knowledge and Solution Concepts, The Electronic Mail Game

UNIT – IV:
Extensive Games with Perfect Information – Extensive Games with Perfect Information Subgame Perfect Equilibrium Two Extensions of the Definition of a Game The Interpretation of a Strategy , Two Notable Finite Horizon Games , Iterated Elimination of Weakly Dominated Strategies Bargaining Games -Bargaining and Game Theory , A Bargaining Game of Alternating Offers Subgame Perfect Equilibrium Variations and Extensions

UNIT – V:
Repeated Games – The Basic Idea Infinitely Repeated Games vs.\ Finitely Repeated Games Infinitely Repeated Games: Definitions Strategies as Machines Trigger Strategies: Nash Folk Theorems Punishing

for a Limited Length of Time: A Perfect Folk Theorem for the Limit of Means Criterion Punishing the Punisher: A Perfect Folk Theorem for the Overtaking Criterion Rewarding Players Who Punish: A Perfect Folk Theorem for the Discounting Criterion The Structure of Subgame Perfect Equilibria Under the Discounting Criterion Finitely Repeated

TEXT BOOKS:

1. M. J. Osborne and A. Rubinstein, A course in Game Theory, MIT Press
2. Roger Myerson, Game Theory, Harvard University Press
3. D. Fudenberg and J. Tirole, Game Theory, MIT Press

REFERENCE BOOKS:
1. J. von Neumann and O. Morgenstern, Theory of Games and Economic Behavior, New York:n John Wiley and Sons.
2.R.D. Luce and H. Raiffa, Games and Decisions, New York: John Wiley and Sons.,
3.G. Owen, Game Theory, (Second Edition), New York: Academic Press,

COURSE OUTCOMES:
1.Show sensitivity to linguistic phenomena and an ability to model them with formal grammars.
2.Understand and carry out proper experimental methodology for training and evaluating empirical NLP systems.
3.Able to manipulate probabilities, construct statistical models over strings and trees
4.Will be able to estimate parameters using supervised and unsupervised training methods.
5.Able to design, implement, and analyze NLP algorithms. Able to design different language modeling Techniques.

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

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(R22A6607) EXPERT SYSTEMS
(PROFESSIONAL ELECTIVE-IV)

Course Objectives:

1. Understand the basic techniques of artificial intelligence.

2. Understand the Non-monotonic reasoning and statistical reasoning

UNIT- I: Introduction to AI programming languages, Blind search strategies, Breadth-first – Depth-first – Heuristic search techniques Hill Climbing – Best first – A Algorithms AO* algorithm – game trees, Minmax algorithms, game playing – Alpha-beta pruning.

UNIT- II Knowledge representation issues predicate logic – logic programming Semantic nets- frames and inheritance, constraint propagation; Representing Knowledge using rules, Rules-based deduction systems.

UNIT- III: Introduction to Expert Systems, Architecture of expert systems, Representation and organization of knowledge, Basics characteristics, and types of problems handled by expert systems.

UNIT- IV: Expert System Tools: Techniques of knowledge representations in expert systems, knowledge engineering, system-building aids, support facilities, stages in the development of expert systems.

UNIT- V :Building an Expert System: Expert system development, Selection of the tool, Acquiring Knowledge, Building process. Problems with Expert Systems: Difficulties, common pitfalls in planning, dealing with domain experts, difficulties during development.

TEXT BOOKS:

1. Elain Rich and Kevin Knight, "Artificial Intelligence", Tata McGraw-Hill, New Delhi.

2. Waterman D.A., "A Guide to Expert Systems", Addison Wesley Longman.

REFERENCE BOOKS:

1. Stuart Russel and other Peter Norvig, "Artificial Intelligence – A Modern Approach", PrenticeHall, 2. Patrick Henry Winston, "Artificial Intelligence", Addison Wesley,

3. Patterson, Artificial Intelligence & Expert System, Prentice Hall India, 1999.

 4. Hayes-Roth, Lenat, and Waterman: Building Expert Systems, Addison Wesley,

5. Weiss S.M. and Kulikowski C.A., "A Practical Guide to Designing Expert Systems", Rowman &Allanheld, New Jersey.

Course Outcomes:

