

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

B.TECH: INFORMATION TECHNOLOGY- COURSE STRUCTURE

I Year B.Tech –I Semester

S.No	Subject Code	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R22A0001	English	2	0	0	2	40	60
	R22A0023	Mathematics–I	3	1	0	4	40	60
3	R22A0021	Applied Physics	3	1	0	4	40	60
4	R22A0022	Engineering Chemistry	3	0	0	2	40	60
5	R22A0501	Programming for Problem Solving	3	0	0	3	40	60
6	R22A0082	Applied Physics/Engineering Chemistry Lab	-	0	3	1.5	40	60
7	R22A0083	Engineering and Computing Hardware Workshop	-	0	2	1	40	60
8	R22A0581	Programming for Problem Solving Lab	-	0	3	1.5	40	60
9	R22A0003	Human Values and Professional Ethics	2	0	0	1	40	60
		Total	16	2	8	20	360	540

I Year B.Tech–II Semester

S.No	Subject Code	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R22A0002	Professional English	2	0	0	2	40	60
2	R22A0024	Mathematics–II	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	3	40	60
5	R22A0502	Python Programming	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	R22A0582	Python Programming Lab	-	0	3	1.5	40	60
9	R22A0004	Environmental Science	2	0	0	1	40	60
		Total	15	1	11	20	360	540

II Year B.Tech- I Semester

S.No	Subject Code	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R22A0503	Data Structures	3	0	0	3	40	60
2	R22A0504	Database Management Systems	3	0	0	3	40	60
3	R22A0505	Software Engineering	3	0	0	3	40	60
4	R22A0506	Design and Analysis of Algorithms	3	1	0	4	40	60
5	R22A0026	Probability, Statistics and Queueing Theory	3	1	0	4	40	60
6	R22A0583	Data Structures Lab	-	0	2	1	40	60
7	R22A0584	Database Management Systems Lab	-	0	2	1	40	60
8	R22A0585	Software Engineering Lab	-	0	2	1	40	60
9	*R22A0005	Foreign Language: French	2	0	0	0	100	-
Total			17	2	6	20	420	480

*Mandatory course: Non-credit course, 50% of scoring is required or 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	R22A0507	Object Oriented Programming through Java	3	0	0	3	40	60
3	R22A0509	Operating Systems	3	0	0	3	40	60
4	R22A1201	Automata and Compiler Design	3	1	0	4	40	60
5	R22A1202	Computer Organization and Microprocessors	3	0	0	3	40	60
6	R22A0586	Object Oriented Programming through Java Lab	-	0	2	1	40	60
7	R22A0587	Operating Systems Lab	-	0	2	1	40	60
8	R22A1291	Industry Oriented Project	-	0	4	2	40	60
9	*R22A0061	Public Policy & Governance	2	0	0	0	100	-
Total			17	1	8	20	420	480

*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	R22A6702	Data Science	3	0	0	3	40	60
2	R22A1204	Web Application Development	3	0	0	3	40	60
3	R22A6601	Artificial Intelligence	3	0	0	3	40	60
4		Open Elective-I	3	0	0	3	40	60
5	R22A0564	Professional Elective-I Mobile Computing	3	0	0	3	40	60
	R22A0514	Distributed Systems						
	R22A0515	Image Processing						
	R22A0512	Computer Networks						
6	R22A1282	Data Science & Artificial Intelligence Lab	-	0	2	1	40	60
7	R22A1283	Web Application Development Lab	-	0	2	1	40	60
8	R22A1292	Application Development-I	-	0	4	2	40	60
9	R22A0084	Professional Development Skills -I	0	0	2	1	40	60
		Total	15	0	10	20	360	540

III Year B.Tech-I Semester

III Year B.Tech –II Semester

S.No	Subject Code	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R22A1205	Data Warehousing and Data Mining	3	0	0	3	40	60
2	R22A0513	Full Stack Development	3	0	0	3	40	60
3	R22A6903	Embedded Systems Design	3	0	0	3	40	60
4		Open Elective-II	3	0	0	3	40	60
5	R22A0520	Professional Elective-II Ad-hoc & Sensor Networks	3	0	0	3	40	60
	R22A6663	Computational Intelligence						
	R22A0570	Software Requirements and Estimation						
	R22A6201	Cyber Security Essentials						
6	R22A1284	Data Warehousing and Data Mining Lab	-	0	2	1	40	60
7	R22A0589	Full Stack Development Lab	-	0	2	1	40	60
8	R22A1293	Application Development-II	0	0	4	2	40	60
9	R22A0085	Professional Development Skills–II	0	0	2	1	40	60
		Total	15	0	10	20	360	540

IV Year B.Tech– I Semester

S.No	Subject Code	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R22A0522	Cloud Computing	3	0	0	3	40	60
2	R22A0524	Block Chain Technology	3	0	0	3	40	60
3	R22A0517	Big Data Analytics	3	0	0	3	40	60
5	R22A6608 R22A6705 R22A6606 R22A0530	Professional Elective-III	3	0	0	3	40	60
		Text Analytics						
		Data Visualization Techniques						
		Computer Vision Game theory						
6	R22A0525 R22A0530 R22A6602 R22A0528	Professional Elective-IV	3	0	0	3	40	60
		Augmented Reality and Virtual Reality						
		Edge Computing Machine Learning						
		Quantum Computing						
7	R22A0590	Big Data Analytics Lab	-	0	2	1	40	60
8	R22A1294	Project Phase-I	-	0	6	3	40	60
Total			15	1	8	20	280	420

IV Year B.Tech–II Semester

S.No	Subject Code	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R22A0334	Innovation, Start-Up & Entrepreneurship	4	0	0	4	40	60
2	R22A0529 R22A0523 R22A0569 R22A6621	Professional Elective–V	3	0	0	3	40	60
		Deep Learning & its Applications						
		Design Patterns using Python Web Security						
		Generative AI						
3	R22A0519 R22A0572 R22A6613 R22A0533	Professional Elective-VI	3	0	0	3	40	60
		Digital Forensics						
		Distributed Databases Cognitive Computing						
		Semantic Web and Social Networks						
4	R22A1295	Project Phase-II	-	0	20	10	80	120
Total			10	0	20	20	200	300

OPEN ELECTIVE I		
S.NO	SUBJECT CODE	SUBJECT
1	R22A0551	JAVA PROGRAMMING
2	R22A1251	WEB DEVELOPMENT
3	R22A2151	INTELLECTUAL PROPERTY RIGHTS
4	R22A0351	ROBOTICS & AUTOMATION
5	R22A0451	ELECTRONICS FOR HEALTHCARE
6	R22A0251	RENEWABLE ENERGY SOURCES
7	R22A6751	PRINCIPLES OF DATA SCIENCE
8	R22A6752	BUSINESS ANALYTICS

OPEN ELECTIVE II		
S.NO	SUBJECT CODE	SUBJECT
1	R22A0553	DATABASE SYSTEMS
2	R22A6753	BIG DATA ARCHITECTURE
3	R22A0352	DESIGN THINKING
4	R22A0552	PRINCIPLES OF CLOUD COMPUTING
5	R22A6951	INTERNET OF THINGS & ITS APPLICATIONS
6	R22A2152	NANO TECHNOLOGY
7	R22A0252	ELECTRICAL AND HYBRID VEHICLES
8	R22A6251	CYBER GOVERNANCE

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I Year B.TECH-I-SEM

L/T/P/C

2/-/-2

(R22A0001) ENGLISH

INTRODUCTION

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

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

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 role plays.
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**JK Rowling's Convocation Speech at Harvard**

Grammar	– Tenses and Question Tags
Vocabulary	– word Formation- Affixes Writing
Writing	– Paragraph Writing
Reading	–Theart of skimming and scanning -ReadingExerciseType1

(Match the statements to the text they refer to)

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–Theart 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 Type 3(Reading between the lines)

Unit-IV**"Abraham Lincoln's Letter to His Son's Teacher"**

Grammar	– Articles, Punctuation
Vocabulary	– Phrasal Verbs
Writing	– Précis Writing
Reading	– ReadingExerciseType4 (Cloze test)

Unit–V**Abdul Kalam’s Biography**

Grammar	– Subject-Verb Agreement, Noun-Pronoun
Agreement Vocabulary–	Commonly Confused Words
Writing	– Memo Writing
Reading	- Reading Exercise Type5(Identifying errors)

*Exercises apart from the text book 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 Heasley. Cambridge University Press. 2006.
5. Communication Skills. Sanjay Kumar and Pushpa Lata. Oxford University Press. 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 the same
2. Hone their language abilities in terms of comprehending complex technical texts with a potential to review literature
3. Present ideas clearly and logically to analyze data and provide valid conclusions in written communication
4. Enrich their grammatical accuracy and fluency to be adept at both the active and passive skills
5. Represent old conventions with a set of the new by professional verbal communicative ability.

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I Year B.TECH-I-SEM

L/T/P/C

3/1/-/4

(R22A0023) MATHEMATICS-I

COURSE OBJECTIVES:

- To learn the concept of a Rank of the matrix and applying the concept to know the consistency and solving the system of linear equations.
- The concept to Eigen values, Eigen vectors and Diagonalisation.
- 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 Eigenvectors

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 $f(x) = e^{ax}$, $\sin ax$, $\cos ax$, 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 BV Ramana., Tata Mc Graw Hill.
- ii) Higher Engineering Mathematics by B.S.Grewal, Khanna Publishers.
- iii) Advanced Engineering Mathematics by Kreyszig, John Wiley& Sons.