1. Apply the basic techniques of artificial intelligence.

2. Discuss the architecture of an expert system and its tools.

3. Understand the importance of building an expert systems

4. Understand various problems with expert systems

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IV Year B.Tech—CSE(AI&ML) - ISem   **L/T/P/C**

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(R22A6214) Database Security

(PROFESSIONAL ELECTIVE-IV)

COURSE OBJECTIVES:

1. Give an Overview of information security
2. Give an overview of Access control of relational databases
3. To learn the security of databases
4. To learn the design techniques of database security
5. To learn the secure software design

UNIT - I

The Web Security, The Web Security Problem, Risk Analysis and Best Practices Cryptography and the Web: Cryptography and Web Security, Working Cryptographic Systems and Protocols, Legal Restrictions on Cryptography, Digital Identification

UNIT - II

The Web's War on Your Privacy, Privacy-Protecting Techniques, Backups and Antitheft, Web Server Security, Physical Security for Servers, Host Security for Servers, Securing Web Applications

UNIT - III

Database Security: Recent Advances in Access Control, Access Control Models for XML, Database Issues in Trust Management and Trust Negotiation, Security in Data Warehouses and OLAP Systems

UNIT - IV

Security Re-engineering for Databases: Concepts and Techniques, Database Watermarking for Copyright Protection, Trustworthy Records Retention, Damage Quarantine and Recovery in Data Processing Systems, Hippocratic Databases: Current Capabilities and

UNIT - V

Future Trends Privacy in Database Publishing: A Bayesian Perspective, Privacy-enhanced Location based Access Control, Efficiently Enforcing the Security and Privacy Policies in a Mobile Environment.

TEXTBOOKS:

1. Web Security, Privacy and Commerce Simson GArfinkel, Gene Spafford, O'Reilly.

2. Handbook on Database security applications and trends Michael Gertz, Sushil Jajodia

COURSE OUTCOMES:

Students should be able to

1. Understand the Web architecture and applications

2. Understand client side and service side programming

3. Understand how common mistakes can be bypassed and exploit the application

4. Identify common application vulnerabilities

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

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(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.

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

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(R22A0529)Quantum Computing
(PROFESSIONAL ELECTIVE-V)

Course Objectives:
1. To introduce the fundamentals of quantum computing
2. The problem-solving approach using finite dimensional mathematics

UNIT - I
Introduction to Essential Linear Algebra: Some Basic Algebra, Matrix Math, Vectors and Vector Spaces, Set Theory. Complex Numbers: Definition of Complex Numbers, Algebra of Complex Numbers, Complex Numbers Graphically, Vector Representations of Complex Numbers, Pauli Matrice, Transcendental Numbers.

UNIT - II
Basic Physics for Quantum Computing: The Journey to Quantum, Quantum Physics Essentials, Basic Atomic Structure, Hilbert Spaces, Uncertainty, Quantum States, Entanglement.
Basic Quantum Theory: Further with Quantum Mechanics, Quantum Decoherence, Quantum Electrodynamics, Quantum Chromodynamics, Feynman Diagram Quantum Entanglement and QKD, Quantum Entanglement, Interpretation, QKE.

UNIT - III
Quantum Architecture: Further with Qubits, Quantum Gates, More with Gates, Quantum Circuits, The D-Wave Quantum Architecture. Quantum Hardware: Qubits, How Many Qubits Are Needed? Addressing Decoherence, Topological Quantum Computing, Quantum Essentials.

UNIT - IV
Quantum Algorithms: What Is an Algorithm? Deutsch's Algorithm, Deutsch-Jozsa Algorithm, Bernstein-Vazirani Algorithm, Simon's Algorithm, Shor's Algorithm, Grover's Algorithm.

UNIT - V
Current Asymmetric Algorithms: RSA, Diffie-Hellman, Elliptic Curve. The Impact of Quantum Computing on Cryptography: Asymmetric Cryptography, Specific Algorithms, Specific Applications.

TEXT BOOKS:
1. Nielsen M. A., Quantum Computation and Quantum Information, Cambridge University Press
2. Dr. Chuck Easttom, Quantum Computing Fundamentals, Pearson

REFERENCE BOOKS:
1. Quantum Computing for Computer Scientists by Noson S. Yanofsky and Mirco A. Mannucci
2. Benenti G., Casati G. and Strini G., Principles of Quantum Computation and Information, Vol. Basic Concepts. Vol. Basic Tools and Special Topics, World Scientific.
3. Pittenger A. O., An Introduction to Quantum Computing Algorithms.