REFERENCE BOOKS:

- i) Advanced Engineering Mathematics by R.K Jain & SRK Iyenger, Narosa Publishers.
- ii) Ordinary and Partial Differential Equations by M.D. Raisinghaniania ,S.Chand Publishers
- iii) Engineering Mathematics by N.PB ali 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 for musing 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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3/-/-/3

(R22A0501) PROGRAMMING FOR PROBLEM SOLVING

COURSE OBJECTIVES:

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

UNIT-I: Introduction to Programming:

Computer Languages, Compilers, Compiling and executing a program, Representation of Algorithms and Flowcharts with examples.

Introduction to C Programming Language:

Structure of a C Program, I/O: Simple input and output with scanf() and printf(), C Tokens- Keywords, Identifiers, Constants, Variables, Datatypes, 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. Jeri R. Hanly and Elliot B. Koffman, Problemsolving and Program Design in C 7th Edition, Pearson.
2. Mastering C, K.R. Venugopal, SR 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. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India.
2. Yashavant Kanetkar, Let Us C, 18th Edition, BPB.
3. Programming in C, Stephen G. Kochan, Fourth Edition, Pears on Education.
4. Herbert Schildt, C: The Complete Reference, McGrawHill, 4th Edition.

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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L/T/P/C

3/1/-/4

(R22A0021) APPLIED PHYSICS

COURSE OBJECTIVES:

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

UNIT-I**LASERS & FIBEROPTICS****(15Hours)**

Lasers: Characteristics of lasers, Absorption, Spontaneous and stimulated emissions, Einstein's Coefficients, Population in version, metastable 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****(10Hours)**

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****(12Hours)**

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, Effectivemass, Origin of energy bands in solids, Classification of materials :Metals, semiconductors and insulators.

UNIT-IV**SEMI CONDUCTOR PHYSICS****(15Hours)**

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

(12Hours)

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:

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

TEXT BOOKS:

1. Engineering Physics by Kshirsagar & Avadhanulu, S.Chand publications.
2. Modern Engineering Physics-Dr K Vijaya Kumar & Dr S Chandra lingam, S. Chand Publications.
3. Engineering Physics- B.K.Pandey, S.Chaturvedi, Cengage Learning.

REFERENCES:

1. Engineering Physics– R.K. Gaur and S.L. Gupta, Dhanpat Rai 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.

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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 electro chemistry 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 Electro chemistry(8hours)

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 H₂-O₂ fuel cell.

Unit II Corrosion:(8hours)

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:(8hours)

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; Disinfection of water by chlorination and ionization. Boiler troubles- caustic embrittlement, scales and sludges; External treatment of water – Ion exchange process; Desalination of water – Reverse osmosis.

Unit IV Polymers:(10hours)

Introduction - Classification of polymers; Types of polymerization - addition and condensation polymerization 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:(8hours)

Nano materials: Introduction and classification of nano materials; preparation of nano materials - Sol-gel method; applications of nanomaterials (industrial and medicinal); Carbon nanotubes (CNTs)-applications.

Smart materials: Introduction - Types of smart materials - examples and applications of piezo electric materials and shape memory alloys.

SUGGESTED TEXTBOOKS:

1. Engineering Chemistry by P.C. Jain & M. Jain: Dhanpat Rai Publishing Company (P) Ltd, New Delhi. 16th Edition.
2. Engineering Chemistry by Prasanta Rath, B. Rama Devi, C.H. Venkata Ramana Reddy, Subhendu Chakroborty, 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, New Delhi.
3. P.W. Atkins, J.D. Paula, "Physical Chemistry", Oxford, 8th edition (2006).
4. B.R. Puri, L.R. Sharma and M.S. Pathania, "Principles of Physical Chemistry", S. Nagin Chand & Company Ltd., 46th edition (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.

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I Year B.TECH-I- SEM

L/T/P/C

-/-/3/1.5

(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 program 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 (including pre/post increment, bitwise and/or/not, etc.). Read required operand values from standard input.
- b. Write a simple program that converts one given data type to another using auto conversion and casting. Take the values from standard 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 $\text{mark} < 40\% = \text{Failed}$, $40\% \leq \text{mark} < 60\% = \text{Second class}$, $60\% \leq \text{mark} < 70\% = \text{First class}$, $\text{mark} \geq 70\% = \text{Distinction}$. 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:
5x1=5
5x2=10
5x3=15

Expression Evaluation:

- a. A building has 10 floors with a floor height of 3 meters each. A ball is dropped from the top of the building. Find the time taken by the ball to reach each floor. (Use the formula $s = ut + \frac{1}{2} at^2$ where u and a are the initial velocity in m/sec ($= 0$) and acceleration in m/sec^2 ($= 9.8 \text{ m/s}^2$)).
- b. Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +, -, *, /, % and use Switch Statement).
- c. Write a C program to find the factorial of a given number.

- d. Write a C program to find the sum of individual digits of a positive integer and test given number is palindrome.
- e. A Fibonacci sequence is defined as follows: the first and second terms in thesequenceare0and1.Subsequenttermsarefoundbyaddingtheprecedingtwo 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– 1if 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:

- Write a C program to display the contents of a file to standard output device.
- Write a C program which copies one file to another file.
- Write a C program to count the number of times a character occurs in a text file. The file name and the character are supplied as command line arguments.
- 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:

- Write a menu driven C program that allows a user to enter n numbers and then choose between finding the smallest, largest, sum, or average. 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.
- Write a C program to construct a pyramid of n umbers as follows:

```
1          *          1
12         **         22
123        ***        333
                4444
```

TEXT BOOKS:

- Jeri R. Hanly and Elliot B.Koffman, Problem solving and Program Design in C 7th Edition, Pearson.
- B.A. Forouzan and R.F. Gilberg C Programming and Data Structures, Cengage Learning, (3rd Edition).

REFERENCE BOOKS:

- Brian W. Kernighan and Dennis M.Ritchie, The C Programming Language ,PHI.
- E. Balagurusamy, Computer fundamentals and C,2nd Edition, Mc Graw-Hill.
- Yashavant Kanetkar, Let UsC,18th Edition, BPB.
- R.G. Dromey, How to solve it by Computer, Pears on (16th Impression).
- Programming in C, Stephen G. Kochan, Fourth Edition, Pearson Education.
- Herbert Schildt, C: The Complete Reference, McGraw Hill, 4th Edition.
- Byron Gottfried, Schaum's Outline of Programming with C, Mc Graw-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 be reused.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I Year B.TECH-I- SEM

L/T/P/C

-/-/3/1.5

(R22A0082) APPLIED PHYSICS LAB/ENGINEERING CHEMISTRY LAB

COURSE OBJECTIVES:

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

LIST OF EXPERIMENTS:

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

REFERENCE BOOKS:

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

COURSE OUTCOMES:

1. Students can compare the elastic constants of different metallic wires, and also determine the ac frequency of vibrating bar.
2. Students can illustrate the interference of light phenomena.
3. Wave length 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.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I Year B.TECH-I- SEM

L/T/P/C

-/-/3/1.5

*(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. In organic quantitative analysis, Vogel
2. A textbook 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 Harrmendra Goel, 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 electro plating method for corrosion protection of metals.

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 POWERPOINT

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 lamp wiring
3. Staircase wiring
4. Soldering and Desoldering practice—components, devices and circuits using general

1. Purpose PCB.

Note: Minimum ON 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 T in, Rectangular T ray& Conical Funnel.

Note: Minimum ON 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.

TEXTBOOKS–IT WORKSHOP

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

TEXTBOOKS–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 Mc Graw-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-I-SEM

L/T/P/C

2/-/-/-

(R20A0003) HUMAN VALUES AND PROFESSIONAL ETHICS**COURSE OBJECTIVES:**

This introductory course input is intended:

1. To help the students appreciate the essential complementarity 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 and enjoyer).

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 in relationship.

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 (Sarvabhaum Vyavastha) - from family to world family!

UNIT-IV:

Understanding Harmony in the nature and Existence - Whole existence as Coexistence: Understanding the harmony in the Nature. Inter connectedness 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.

TEXTBOOKS:

1. R. R. Gaur, R Sangal, GP Bagaria, 2009, A Foundation Course in Human Values and Professional Ethics.
2. Prof. K. V. Subba Raju, 2013, Success Secrets for Engineering Students, Smart Student Publications, 3rd Edition.

REFERENCE BOOKS:

1. IvanIllich,1974,Energy&Equity,TheTrinityPress,Worcester,andHarperCollins,USA
2. E. F. Schumancher, 1973, Small is Beautiful: a study of economics as if people mattered. Blond & Briggs, Britain.
3. ANagraj,1998Jeevan Vidyaek Parichay, Divya Path Sansthan, Amarkantak.
4. Sussan George,1976, How the Other Half Dies, Penguin Press, Reprinted1986,1991.
5. P. L. Dhar,R.R.Gaur,1990,Science and Humanism,Comm on wealth Publishers. A.N.Tripathy,2003,Human Values,NewAgeInternational Publishers.
6. Subhas Palekar, 2000, How to practice Natural Farming, Pracheen(Vaidik) Krishi TantraShodh, Amravati.

7. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, Limits to Growth - Club of Rome's report, Universe Books.
8. E G Seebauer & Robert L. Berry, 2000, Fundamentals of Ethics for Scientists & Engineers, Oxford University Press.
9. M Govindrajan, S Natrajan & V. S Senthil kumar, Engineering Ethics (including HumnaValues), Eastern Economy Edition, Prentice Hall of India Ltd.

Relevant CDs, Movies, Documentaries & Other Literature:

1. Value Education website, <http://www.uptu.ac.in>
2. Story of Stuff, <http://www.storyofstuff.com>
3. Al Gore, An In convenient Truth, Paramount Classics, USA
4. Charle Chaplin, Modern Times, United Artists, USA
5. IIT Delhi, ModernTechnology-the Untold Story

COURSE OUTCOMES:

1. The students will be able to obtain happiness and prosperity in their life.
2. They will develop harmony a tall levels.
3. They can have satisfying human behavior throughout their life

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I Year B. TECH-II-SEM

L/T/P/C

2/-/-2

(R22A0002) PROFESSIONAL ENGLISH

INTRODUCTION:

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

COURSE OBJECTIVES:

- 1 To enrich students to express themselves appropriately and fluently in professional contexts.
- 2 To enhance their employ ability through regular participation in group discussions and interview skills.
- 3 To lay foundation with writing strategies for the future work place needs.
- 4 To acquaint students with different components of professional presentation skills.
- 5 To equip students with necessary training in listening to comprehend dialects of English language.

UNIT-I***“Moksha gundam Visvesvaraya”***

Speaking	- Description of Pictures, Places, Objects and Persons
Grammar	-‘If’ Clauses
Vocabulary	-Homonyms, homophones and homographs
Writing	-Paragraph Writing

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	- Oral presentations
Grammar	-Transformation of Sentences
Vocabulary	-Idioms

Writing -Abstract Writing

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

Unit–IV

'Howa Chinese Billionaire Built HerFortune'

Speaking - Telephonic Expressions and Conversations

Grammar - Auxiliary

verbs& model Verbs, Degrees of Comparison

Vocabulary - Word Analogy

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. MichaelSwan.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 UniversityPress.2006.
5. Communication Skills. Sanjay Kumar and PushpaLata. Oxford UniversityPress.2011.
6. Exercises in Spoken English. Parts. I- III. CIEFL, Hyderabad. Oxford University Press
7. 'English for Engineers'. Cambridge University Press

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I Year B. TECH-II-SEM

L/T/P/C

3/1/-/4

(R22A0024) MATHEMATICS-II

COURSE 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 datapoints 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 $1/3^{\text{rd}}$ and Simpson's $3/8^{\text{th}}$ 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).

TEXTBOOKS:

- a. Higher Engineering Mathematics by BV Ramana, Tata McGraw Hill.
- b. Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers.
- c. Mathematical Methods by S.R. Klyenger, 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.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I Year B. TECH-II-SEM

L/T/P/C

3/-/-3

(R22A0201) PRINCIPLES OF ELECTRICAL AND ELECTRONICS ENGINEERING

COURSE OBJECTIVES:

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

UNIT-I:

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

NETWORK ANALYSIS (D.C EXCITATION): Serie 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 phase difference, 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 JUNCTIONDIODE: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.

ZENERDIODE: 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 Characteristics, MOSFET (Enhancement and Depletion mode) Symbol, Construction, Principle of Operation and its Characteristics.

TEXTBOOKS:

1. Engineering Circuit Analysis-William Hayt, Jack E. Kemmerly, SM Durbin, McGraw Hill Companies.
2. Electric Circuits-A.Chakrabarhty, DhanipatRai&Sons.
3. Electrical Machines–P.S. Bimbira, Khanna Publishers.
4. “Electronic Devices & Circuits”, Special Edition– MRCET, McGraw Hill Publications,2017.
5. Integrated Electronics Analog Digital Circuits, Jacob Millman and D. Halkias, McGraw Hill.
6. Electronic Devices and Circuits,S. Salivahanan, N. Sureshkumar ,McGraw Hill.

REFERENCE BOOKS

1. Network analysis by M.E VanValkenburg, PHI learning publications.
2. Network analysis-N.C Jagan and C. Lakhminarayana, B S publications.
3. Electrical Circuits by A.Sudhakar, Shyammohan and S Palli, Mc Graw Hill Companies.
4. Electrical Machines by I .J. Nagrath &D.P. Kothari, Tata McGraw-Hill Publishers.
5. Electronic Devices and Circuits, K. LalKishore, B.S Publications
6. Electronic Devices and Circuits, G.S.N. Raju, I.K. International Publications,NewDelhi,2006.

COURSE OUTCOMES:

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 to fimpedance parameters and power.
4. Understand the Constructional Details and Principle of Operation of DC Machines and Transformers
5. To understand the concepts of p-n diode, rectifiers and Zener diode
6. To understand the concepts of BJTs, JFET and MOSFETs

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I Year B. TECH-II- SEM

L/T/P/C

2/-/2/3

(R22A0301) COMPUTER AIDED ENGINEERING GRAPHICS

COURSE OBJECTIVES:

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

UNIT I:

Introduction to Auto CAD: Introduction to software interface Standard toolbar/menu, Understanding the co-ordinate systems-2D and 3D Visualization, 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 II:

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 III:

Projections of Planes: Introduction to Regular 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 IV:

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

UNIT V:

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

TEXTBOOKS:

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,32ndedition,2005-Subash Publishers, Bangalore.

COURSE OUTCOMES:

After the completion of course the student will be capable to

1. To produce geometric construction, dimensioning & Curves and detail drawings.
2. To compile Projections of points, lines, then create virtual drawing by using computer
3. To sketch the Planes and Solid Projections
4. To develop isometric drawings of simple objects reading the orthographic projections of those objects.
5. To understand and visualize the 3-D view of engineering objects. Elaborate the conversions of 2D -3D and Vice-Versa

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I Year B. TECH-II- SEM

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3/-/-/3

(R22A0502) 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:

Up on 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.

TEXTBOOKS

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.

REFERENCE BOOKS:

1. Core Python Programming, W. Chun, Pearson.
2. Introduction to Python, Kenneth A. Lambert, Cengage.
3. Learning Python, Mark Lutz, Orielly.

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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.

COURSE 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—AskingforandGivingDirections—ThankingandResponding—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 Lab for 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-2.8GHZ
 - b) RAM-512MBMinimum
 - c) HardDisk-80GB
- 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-dayworkand10markstobeawardedbyconductingInternalLabTest(s).The year-endExaminationshallbeconductedbytheteacherconcernedwiththehelpof another member of the staff of the same department of the other institution.

COURSE 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 there by 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 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 Superposition theorem.
5. Magnetization characteristics of DC shunt generator.
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:***Attend 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 test on transformers and DC motors.
4. Plot the characteristics of Zener diodes.
5. Determine the working of rectifiers in detail.

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(R22A0582) 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 items
- B) Write a python program using the following methods:1)count 2)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

Week 10:

- 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.

Week 11:

- 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().

Week 12:

- 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.

TEXTBOOKS:

1. R.NageswaraRao, "Core Python Programming", dreamtech.
2. Allen B. Downey, "Think Python: How to Think Like a Computer Scientist", Second Edition, 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.

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(R22A0004) ENVIRONMENTAL SCIENCE

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

1. CO1: To distinguish the interrelationship 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.

UNIT-I: ECOSYSTEMS(6hours)

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: 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 (6hours)

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(5hours)

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(4hours)

Definition of sustainable development, sustainable development goals, threats to sustainability, strategies to achieve sustainable development.

Activities: Worksheets, seminars, s logans, group projects.

TEXTBOOKS:

1. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha 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 AnubhaKaushik,4Edition,Newage international publishers
2. Environmental Science: towards a sustainable futurebyRichardT.Wright.2008 PHL Learning Pvt. Ltd, New Delhi
3. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela. 2008PHL Learning Pvt. Ltd, New Delhi
4. Environmental Science by Daniel B. Botkin & Edward A. Keller, Wiley INDIA edition

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.

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(R22A0503) DATA STRUCTURES

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 Nonlinear 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.

TEXT BOOKS:

1. Data structures and algorithms in python by Michael T. Good rich
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 Millerand David L. Ranum.
4. Core Python Programming- Second Edition, R. NageswaraRao, 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.

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(R22A0504) DATABASE MANAGEMENT SYSTEMS

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 –Testing for serializability- Lock–Based Protocols– Timestamp Based Protocols-Validation-Based Protocols– Multiple Granularity.

UNIT-V:

Recovery and Atomicity– Log– Based Recovery – Recovery with Concurrent Transactions– Check Points- Buffer Management–Failure with loss of non-volatile storage.

TEXTBOOKS:

1. Database System Concepts, Silberschatz, Korth, Mc Graw hill, Sixth Edition.(All units except IIIrd)
2. Database Management Systems, Raghu Ramakrishnan, Johannes Gehrke, TATA McGraw Hill 3rd Edition.

REFERENCE BOOKS:

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

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(R22A0505) SOFTWARE ENGINEERING

COURSE OBJECTIVES:

1. The aim of the course is to provide an understanding of the working knowledge of the techniques to understand Software development as a process.
2. Various software process models and system models.
3. Various software designs, Architectural, object oriented, user interface etc.
4. Software testing methodologies overview: various testing techniques including white box testing black box testing regression testing etc.
5. Software quality: metrics, risk management quality assurance etc.

UNIT-I:

Introduction to Software Engineering: The evolving role of software, changing nature of software, software myths.

A Generic view of process: Software engineering-a layered technology, a process framework, the capability maturity model integration(CMMI).

Process models: The waterfall model, Spiral model and Agile methodology

UNIT-II:

Software Requirements: Functional and non- functional requirements, user requirements, system requirements, interface specification, the software requirements document.

Requirements engineering process: Feasibility studies, requirements elicitation and analysis, requirements validation, requirements management.

UNIT-III:

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

UNIT-IV:

Testing Strategies: A strategic approach to software testing, test strategies for conventional software, black-box and white-box testing, validation testing, system testing, the art of debugging.

Metrics for Process and Products: Software measurement, metrics for software quality.

UNIT-V:

Risk management: **Reactive Vs proactive risk strategies, software risks, risk identification, risk projection, risk refinement, RMMM.**

Quality Management: Quality concepts, software quality assurance, software reviews, formal technical reviews, statistical software quality assurance, software reliability, the ISO 9000 quality standards.

TEXTBOOKS:

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

COURSE OUTCOMES:

1. Understand software development life cycle Ability to translate end-user requirements into system and software requirements.
2. Structure the requirements in a Software Requirements Document and Analyze Apply various process models for a project, Prepare SRS document for a project
3. Identify and apply appropriate software architectures and patterns to carry out high level design of a system and be able to critically compare alternative choices.
4. Understand requirement and Design engineering process for a project and Identify different principles to create an user interface
5. Identify different testing methods and metrics in a software engineering project and Will have experience and/or awareness of testing problems and will be able to develop a simple testing report

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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.

UNIT- I:

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.

UNIT-II:

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.

UNIT-III:

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

UNIT-IV:

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

UNIT-V:

Branch and Bound: General method, applications- Travelling sales person problem, 0/1 Knapsack problem LC branch and Bound solution, FIFO branch and bound solution.

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

TEXTBOOKS:

1. Fundamentals of Computer Algorithms, Ellis Horowitz, SatrajSahni and Rajasekharan, Universities press
2. Design and Analysis of Algorithms, P.h. Dave, 2nd edition, Pearson Education.

REFERENCEBOOKS:

1. Introduction to the Design And Analysis of Algorithms A Levitin Pearson Education
2. Algorithm Design foundations Analysis and Internet examples, M.T. Good rich and R Tomassi a John Wiley and sons
3. Design and Analysis of Algorithms, S. Sridhar, Oxford Univ. Press
4. Design and Analysis of Algorithms, Aho, Ulmanand Hop craft, Pearson Education.
5. Foundations of Algorithms, R.Neapolitan and K.Naimipour, 4th edition

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.

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(R22A0026) PROBABILITY, STATISTICS AND QUEUEING THEORY

COURSE OBJECTIVES:

1. To understand a random variable that describes randomness or an uncertainty in certain realistic situation. It can be either discrete or continuous type.
2. 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.
3. To Understand linear relationship between two variables and also to predict how a dependent variable change based on adjustments to an independent variable.
4. To learn the types of sampling, sampling distribution of means and variance, Estimations of statistical parameters.
5. Use of probability theory to make inferences about a population from large and small samples.
6. To understand different queuing models.

UNIT-I: Basic Probability and Random Variables

Basic Probability: Definition, The axioms of probability and basic problems.

Single Random Variables: Discrete and Continuous. Probability distribution function, Probability mass and density functions, mathematical expectation.

Multiple Random variables: Discrete and Continuous, Joint probability distributions-Joint probability mass and density functions, Marginal probability mass and density functions.

UNIT-II: Probability Distributions

Binomial distribution – properties, mean, variance and recurrence formula for Binomial distribution, Poisson distribution – Poisson distribution as Limiting case of Binomial distribution, properties, mean variance and recurrence formula for Poisson distribution, Normal distribution–mean, variance, median, mode and characteristics of Normal distribution.

UNIT-III: Correlation and Regression

Correlation -Coefficient of correlation, Rank correlation, Regression- Regression coefficients, Lines of regression.

Multiple correlation and regression- Coefficient of multiple Correlation, multiple regression, Multiple linear regression equations.

UNIT-IV: Testing of Hypothesis

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, and 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: Queuing Theory

Queuing theory –Structure of a queuing system and its characteristics-Arrival pattern and service pattern- Pure birth and Death process.

Terminology of Queuing systems-queuing model sand its types -M/M/1Model of infinite queue (without proofs) and M/M/1 Model of finite queue (without proofs).

TEXT BOOKS:

1. Fundamental of Statistics by S.C. Gupta,7th Edition,
2. Fundamentals of Mathematical Statistics by SC Gupta and V.K.Kapoor
3. Higher Engineering Mathematics by B.S. Grewal, KhannaPublishers,35thEdition,2000.
4. R. A. Johnson, Miller and Freund's "Probability and Statistics for Engineers", Pearson Publishers, 9th Edition, 2017.

REFERENCE BOOKS:

1. Introduction to Probability and Statistics for Engineers and Scientists by Sheldon M. Ross.
2. 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 in sight 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. To design balanced systems that serve customers quickly and efficiently but it is not cost effective.

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(R22A0583) DATA STRUCTURES LAB

COURSE OBJECTIVES:

1. To understand arrange 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 on-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 over loading 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 LinkedList

WEEK 9: Write a program to implement Doubly LinkedList

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

WEEK 11: Write a program to implement BinarySearchTree

WEEK 12: Write a program to implement B+ Tree

COURSE OUTCOMES:

The students should be able to:

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

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(R22A0584) DATABASE MANAGEMENT SYSTEMS LAB

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/ Mongo DB and practicing DDL, commands

TEXTBOOKS:

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

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 XTeam, S. Shahand 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

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(R22A0585) SOFTWARE ENGINEERING LAB

Prerequisites

- A course on “Programming for Problem Solving”.

Co-requisite

- A Course on “Software Engineering”.

COURSE OBJECTIVES:

- Discuss and Analyses how to develop software requirements specifications for a given problem.
- To underst and Software development as a process
- To implement Various software designs, data flow diagram models.
- various testing techniques including white box testing black box testing regression testing
- To have hands on experience in developing a software project by using various software engineering principles and methods in each of the phases of software development.

COURSE OUTCOMES:

- Ability to translate end-user requirements into system and software requirements
- Ability to generate a high-level design of the system from the software requirements
- Will have experience and/or awareness of testing problems and will be able to develop a simple testing report
- Understand and develop various structure and behavior UML diagrams.
- Explain the knowledge of project management tool Demonstrate how to manage file using Project Libre project management tool.

LIST OF EXPERIMENTS:

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

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

TEXTBOOKS:

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

REFERENCE BOOKS:

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

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(R22A0005) FOREIGN LANGUAGE: FRENCH

INTRODUCTION

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

COURSE OBJECTIVES:

1. To inculcate the basic knowledge of the French language
2. To hone the basic sentence constructions in day today expressions for communication in their vocation
3. To form simple sentences that aids in day-to-day communication
4. To prepare the students towards DELFA1
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–verbs in the
present-Possessive adjectives - Qualifying adjectives
Vocabulary: The family–Clothes-Colors-The numbers from 1 to 100-The classroom

UNIT-III:

Speaking: Talk about your daily activities-be in time-ask and indicate the date and
time- talk about sports and recreation - express the frequency
Writing: A letter to a friend
Grammar: The expression of time– The–irverbs 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. Apprenonsle Français1&2, New Saraswati House,2015
2. Apropos ,A1, Langers International,2010
3. Easy French Step-by-step_by Myrna Bell Rochester
4. Ultimate French Beginner-Intermediate (Coursebook) By Livid Language
5. À L'Aventure: An Introduction to French Language and Franco phone Cultures by Evelyne 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

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(R22A0028) DISCRETE MATHEMATICS

COURSE OBJECTIVES:

1. Describe mathematical concepts as applied in computer science for solving logical problems.
2. Understanding the concepts of sets, functions, relations, recurrence relations and Lattices.
3. Understand the concepts on elementary combinations and permutations.
4. To develop the mathematical skills needed for advanced quantitative courses.
5. Analyze the properties of graphs and trees.

UNIT-I:

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

UNIT-II:

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

UNIT-III:

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

UNIT-IV:

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

UNIT-V:

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

TEXTBOOKS:

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 I. Mott, Abraham Kandel, Theodore 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 Mc Graw Hill publishing co.

COURSE OUTCOMES:

1. Understand and construct precise mathematical proofs
2. Apply logic and set theory to formulate precise statements
3. Analyze and solve counting problems on finite and discrete structures
4. Describe and manipulate sequences
5. Apply graph theory in solving computing problems

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(R22A0507) OBJECT ORIENTED PROGRAMMING THROUGH JAVA

COURSE OBJECTIVES:

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

UNIT-I:

Java Programming-History of Java, comments, Java Buzzwords, Datatypes, 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 standalone 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 to4 drivers, Connecting to a database, querying a database and processing the results, updating data with JDBC, Data Access Object (DAO).

UNIT-V:

GUI Programming with Swing - The AWT class hierarchy, Introduction to Swing, Swing Vs AWT, Hierarchy for Swing components, Overview of some Swing components – JButton, JLabel, JTextField, JTextArea, simple Swing applications, Layout management – Layout manager types –border, grid and flow.