Course Outcomes:

1. Understand basics of quantum computing
2. Understand physical implementation of Qubit
3. Understand Quantum algorithms and their implementation
4. Understand the Impact of Quantum Computing on Cryptography

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

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(R22A6608) Text Analytics
(PROFESSIONAL ELECTIVE-V)

COURSE OBJECTIVES Describe text extraction techniques.

1. Differentiate clustering and classification techniques on text.
2. Analyze visualization methodologies.
3. Illustrate about event detection methods and embedding semantics in models.
4. Compare feature extraction methods

UNIT-I: TEXT EXTRACTION

Text Extraction: Introduction, Rapid automatic keyword extraction: candidate keywords, keyword scores, adjoining keywords, extracted keywords, Benchmark evaluation: precision and recall, efficiency, stop list generation, Evaluation on new articles.

UNIT-II: CLUSTERING

Clustering: Multilingual document clustering: Multilingual LSA, Tucker1 method, PARAFAC2 method, LSA with term alignments, LMSA, LMSA with term alignments.

UNIT-III: CLASSIFICATION

Classification: Content-based spam email classification using machine-learning algorithms, Utilizing nonnegative matrix factorization for email classification problems, Constrained clustering with k- means type algorithms.

UNIT-IV: ANOMALY AND TREND DETECTION

Anomaly and trend detection: Text Visualization techniques such as tag clouds, authorship and change tracking, Data Exploration and the search for novel patterns, sentiment tracking, visual analytics and Future Lens, scenario discovery, adaptive threshold setting for novelty mining.

UNIT-V: TEXT STREAMS

Text streams: Introduction, Text streams, Feature extraction and data reduction, Event detection, Trend detection, Event and trend descriptions, Embedding semantics in LDA topic models: Introduction, vector space modeling, latent semantic analysis, probabilistic latent semantic analysis, Latent Dirichlet allocation, embedding external semantics from

Wikipedia, data-driven semantic embedding.

TEXT BOOKS

1. Michael W. Berry & Jacob Kogan ,"Text Mining Applications and Theory", Wiley publications.
2. Aggarwal, Charu C., and Cheng Xiang Zhai, eds. mining text data. Springer Science & BusinessMedia, 2012.

REFERENCE BOOKS

1. Miner, Gary, et al. Practical text mining and statistical analysis for non-structured text dataapplications. Academic Press, 2012.

2.Srivastava, Ashok N., and Mehran Sahami. Text mining: Classification, clustering, and applications,Chapman and Hall/CRC, 2009.

3. Buitelaar, Paul, Philipp Cimiano, and Bernardo Magnini, eds. Ontology learning from text: methods,evaluation and applications. Vol. 123. IOS press, 2005.

COURSE OUTCOMES

Upon completion of this course, the students will be able to:

1. Design text extraction techniques.
2. Design clustering techniques for text.
3. Design classification techniques for text
4. Practice visualization methodologies using tools.
5. Practice feature extraction using tools

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

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(R22A0564) Mobile Computing
(PROFESSIONAL ELECTIVE-V)

COURSE OBJECTIVES

This course will enable the students:

1. To make the student understand the concept of mobile computing paradigm, its applications and limitations.
2. To understand the typical mobile networking infrastructure through a popular GSMprotocol.
3. To understand the issues and solutions of various layers of mobile networks, namely MAClayer, Network Layer & Transport Layer
4. To understand the database issues in mobile environments & data delivery models.
5. To understand the ad hoc networks and related concepts.
6. To understand the platforms and protocols used in mobile environment.

UNIT I
Introduction: Mobile Communications, Mobile Computing – Paradigm, Promises/Novel Applications and Impediments and Architecture; Mobile and Handheld Devices, Limitations of Mobile and Handheld Devices. GSM – Services, System Architecture, Radio Interfaces, Protocols,Localization, Calling, Handover, Security, New Data Services, GPRS, CSHSD, DECT.

UNIT II
(Wireless) Medium Access Control (MAC): Motivation for a specialized MAC (Hidden and exposed terminals, Near and far terminals), SDMA, FDMA, TDMA, CDMA, Wireless LAN/(IEEE 802.11) Mobile Network Layer: IP and Mobile IP Network Layers, Packet Delivery and Handover Management, Location Management, Registration, Tunneling and Encapsulation, Route Optimization, DHCP.

UNIT III
Mobile Transport Layer: Conventional TCP/IP Protocols, Indirect TCP, Snooping TCP, Mobile TCP,Other Transport Layer Protocols for Mobile Networks.
Database Issues: Database Hoarding & Caching Techniques, Client-Server Computing & Adaptation, Transactional Models, Query processing, Data Recovery Process & QoS Issues.

UNIT IV
Data Dissemination and Synchronization: Communications Asymmetry, Classification of Data Delivery Mechanisms, Data Dissemination, Broadcast Models, Selective Tuning and Indexing Methods, Data Synchronization – Introduction, Software, and Protocols.

UNIT V
  Mobile Adhoc Networks (MANETs): Introduction, Applications & Challenges of a MANET,

Routing, Classification of Routing Algorithms, Algorithms such as DSR, AODV, DSDV, etc. , MobileAgents, Service Discovery. Protocols and Platforms for Mobile Computing: WAP, Bluetooth, XML, J2ME, Java Card, Palm OS, Windows CE, Symbian OS, Linux for Mobile Devices, Android.

TEXT BOOKS:

1.   Jochen Schiller, ―Mobile Communications‖, Addison-Wesley, Second Edition, 2009.

2.   Raj Kamal, ―Mobile Computing‖, Oxford University Press, 2007, ISBN: 0195686772.

REFERENCE BOOKS:

1. Jochen Schiller, ―Mobile Communications, Addison-Wesley, Second Edition, 2004.

2.   Stojmenovic and Cacute, ―Handbook of Wireless Networks and Mobile Computing,Wiley, 2002, ISBN 0471419028.

3.   Reza Behravanfar, ―Mobile Computing Principles: Designing and Developing Mobile Applications with UML and XML, ISBN: 0521817331, Cambridge University Press, Oct 2004.

COURSE OUTCOMES:

Students will be able to:

1. Understand the concept of mobile computing and the working of GSM architecture
2. Identify the issues in the mobile networks layers and to provide solutions.
3. Understand the issues in database mobile environment.
4. Understand the data delivery mechanism broadcasting models and data synchronization .
5. Develop a routing algorithms or protocol in mobile adhoc networks.

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

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(R22A06610) Social Network Analysis
(PROFESSIONAL ELECTIVE-V)

Course Objectives:

1. Understand the concepts of social media
2. Learn the mechanisms for social network analysis
3. Analysis of widely used services such as email, Wikis, Twitter, flickr, YouTube, etc

UNIT - I Introduction: Social Media and Social Networks Social Media: New Technologies of Collaboration Social Network Analysis: Measuring, Mapping, and Modelling collections of Connections.

UNIT - II NodeXL, Layout, Visual Design, and Labelling, Calculating and Visualising Network Metrics, Preparing Data and Filtering, Clustering and Grouping.

UNIT - III CASE STUDIES: Email: The lifeblood of Modern Communication. Thread Networks: Mapping Message Boards and Email Lists Twitter: Conversation, Entertainment and Information

UNIT - IV CASE STUDIES: Visualizing and Interpreting Facebook Networks, WWW Hyperlink Networks

UNIT - V CASE STUDIES: You Tube: Contrasting Patterns of Content Interaction, and Prominence. Wiki Networks: Connections of Creativity and Collaboration

TEXT BOOK:

1. Hansen, Derek, Ben Sheiderman, Marc Smith, Analyzing Social Media Networks with NodeXL: Insights from a Connected World, Morgan Kaufmann, 2011.

REFERENCE BOOKS:

1. Avinash Kaushik, Web Analytics 2.0: The Art of Online Accountability, Sybex, 2009.

2. Marshall Sponder, Social Media Analytics: Effective Tools for Building, Interpreting and Using Metrics, 1st Edition, MGH, 2011.