Event Handling- Events, Event sources, Event classes, Event Listeners, Delegation event model, Examples: Handling Mouse and Key events, Adapter classes.

TEXTBOOK:

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. Deitel and H.M. Deitel, PHI
2. Object Oriented Programming through Java, P. Radha Krishna, Universities Press.
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
 - a. synchronization
4. Understand the use of Collection Framework
5. Design GUI based applications using AWT and Swings

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(R22A0509) OPERATING SYSTEMS

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

TEXTBOOKS:

1. Beginning Linux Programming– Neil Mathew, Richard Stones 4th Edition, Wiley
2. Operating System Principles- Abraham Silberschatz, Peter B. Galvin, Greg Gagne 7thEdition, John Wiley
3. Unix System Programming using C++, T. Chan, PHI.
4. Unix Concepts and Applications, 4th Edition, Sumitabha Das, 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.

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(R22A1201) AUTOMATA AND COMPILER DESIGN

COURSE OBJECTIVES:

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

UNIT-I

Formal Language and Regular Expressions: Languages, Definition Languages regular expressions, Finite Automata - DFA, NFA. Conversion of regular 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 now 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. Introduction to Theory of computation. Sipser, 2nd Edition, Thomson.
2. Compilers Principles, Techniques and Tools Aho, Ullman, Ravi Sethi, Pearson Education.

REFERENCE BOOKS:

1. Modern Compiler Implementation in C-Andrew N. Apple, Cambridge University Press.
2. Lex & yacc–John R. Levine, Tony Mason, Doug Brown, O'Reilly
3. Modern Compiler Design- Dick Grune, Henry E. Bal, Criel T. H. Jacobs, Wileydreamtech.
4. Engineering a Compiler- Cooper & Linda, Elsevier.
5. Compiler Construction, Loudon, Thomson.
6. Introduction to Automata Theory Languages and Computation". Hopcroft H.E. and Ullman J.D. Pearson Education.

COURSE OUTCOMES:

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

- 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.

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(R22A1202) COMPUTER ORGANIZATION AND MICROPROCESSORS

COURSE OBJECTIVES:

This course will enable students to

1. To understand the basic components of computers.
2. To learn the architecture of 8086processor, instruction sets, instruction formats and various addressing modes of 8086.
3. To understand the representation of data at the machine level and how computations are performed at machine level.
4. To gain knowledge about the memory organization and I/ O organization.
5. To comprehend the parallelism both in terms of single and multiple processors.

UNIT-I

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

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

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

UNIT-II

Central Processing Unit: The 8086 Processor Architecture, Register organization, Physical memory organization, Minimum and Maximum mode system and timings. 8086 Instruction Set and Assembler Directives- Addressing modes, Instruction set of8086, Assembler directives.

UNIT-III

Assembly Language Programming with 8086- Programming with an assembler, Assembly Language example programs. Stack structure of 8086, Interrupts and Interrupt service routines, Interrupt cycle of 8086, Passing parameters to procedures, Macros.

UNIT-IV

Computer Arithmetic: Introduction, Addition and Subtraction, Multiplication Algorithms, Division Algorithms.

Input-Output Organization: Peripheral Devices, Input-Output Interface, Asynchronous data transfer, Modes of Transfer, Priority Interrupt, Direct memory Access, Input –Output Processor (IOP).

UNIT-V

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

Pipeline and Vector Processing: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processors.

TEXTBOOKS:

1. Computer System Architecture, M. Morris Mano, Third Edition, Pearson.(UNITS-I , IV , V).
2. Advanced Microprocessors and Peripherals, K M Bhurchandi, A.K Ray 3rd edition, Mc Graw Hill India Education Private Ltd.(UNITS - II, III).

REFERENCE BOOKS:

1. Microprocessors and Interfacing, D V Hall, SSSP Rao, 3rd edition, Mc Graw Hill India Education Private Ltd.
2. Carl Hamacher, Zvonko Vranesic, Safwat Zaky: Computer Organization, 5th Edition, Tata McGraw Hill, 2002.
3. Computer Organization and Architecture, William Stallings, 9th Edition, Pearson.
4. David A. Patterson, John L. Hennessy: Computer Organization and Design – The Hardware /Software Interface ARM Edition, 4th Edition, Elsevier, 2009.

COURSE OUTCOMES:

1. Ability to illustrate basic components and the design of CPU, ALU and Control Unit.
2. Ability to analyze memory hierarchy and its impact on computer cost/performance.
3. Ability to compare the advantage of instruction level parallelism and pipelining for high performance Processor design.
4. Ability to demonstrate the instruction set, instruction formats and addressing modes 8086.
5. Ability to write assembly language programs to solve problems.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II Year B. TECH-II- SEM

L/T/P/C

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(R22A0586) OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB

COURSE OBJECTIVES:

1. To prepare students to become familiar with the Standard Java technologies of J2SE
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

Week1:

- 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

Week2:

- 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

Week3:

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

Week4:

- a) Write a program to create an abstract class named Shape that contains two integers and an empty method named print Area(). 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 print Area () 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

Week5:

- 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.

Week6:

- 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

Week7:

- 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

Week8:

Write a program to implement following collections

- a) Array List b) Vector c) Hash table d) Stack

Week9:

- a) Write a program for producer and consumer problem using Threads

Week10:

- 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

Week11:

- 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

Week12:

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

COURSE OUTCOMES:

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

1. Analyze the necessity for Object Oriented Programming paradigm and over structured programming and become familiar with the fundamental concepts in OOP.
2. Demonstrate an ability to design and develop Java programs, analyze, and interpret object oriented data and report results.
3. Analyze the distinguish between various types of inheritance.
4. Demonstrate an ability to design an objectoriented 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

II Year B. TECH-IT-II-SEM

L/T/P/C

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(R22A0587) OPERATING SYSTEMS LAB

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

WEEK6:

a) Write a program that illustrate communication between two process using unnamed pipes

WEEK7:

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

WEEK8:

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

WEEK9:

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

WEEK10:

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

WEEK11:

a) Write a C program to create child process and allow parent process to display “parent” and the child to display “child” on the screen

WEEK12:

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

TEXTBOOKS:

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 STanenbaum,2ndedition, Pearson/PHI
4. UNIX Programming Environment, Kernighanand Pike, PHI/Pearson Education
5. UNIX Internals: The New Frontiers, U. Vahalia, Pearson Education

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II Year B. TECH–II-SEM

L/T/P/C

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(R22A0061) PUBLIC POLICY & 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.,andHindmoor,A.(2009)RethinkingGovernance:TheCentralityofthe StateinModernSociety,Cambridge:CambridgeUniversityBell,Stephenand 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 gamutofits canvas.
3. Students will understand the what are emerging trends in public and private
4. Governance and various theories in public policy making

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III Year B. TECH-I-SEM

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(R22A6702) DATA SCIENCE

COURSE OBJECTIVES:

The students should be able to:

1. Understand the data science process.
2. Conceive the methods in R to load, explore and manage large data.
3. Choose and evaluate the models for analysis.
4. Describe the regression analysis.
5. Select the methods for displaying the predicted results.

UNIT –I**Introduction to Data Science**

Data Science Process: Roles in a data science project, Stages in a data science project, Applications of data science.

Overview of R: Basic Features of R, R installation, basic data types: Numeric, Integer, Complex, Logical, Character. Data Structures: vectors, lists, matrices, array, data frames, factors.

Control Structures: if, if-else, for loop, while loop, next, break. Functions: named arguments, default parameters, return values.

UNIT –II**Loading, Exploring and Managing Data**

Working with data from files: Reading and writing data, reading data files with read.table(), Reading in larger datasets with read.table. Working with relational databases.

Data manipulation packages: dplyr, data.table, reshape2, tidyr, lubridate.

UNIT–III**Exploratory Data Analysis and Validation Approaches**

Data validation: handling missing values, null values, duplicate values, outlier detection, data cleaning, data loading and inspection, data transformation.

Cross validation: Validation set approach, leave one out cross validation, k-fold cross validation, repeated k-fold cross validation.

UNIT – IV**Modelling Methods**

Supervised: Regression Analysis in R, linear regression, logistic regression, naive bayes classifier, decision tree, random forest, knn classifier,

Unsupervised: kmeans clustering, association rule mining, apriori algorithm.

UNIT – V**Data Visualization in R**

Introduction to ggplot2: Univariate graphs: categorical, quantitative, bivariate graphs categorical vs. categorical, quantitative vs quantitative, categorical vs. quantitative, multivariate graphs : grouping, faceting.

TEXT BOOKS:

1. Practical Data Science with R, Nina Zumel & John Mount , Manning Publications NY, 2014.
2. Beginning Data Science in R-Data Analysis, Visualization, and Modelling for the Data Scientist -Thomas Mailund –Apress -2017.

REFERENCE BOOKS:

1. The Comprehensive R Archive Network-<https://cran.r-project.org>.
2. R for Data Science by Hadley Wickham and Garrett Golemund , 2017 , Published by O Reilly Media, Inc.
3. R Programming for Data Science -Roger D. Peng, 2015 , Lean Publishing.
4. <https://rkabacoff.github.io/datavis/IntroGGPLOT.html>.