Course Outcomes :

1. Ability to construct social network maps easily
2. Gain skills in tracking the content flow through the social media
3. Understand NodeXL use to perform social network analysis

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

3/0/0/3

(R22A06613) Cognitive Computing
(PROFESSIONAL ELECTIVE-VI)

Course Objectives:
1. To provide an understanding of the central challenges in realizing aspects of human cognition.
2. To provide a basic exposition to the goals and methods of human cognition.
3. To develop algorithms that use AI and machine learning along with human interaction and feedback to help humans make choices/decisions.
4. To support human reasoning by evaluating data in context and presenting relevant findings along with the evidence that justifies the answers.

UNIT - I
Introduction to Cognitive Science: Understanding Cognition, IBM's Watson, Design for Human Cognition, Augmented Intelligence, Cognition Modeling Paradigms: Declarative/ logic-based computational cognitive modeling, connectionist models of cognition, Bayesian models of cognition, a dynamical systems approach to cognition.

UNIT - II
Cognitive Models of memory and language, computational models of episodic and semantic memory, modeling psycholinguistics.

UNIT - III
Cognitive Modeling: modeling the interaction of language, memory and learning, Modeling select aspects of cognition classical models of rationality, symbolic reasoning and decision making.

UNIT - IV
Formal models of inductive generalization, causality, categorization and similarity, the role of analogy in problem solving, Cognitive Development Child concept acquisition. Cognition and Artificial cognitive architectures such as ACT-R, SOAR, OpenCog, CopyCat, Memory Networks.

UNIT - V
DeepQA Architecture, Unstructured Information Management Architecture (UIMA), Structured Knowledge, Business Implications, Building Cognitive Applications, Application of Cognitive Computing and Systems.

TEXT BOOK:
1. The Cambridge Handbook of Computational Psychology by Ron Sun (ed.), Cambridge University Press.

REFERENCE BOOKS:
1. Judith S. Hurwitz, Marcia Kaufman, Adrian Bowles Cognitive Computing and Big Data Analytics, Wiley
2. Vijay V Raghavan, Venkat N. Gudivada, Venu Govindaraju, Cognitive Computing: Theory and

Applications: Volume 35 (Handbook of Statistics), North Hollan.

Course Outcomes:
- Understand cognitive computing
- Plan and use the primary tools associated with cognitive computing.
- Plan and execute a project that leverages cognitive computing.
- Understand and develop the business implications of cognitive computing.

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

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(R22A06611) Generative AI
(PROFESSIONAL ELECTIVE-VI)

COURSE OBJECTIVES

1. To familiarize students on the concept of Generative Modelling

2. To understand the encoding & decoding mechanisms in Variational Autoencoders.

3. To gain knowledge on Generative Adversarial Networks.

4. To learn the fundamentals of Autoregressive models & Transformers.

5. To assess the emerging market of Generative Artificial Intelligence.

UNIT I Generative Modeling

Generative Modeling, Generative Versus Discriminative Modeling, The rise of Generative Modeling,

Generative Modeling and AI, Building a Generative Model, Core Probability Theory, Generative Model

Taxonomy, **Case Study**: The Generative Deep Learning Codebase, Cloning the Repository, Using Docker,

Running on a GPU.

UNIT II Variational Autoencoders (VAE)

Introduction, **Autoencoders**: Architecture, The Encoder, The Decoder, Joining the Encoder to the

Decoder, Training & Analysis of the Auto Encoder, Case Study – The Variational Art Exhibition,

VAE: Building a VAE, Analysis of the VAE, Case Study – Using VAE to generate faces.

UNIT III Generative Adversarial Networks (GAN)

Introduction, **Deep Convolutional GAN (DC-GAN)**: Discriminator, Generator, Training & Analysis

of DCGAN, Case Study - Wasserstein GAN with Gradient Penalty (WGAN - GP): Wasserstein Loss,

The Lipschitz Constraint, Weight Clipping, The Gradient Penalty (GP) Loss, Training & Analysis of

the WGAN - GP.

UNIT IV Autoregressive Models & Transformers

Introduction, **Long Short-Term Memory Network (LSTM)**: The Recipes Dataset, Working with Text Data, Tokenization, Creating the Training Set, The LSTM Architecture, The Embedding Layer, The LSTM Layer, The LSTM Cell, Training & Analysis of the LSTM, **Transformers –** Introduction, GPT: The Wine Reviews, Dataset, Attention, Queries, Keys, and Values, Multihead Attention, Causal Masking, The Transformer Block, Positional Encoding, Training & Analysis of GPT.

UNIT V Timeline & Future Scope of Generative AI

2014–2017: The VAE and GAN Era, 2018–2019: The Transformer Era, 2020–2022: The Big Model Era, **The Current State of Generative AI**: Large Language Models (LLM's), Text-to-Code Models, Text-to-Image Models, Other Applications, **The Future of Generative AI**: Generative AI in Everyday Life, Generative AI in the Workplace, Generative AI in Education, Generative AI Ethics and Challenges.

TEXT BOOK

1. GENERATIVE DEEP LEARNING Teaching Machines to Paint, Write, Compose and Play - David Foster - O'Reilly - 2nd Edition

REFERENCE BOOKS

1. Generative AI in Practice – Bernard Marr - Wiley

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

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(R22A06705) Data Visualization Techniques
(PROFESSIONAL ELECTIVE-VI)

COURSE OBJECTIVES:
- To learn different statistical methods for Data visualization.
- To understand the basics of Python.
- To understand the usage of the Matplotlib, Seaborn Packages
- To Learn about Excel and various operations using Excel
- To understand visualization using KNIME

UNIT I(Introduction)

Introduction to Data Visualization
Overview of data visualization - Data Abstraction - Task Abstraction, - Analysis: Four Levels for Validation
Visualization Techniques:
Scalar and point techniques, – vector visualization techniques – multi dimensional techniques – visualizing cluster analysis– matrix visualization in Bayesian data analysis

UNIT II(Python-PANDAS)

Getting Started with Pandas: Arrays and vectorized conputation, Introduction to pandas Data Structures, Essential Functionality, Summarizing and Computing Descriptive Statistics. Data Loading, Storage and File Formats. Reading and Writing Data in Text Format, Web Scraping, Binary Data Formats, Interacting with Web APIs, Interacting with Databases Data Cleaning and Preparation. Handling Missing Data, Data Transformation, String Manipulation

UNIT III (Data Visualization Using Matplotlib)
Data Visualization Tools inPython- Introduction to Matplotlib, Basic plots Using matplotlib, Specialized Visualization Tools using Matplotlib, Advanced Visualization Tools using Matplotlib-Waffle Charts, Word Clouds.
Introduction to Seaborn: Seaborn functionalities and usage, Spatial Visualizationsand Analysis in Python with Folium, Case Study.

UNIT-IV(Working With Excel)

Introduction: Data Analysis, Excel Data analysis. Working with range names.Tables.Cleaning Data.Conditional formatting, Sorting, Advanced Filtering, Lookup functions, Pivot tables, Data Visualization, Data Validation. Understanding Analysis tool pack: Anova, correlation, covariance, moving average, descriptive statistics, exponential smoothing, fourier Analysis, Random number generation, sampling, t-test, f-test, and regression.

UNIT-V (Working with KNIME)

KNIME : Organizing your work, Nodes, Meta nodes, Ports, Flow variables, Node views. User Interface. Data Preparation: Importing Data-Database, tabular files, web services. Transforming the Shape- Filtering rows, Appending tables ,Less columns, More columns, Group By, Pivoting and Unpivoting, One2Many and Many2One,Cosmetic transformations. Transforming values: Generic transformations , Conversion between types, Binning, Normalization, Multiple columns, XML transformation, Time transformation, Smoothing, Data generation, Constraints ,Loops, Workflow customization.

TEXT BOOKS:
1. Core Python Programming - Second Edition,R. NageswaraRao, Dreamtech
Press.
2**.** A To Z Of MS EXCEL: A Book For Learners & Trainers (MS Excel Comprehensive Guide 1)
by RinkooJainn
3.Data Analysis with Excel by Manish Nigam. bpb Publications
4. KNIME Essentials, by Gábor Bakos,2013
5. Data Science Tools by Christopher Greco,2020