COURSE OUTCOMES:

The students will be able to:

- Analyze the basics in R programming in terms of constructs, control statements, Functions.
- Implement Data Preprocessing using R Libraries.
- Apply the R programming from a statistical perspective and Modelling Methods.
- Build regression models for a given problem.
- Illustrate R programming tools for Graphs.

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III Year B. TECH–I-SEM

L/T/P/C
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(R22A1204) WEB APPLICATION DEVELOPMENT

COURSE OBJECTIVES:

1. To study the insights of the Web architecture and PHP Frame work.
2. To gain knowledge in interfacing Java Servlet Program with JDBC Connection.
3. To be trained to dynamically generate the web pages using Java Server Pages.
4. To understand the designing applications over web using Spring Framework.
5. To get acquainted with applications over the web using 'Django' Framework.

UNIT-I

Web Basics and Overview: Introduction to Internet, World Wide Web, Web Browsers, URL,HTTP.PHP: Declaring Variables, Data types, Operators, Control structures, Functions.

MVC Framework and Design Pattern, Types of PHP MVC framework.

UNIT-II

Servlets: Introduction to Servlets, Benefits of Servlets, use as controller in MVC, servlet lifecycle, basic HTTP, Reading Servlet parameters servlet session, cookies, Servlets API.

JDBC: JDBC Architecture, JDBC API, Connecting to a Database Using JDBC.

UNIT-III

Java Server Pages: Generating Dynamic Content, Using Scripting Elements, Implicit JSP

Objects. Conditional Processing – Displaying Values, setting attributes, Error Handling and Debugging.

UNIT-IV

Java Script: Introduction to Java Script, Declaring variables, Functions, Event handlers (onclick, on submit, etc.,) and Form Validation.

Spring Framework: Overview, Controllers, Handler Methods, and Developing Web Application using spring.

UNIT-V

Django: Introduction to Django, Django architecture, Django Models and Database Backends, Developing Web Application using Django.

TEXT BOOKS:

1. Hans Bergsten , Java Server Pages, O'Reilly, 2003
2. Jason Hunter, William Crawford , Java Servlet Programming, Second Edition, , O'ReillyMedia

REFERENCE BOOKS:

1. Joseph J. Bambara, Paul R. Allen, Mark Ashnault, Ziyad Dean, Thomas Garben, Sherry Smith J2EE UNLEASHED — SAMS Tech media 5 StepahnieBodoff, Dale Green, Kim Hasse, Eric Jendrock, Monica Pawlan, Beth Stearns , The J2EE Tutorial, Pearson Education ,Asia.
2. Learning Django Web Development, Sanjeev Jaiswal Ratan Kumar, PACKT Publishing.
3. <https://www.djangoproject.com/> spring framework (IBM)

COURSE OUTCOMES:

1. Analyze a web page and identify its elements and attributes of PHP Frame Work.
2. Installation and usage of Server Software's & Web.xml Deployment.
3. Database Connectivity to web applications.
4. Build web applications using Servlet and JSP.
5. Build web applications using to Django.

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III Year B. TECH–I-SEM

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(R22A6601) ARTIFICIAL INTELLIGENCE

COURSE OBJECTIVES:

1. To learn about Intelligent Agents and environments.
2. To acquire knowledge about uninformed and informed search algorithms.
3. To understand knowledge-based systems using First order logic and Uncertain Domains.
4. To comprehend knowledge acquisition through various learning techniques.
5. To understand the purpose and concepts of Expert Systems.

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, AO* 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, Non monotonic Reasoning, Other Knowledge Representation Schemes Reasoning Under Uncertainty: Basic probability, Acting Under Uncertainty, Bayes' Rule, Representing Knowledge in an Uncertain Domain, Bayesian Networks

UNIT - IV:

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

UNIT - V:

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

TEXT BOOKS:

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

REFERENCE BOOKS:

1. Artificial Intelligence, Elaine Rich, Kevin Knight, Shivasankar B. Nair, The McGraw Hill publications, Third Edition, 2009. 2. George F. Luger,
2. Artificial Intelligence: Structures and Strategies for Complex Problem Solving, Pearson Education, 6th ed., 2009.

COURSE OUTCOMES:**At the end of the course, Students should be able to:**

1. Apply search strategies to solve problems.
2. Represent real- life problems in a state space representation and devise solutions.
3. Devise knowledge representation frameworks for systems and games.
4. Formulate valid solutions for problems involving uncertain inputs or outcomes.
5. Design and evaluate expert models for perception and prediction from intelligent environment

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III Year B. TECH-I-SEM

L/T/P/C
3/0/0/3**Professional Elective - I**
(R22A0564) MOBILE COMPUTING**COURSE OBJECTIVES:**

1. To make the student understand the concept of mobile computing paradigm, its novel applications and limitations.
2. To understand the typical mobile networking infrastructure through a popular GSM protocol.
3. To understand the issues and solutions of various layers of mobile networks, namely MAC layer, 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 Ad hoc Networks (MANETs): Introduction, Applications & Challenges of a MANET, Routing, Classification of Routing Algorithms, Algorithms such as DSR, AODV, DSDV, etc., Mobile Agents,

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. Able to think and develop new mobile application.
2. Able to take any new technical issue related to this new paradigm and come up with a solution(s).
3. Able to develop new ad hoc network applications and/or algorithms/protocols.
4. Able to understand & develop any existing or new protocol related to mobile environment

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III Year B. TECH–I-SEM

L/T/P/C

3/0/0/3

Professional Elective-I
(R22A0514) DISTRIBUTED SYSTEMS**COURSE OBJECTIVES:**

1. To learn the principles, architectures, algorithms and programming models used in distributed systems.
2. To understand the algorithms of mutual exclusion, election & multicast communication.
3. To learn the different mechanisms for Inter process communication and remote invocations.
4. To acquire knowledge and implement sample distributed systems.
5. To learn transactions and concurrency control mechanisms in different distributed environments.

UNIT - I

Characterization of Distributed Systems: Introduction, Examples of Distributed systems, Resource Sharing and Web, Challenges.

System Models: Introduction, Architectural models, Fundamental models.

UNIT - II

Time and Global States: Introduction, Clocks, Events and Process states, Synchronizing Physical clocks, Logical time and Logical clocks, Global states.

Coordination and Agreement: Introduction, Distributed mutual exclusion, Elections, Multicast Communication, Consensus and Related problems.

UNIT - III

Inter process Communication: Introduction, Characteristics of Inter process communication, External Data Representation and Marshalling, Client-Server Communication, Group Communication

Distributed Objects and Remote Invocation: Introduction, Communication between Distributed Objects, Remote Procedure Call, Events and Notifications

UNIT - IV

Distributed File Systems: Introduction, File service Architecture, Case Study: 1: Sun Network File System , Case Study 2: The Andrew File System.

Distributed Shared Memory: Introduction, Design and Implementation issues, Consistency Models.

UNIT - V

Transactions and Concurrency Control: Introduction, Transactions, Nested Transactions, Locks, Optimistic concurrency control, Timestamp ordering, Comparison of methods for concurrency control.

Distributed Transactions: Introduction, Flat and Nested Distributed Transactions, Atomic commit protocols, Concurrency control in distributed transactions, Distributed deadlocks, Transaction recovery.

TEXT BOOKS:

1. Distributed Systems Concepts and Design, G Coulouris, J Dollimore and T Kindberg, Fourth Edition, Pearson Education. 2009.

REFERENCE BOOKS:

1. Distributed Systems, Principles and paradigms, Andrew S.Tanenbaum, Maarten VanSteen, Second Edition, PHI.
2. Distributed Systems, An Algorithm Approach, Sikumar Ghosh, Chapman & Hall/CRC Taylor & Francis Group, 2007.

COURSE OUTCOMES:

1. Able to compare different types of distributed systems and different models.
2. Able to analyze the algorithms of mutual exclusion, election & multicast communication.
3. Able to evaluate the different mechanisms for Interprocess communication and remote in vocations.
4. Able to design and develop new distributed applications.
5. Able to apply transactions and concurrency control mechanisms in different distributed environments.

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III Year B. TECH-I-SEM

L/T/P/C

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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 MATLAB: Rafael C. Gonzalez, Richard E. Woods, Steven L. Eddins: Pearson Education India,2004.
3. Digital Image Processing: William K. Pratt, John Wiley, 3rd Edition,2004.
4. Image Processing, Analysis and Machine Vision, Second Edition, Milan Sonka, aclaav 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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III Year B. TECH–I-SEM

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3/0/0/3

Professional Elective-I

(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, Super Netting, 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.

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III Year B. TECH-I-SEM

L/T/P/C
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(R22A1282) DATA SCIENCE & ARTIFICIAL INTELLIGENCE LAB

COURSE OBJECTIVES:

The students will be able:

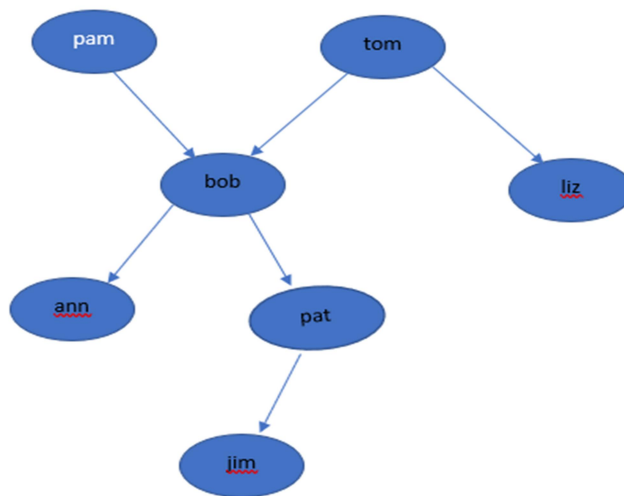
- 1.To identify core principles of R programming for data science
- 2.To get the idea regarding installation of packages in R
- 3.To imbibe the functions for data manipulation
- 4.To understand the Prolog programming environment
- 5.To perceive how to develop a logical system.