REFERENCE BOOKS:
1. Introduction to Data Science a Python approach to concepts, Techniques and Applications, Igual, L;Seghi', S. Springer, ISBN:978-3-319-50016-4.
2. ALL-IN-ONE-EXCEL 2022 BIBLE FOR DUMMIES BY Bryant Shelton
3. Excel® 2019 BIBLE BY Michael Alexander ,DickKusleika
4. Python for Data Analysis by William McKinney, Second Edition, O'Reilly Media
Inc.
5. https://seaborn.pydata.org/
6. https://dataplatform.cloud.ibm.com/

Course Outcomes:
At Completion of this course, students would be able to -
- Apply statistical methods for Data visualization on Various Datasets
- Gain knowledge on various visualization techniques using Python
- Understand usage of various packages in Python.
- Understand the concept of Excel, Visualization using Excel
- Apply KNIME principles to fetch the data visualization

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IV Year B.Tech—CSE(AI&ML) - IISem

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(R22A06615) Federated Machine Learning

(PROFESSIONAL ELECTIVE-VI)

Course Objectives

1. Understand the key concepts and issues behind Federated Learning
2. Get familiar with key theoretical results of Federated Learning

UNIT - I

Introduction: Motivation, Federated Learning as a Solution, The Definition of Federated Learning, Categories of Federated Learning, Current Development in Federated Learning, Research Issues in Federated Learning, Open-Source Projects, Standardization Efforts, The Federated AI Ecosystem Background: Privacy-Preserving Machine Learning, PPML and Secure ML, Threat and Security Models, Privacy Threat Models, Adversary and Security Models, Privacy Preservation Techniques, Secure Multi-Party Computation, Homomorphic Encryption, Differential Privacy

UNIT - II

Distributed Machine Learning: Introduction to DML, The Definition of DML, DML Platforms, Scalability-Motivated DML, Large-Scale Machine Learning, Scalability-Oriented DML Schemes, Privacy-Motivated DML, Privacy-Preserving Decision Trees, Privacy-Preserving Techniques, Privacy-Preserving DML Schemes, Privacy-Preserving Gradient Descent, Vanilla Federated Learning, Privacy-Preserving Methods

UNIT - III

Horizontal Federated Learning: The Definition of HFL, Architecture of HFL, The Client- Server Architecture, The Peer-to-Peer Architecture, Global Model Evaluation, The Federated Averaging Algorithm, Federated Optimization, The FedAvg Algorithm, The Secured FedAvg Algorithm, Improvement of the FedAvg Algorithm, Communication Efficiency, Client Selection Vertical Federated Learning: The Definition of VFL, Architecture of VFL, Algorithms of VFL, Secure Federated Linear Regression, Secure Federated Tree-Boosting

UNIT - IV

Federated Transfer Learning: Heterogeneous Federated Learning, Federated Transfer Learning, The FTL Framework, Additively Homomorphic Encryption, The FTL Training Process, The FTL Prediction Process, Security Analysis, Secret Sharing-Based FTL Incentive Mechanism Design for Federated Learning: Paying for Contributions, Profit- Sharing Games, Reverse Auctions, A Fairness-Aware Profit Sharing Framework, Modeling Contribution, Modeling Cost, Modeling Regret, Modeling Temporal Regret, The Policy Orchestrator, Computing Payoff Weightage

UNIT - V

Federated Learning for Vision, Language, and Recommendation: Federated Learning for Computer Vision, Federated CV, Federated Learning for NLP, Federated NLP, Federated Learning for Recommendation Systems, Recommendation Model, Federated Recommendation System

Federated Reinforcement Learning: Introduction to Reinforcement Learning, Policy, Reward, Value Function, Model of the Environment, RL Background Example, Reinforcement Learning Algorithms, Distributed Reinforcement Learning, Asynchronous Distributed Reinforcement Learning, Synchronous Distributed Reinforcement Learning, Federated Reinforcement Learning, Background and Categorization

TEXT BOOK:
1. Federated Learning, Qiang Yang, Yang Liu, Yong Cheng, Yan Kang, Tianjian Chen, and Han Yu Synthesis Lectures on Artificial Intelligence and Machine Learning 2019.

Course Outcomes
1. Understand the basics on privacy-preserving ML
2. Analyze the key concepts of Distributed ML and FL
3. Understand the key concepts and applications of Horizontal FL and Vertical FL
4. Motivates the intensive mechanism design for FL
5. Analyze the concepts of federated reinforcement learning