R Programming

- 1) a. Write a R program to create a list containing strings, numbers, vectors and logical values.
b. Write a R program to merge two given lists into one list.
c. Write a R program to create a list containing a vector, a matrix and a list and give names to the elements in the list. Access the first and second element of the list.
- 2) a. Write a R program to read a CSV file.
b. Write R program to read Text file.
c. Write a R Program to read and load data from larger datasets
- 3) Install the necessary R packages and apply data manipulation packages- dplyr, data.table, reshape2, tidyr, Lubridate.
- 4) a. Write a R program to handling values, null values and duplicate values.
b. Write a R program to handle outlier detection.
c. Write a R program to clean, transform and load the data.
- 5) a. Write a R program to apply K-fold cross validation method in splitting the data and apply any machine learning model.
b. Write a R program to apply Leave One out cross validation method in splitting the data and apply any machine learning model.
- 6) a. Write a R program to build linear regression and predict the model.
b. Write a R program to build logistic regression and predict the model.
- 7) Write R Programs to implement decision tree and K Nearest Neighbour algorithms
- 8) Write a R program to create univariate and bivariate graphs in R.

Prolog Programming

- 1)
 - a) Procedure for the installation of GNU Prolog.
 - b) Write a Prolog program for the usage of all arithmetic Operators.
 - c) Write a Prolog program to find the maximum and minimum of given two numbers.
- 2)
 - a) Write a Prolog program for factorial of a given number.
 - b) Write a Prolog program for Fibonacci of a given number.
 - c) Write a Prolog program for solving the Towers of Hanoi problem.
- 3) Write a Prolog program for N-Queens Problem.
- 4) Write a Prolog program for depicting and inferring from the given Family relationship diagram.



Sample family Tree

Facts:

female(pam)
male(tom)
male(bob)
female(liz)
female(pat)
female(ann)
male(jim)

- 5) Write a Prolog program for implementing the solution for 8-Puzzle problem.
- 6) Write a Prolog program for implementing the Water Jug Problem.

REFERENCE BOOKS:

1. Practical Data Science with R, NinaZumel & John Mount , Manning Publications, NY, 2014
2. R for Data Science by Hadley Wickham and Garrett Grolemond , 2017 , Published byOReilly Media, Inc.,
3. R Programming for Data Science - Roger D. Peng, 2015 , Lean Publishing.

COURSE OUTCOMES:

The students will be able:

- To write Prolog programs
- To develop a logical system
- To install packages and apply data manipulation packages
- To build model using sample datasets
- To predict the functions for data manipulation

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III Year B. TECH-I-SEM

L/T/P/C
-/0/2/1

(R22A1283) WEB APPLICATION DEVELOPMENT LAB

COURSE OBJECTIVES:

The student should be able:

1. To study the insights of HTML, JavaScript and XML usage
2. To gain understanding regarding the use of Tomcat Server
3. To get an idea about the working of Servlets and JSP
4. To identify the usage of Beans and Spring framework

1. Design the following static web pages required for an online book store web site.

a) HOME PAGE: The static home page must contain three **frames**.

b) LOGIN PAGE

c) CATALOGUE PAGE: The catalogue page should contain the details of all the books available in the web site in a table.

d) REGISTRATION PAGE

2. Develop and demonstrate PHP Script for the following problems:

a) Write a PHP Script to find out the Sum of the Individual Digits.

b) Write a PHP Script to check whether the given number is Palindrome or not

3. Write an XML file to display the Book information which includes the following:

a) Title of the book b) Author Name c) ISBN number

d) Publisher name e) Edition f) Price

4. Design an XML document to store information about a student in an engineering College affiliated to JNTU**5. SERVLETS:**

1. Write a program to generate a plain text.

2. Write a program to display cookie id.

6. JDBC:

1. Write a program to select a query using JDBC.

2. Write a program to update customer information using JDBC

7. JAVA SERVER PAGES:

1. Write a program to represent basic arithmetic functions.
2. Write a program to display a string.
3. Write a program to create checkboxes.

COURSE OUTCOMES:

1. Using XML Scripting display the college details.
2. Use Tomcat Server for Servlets and JSPs
3. Write simple applications with Technologies like HTML, JavaScript, PHP
4. Servlets and JSPs Connect to Database and get results

COURSE OUTCOMES:

1. Using XML Scripting display the college details.
2. Use Tomcat Server for Servlets and JSPs
3. Write simple applications with Technologies like HTML, JavaScript, PHP
4. Servlets and JSPs Connect to Database and get results

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III Year B. TECH-II-SEM

L/T/P/C

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(R22A0084) PROFESSIONAL DEVELOPMENT SKILLS -I

COURSE OBJECTIVES:

1. To strengthen the students with the professional skill set.
2. To make the students recognize the role of technical English in their academic and professional fields.
3. To improve language proficiency and to develop the required professional ethics.
4. To equip students, organize, comprehend, write, and present, short and long forms of any technical work within the broad framework of the Scientific Method.
5. To facilitate communication about projects and ideas throughout the industry and also to the non-technical people.

UNIT- I:

- Communication Skills: Verbal & Non-verbal communication
- Body Language: Facial expressions, Gestures, Eye Contact, Shrugging, and Standing Postures
- Writing: Letter Writing: requisition, complaint, Enquiry and response
- Exploring Career Opportunities

UNIT-2:

- Self-Introduction
- Ice-Breaking
- Writing: E-Mail Writing, Email Etiquette
- Social and Cultural Etiquette

UNIT-3:

- Oral Presentation Skills: PPTs, Paper Presentation, Poster Presentation etc.,
- JAM Session
- Writing: Paragraph writing and Types of Paragraph Writing (descriptive, narrative, expository, and persuasive)
- Ethics and Integrity

UNIT-4:

- Describing People, Places, things etc.
- Telephonic Conversation: Telephonic Expressions, and Etiquette
- Writing: Essay writing and Types of Essay Writing
- Digital Literacy and Social Media

UNIT-5:

- Extempore
- Role play and Situational dialogues
- Writing: Memo Writing
- Digital Ethics and Cyber Security

OUTCOMES:

Students will be able to

1. Understand information which assists in completion of the assigned job tasks more successfully
2. Market them with the rich professional skills that they acquire.
3. Adhere to ethical norms of scientific communication
4. Strengthen their individual and collaborative work strategies
5. Successfully market them and sell themselves to the employer of their choice.

REFERENCE BOOKS:

1. Curriculum and Guide line for Life Skills, By UGC, August 2023
2. David F. Beer and David McMurrey, Guide to writing as an Engineer, John Willey. New York, 2004
3. Diane Hacker, Pocket Style Manual, Bedford Publication, New York, 2003. (ISBN 0312406843)
4. Shiv Khera, You Can Win, Macmillan Books, New York, 2003.
5. Raman Sharma, Technical Communications, Oxford Publication, London, 2004.
6. Meenakshi Raman, Prakash Singh, Business communication, Oxford Publication, New Delhi 2012.
7. Dale Jung k, Applied Writing for Technicians, McGraw Hill, New York, 2004. (ISBN: 07828357-4)
8. Sharma, R. and Mohan, K. Business Correspondence and Report Writing, TMH New Delhi 2002.
9. Xebec, Presentation Book, TMH New Delhi, 2000. (ISBN 0402213)

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III Year B. TECH–II-SEM

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(R22A1205) DATA WAREHOUSING AND DATA MINING

COURSE OBJECTIVES:

Students will be able:

1. To study the data warehouse principles
2. To understand the working of data mining concepts
3. To identify the association rules in mining
4. To define the classification algorithms
5. To imbibe the clustering techniques.

UNIT-I

Data warehouse: Introduction to Data warehouse, Difference between operational database systems and data warehouses, Data warehouse Characteristics, Data warehouse Architecture and its Components, Extraction-Transformation-Loading, Logical(Multi-Dimensional), Data Modeling, Schema Design, Star and Snow-Flake Schema, Fact Constellation, Fact Table, OLAP Cube, OLAP Operations, OLAP Server Architecture-ROLAP, MOLAP and HOLAP.

UNIT-II

Introduction: Fundamentals of data mining, Data Mining Functionalities, Classification of Data Mining systems, Data Mining Task Primitives, Integration of a Data Mining System with a Database or Data Warehouse System, Major issues in Data Mining.

Data Preprocessing: Need for Preprocessing the Data, Data Cleaning, Data Integration & Transformation, Data Reduction, Discretization and Concept Hierarchy Generation.

UNIT-III:

Association Rules: Problem Definition, Frequent Item Set Generation, The APRIORI Principle, Support and Confidence Measures, Association Rule Generation; APRIORI Algorithm, FP Growth Algorithms, Compact Representation of Frequent Item Set- Maximal Frequent Item Set, Closed Frequent Item Set.

UNIT-IV

Classification: Problem Definition, General Approaches to solving a classification problem, Evaluation of Classifiers, Classification techniques, Decision Trees-Decision tree Construction, Algorithm for Decision Tree Induction; Naive-Bayes Classifier, Bayesian Belief Networks; K-Nearest Neighbor Classification-Algorithm and Characteristics.

UNIT-V

Clustering: Clustering Overview, A Categorization of Major Clustering Methods, Partitioning Methods, Hierarchical Methods, Partitioning Clustering-K-Means Algorithm, PAM Algorithm; Hierarchical Clustering-Agglomerative Methods and divisive methods, Key Issues in Hierarchical Clustering, Strengths and Weakness, Outlier Detection.

TEXT BOOKS:

1. Data Mining- Concepts and techniques- Jiawei Han, Micheline Kamber, Morgan Kaufmann Publishers, Elsevier, 2 Edition, 2006.
2. Introduction to Data Mining, Pang-Ning Tan, Vipin Kumar, Michael Steinbach, Pearson Education.

REFERENCE BOOKS:

1. Data Mining Techniques, Arun K Pujari, 3rd Edition, Universities Press.
2. Data Warehousing Fundamentals, Pualraj Ponnaiah, Wiley Student Edition.
3. The Data Warehouse Life Cycle Toolkit — Ralph Kimball, Wiley Student Edition.
4. Data Mining, Vikram Pudi, P Radha Krishna, Oxford University Press.

COURSE OUTCOMES:

The students will be able:

- To comprehend the data warehouse in addition to database systems.
- To perform the pre-processing of data
- To apply mining techniques on the data
- To categorize the association rules, classification and clusters in large data sets
- To solve real world problems in business and scientific information using data mining

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III Year B. TECH-IT-II-SEM

L/T/P/C

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(R22A0513) FULL STACK DEVELOPMENT

COURSE OBJECTIVES:

1. To become knowledgeable about the most recent web development technologies.
2. To acquire Idea for creating two tier and three tier architectural web applications.
3. To Design and Acquire knowledge about real time web applications.
4. To learn how to construct suitable client and serverside applications.
5. To learn core concept of both front end and backend 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 J Query 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 BYAZAT MARDAN

REFERENCE BOOKS:

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

COURSE OUTCOMES:

1. Develop a fully functioning website and deploy on a web server.
2. To analyze the front end and backend Tools
3. Find and use code packages based on their documentation to produce working results in a project.
4. To build web pages that function using external data.
5. To Implement web application employing efficient database access.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III Year B. TECH–II-SEM

L/T/P/C

3/0/0/3

(R22A6903) EMBEDDED SYSTEMS DESIGN

COURSE OBJECTIVES:

For embedded systems, the course will enable the students to:

1. Understand micro controllers architecture and its functionalities
2. Perceive the core of an embedded system
3. Learn the internal and external communication interface
4. Learn the embedded firmware design and development
5. Know the embedded programming concepts.

UNIT-I**INTRODUCTION TO MICROCONTROLLERS:**

8051 Microcontroller: Overview of 8051 Microcontroller, 8051 Architecture, Pin diagram, Memory Organization, Addressing Modes, Instruction set of 8051.

Arduino: Overview of Arduino, Introduction to ATMEGEA 328P, Arduino board. Introduction

Arduino Programming: Setup (), loop (), Digital Read (), Digital Write (), AnalogRead(), AnalogWrite().

UNIT-II**INTRODUCTION TO EMBEDDED SYSTEMS:**

Definition of Embedded System, Embedded Systems Vs General Computing Systems, History of Embedded Systems, Classification, Major Application Areas, Purpose of Embedded Systems, Characteristics and Quality Attributes of Embedded Systems.

UNIT-III**TYPICAL EMBEDDED SYSTEM:**

Core of the embedded system, Sensors and actuators, Onboard communication interfaces-I2C, SPI, UART, parallel interface; External communication interfaces RS232,USB,infrared,Bluetooth,Wi- Fi, Zig-Bee, GPRS.

UNIT-IV**EMBEDDED FIRMWARE DESIGN AND DEVELOPMENT:**

Embedded firmware design approaches - super loop-based approach, operating system based approach; embedded firmware development languages- assembly language based development, high-level language based development.

UNIT-V**EMBEDDED PROGRAMMING:**

Assembly language: Interfacing LED, LCD and Keypad to 8051 Microcontroller.

Embedded C: Interfacing LED, RGB LED, LCD, switch, Sensors, Buzzer to Arduino uno,

serialcommunication programming with Arduino

TEXTBOOKS:

1. Introduction to Embedded Systems-shibu k v, McGraw Hill Education.
2. Kenneth. J.Ayala, The 8051 Microcontroller, 3rd Edition Cengage Learning.

REFERENCE BOOKS:

1. The 8051 Microcontroller and Embedded Systems Second Edition Muhammad AliMazidi Janice Gillispie Mazidi Rolin D. McKinlay
2. Embedded Systems- An integrated approach - Lyla B Das, Pearsoneducation2012.

COURSE OUTCOMES:

After going through this course, the student will be able to

1. Analyze the internal organization of popular 8051microcontroller.
2. Get to know the core of the embedded systems.
3. Compare the internal and external communication interface.
4. Build and apply Embedded Firmware design approaches.
5. Develop the programs for Embedded Systems.

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L/T/P/C

3/0/0/3

Professional Elective-II
(R22A0520) ADHOC AND SENSOR NETWORKS**COURSE OBJECTIVES:**

1. To understand the concepts of sensor networks
2. To understand the MAC and transport protocols for adhoc networks
3. To understand the security of sensor networks
4. To understand the applications of adhoc and sensor networks

UNIT-I

Introduction to AdHoc Networks-Characteristics of MANETs, Applications of MANETs and Challenges of MANETs.

Routing in MANETs - Criteria for classification, Taxonomy of MANET routing algorithms, Topology-based routing algorithms-Proactive: DSDV; Reactive: DSR, AODV; Hybrid: ZRP; Position-based routing algorithms – Location Services-DREAM, Quorum-based.

UNIT-II

Data Transmission- Broadcast Storm Problem, Rebroadcasting Schemes-Simple-flooding, Probability-based Methods, Area-based Methods, Neighbor Knowledge-based: SBA, Multipoint Relaying, AHBP.

Multicasting: Tree-based: AMRIS, MAODV; Mesh-based: ODMRP, CAMP; Hybrid: AMRoute, MCEDAR.

UNIT-III

Geo-casting: Data-transmission Oriented-LBM; Route Creation Oriented-GeoTORA.

TCP over AdHoc TCP protocol Overview: TCP Basics, TCP Header Format, Congestion Control; TCP and Manets: Effects of Partition on TCP, Impact Of Lower Layers On TCP.

UNIT-IV

Basics of Wireless, Sensors and Lower Layer Issues: Applications, Classification of sensor networks, Architecture of sensor network, Physical layer, MAC layer, Link layer, Routing Layer.

UNIT-V

Upper Layer Issues of WSN: Transport layer, High-level application layer support, Adapting to the inherent dynamic nature of WSNs, Sensor Networks and mobile robots.

TEXTBOOKS:

1. AdHoc and Sensor Networks–Theory and Applications, Carlos Corderio Dharma P.Aggarwal, World Scientific Publications, March 2006,ISBN–981–256–681–3.
2. Wireless Sensor Networks: An Information Processing Approach, FengZhao, Leonidas Guibas, Elsevier Science, ISBN –978-1-55860-914-3 (Morgan Kauffman).

COURSE OUTCOMES:

1. Ability to understand the state-of-the-art research in the emerging subject of Ad Hoc and Wireless Sensor NetworksAbility to solve the issues in real-time application development based on ASN.
2. Ability to conduct further research in the domain of ASN

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III Year B. TECH–II-SEM

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3/0/0/3

Professional Elective-II

(R22A6663) COMPUTATIONAL INTELLIGENCE

COURSE OBJECTIVES:

Students will be able:

- To know the context of Computational Intelligence .
- To understand the special benefits in certain areas like Classification, Regression, Pattern Matching, Control, Robotics, Data Mining etc.
- To acquire knowledge about the basic tools and techniques in Computational Intelligence such as Neural Networks and Genetic Algorithms.
- To learn the concepts of Fuzzy Systems.
- To gain an application perspective of the performance metrics.

UNIT-I

Introduction to Computational Intelligence: Myths and Applications areas of Computational Intelligence. Adaptation, Self organization and Evolution, Historical Views of Computational Intelligence, Adaptation and Self organization for Computational Intelligence, Ability to Generalize, Computational Intelligence and Soft Computing Vs Artificial Intelligence and Hard Computing.

UNIT-II

Review of evolutionary computation theory and concepts: History of Evolutionary Computation, Evolution Computation Overview, Genetic algorithms, Evolutionary programming, Evolution strategies, genetic programming, and particle swarm optimization.

UNIT-III

Review of basic neural network theory and concepts: Neural Network History, What Neural Networks are and Why they are useful, Neural Networks Components and Terminology, Neural Networks Topology, Neural Network Adaptation, Comparing Neural Networks and Other information Processing Methods, Preprocessing and Post Processing.

UNIT- IV

Fuzzy Systems Concepts and Paradigms: Fuzzy sets and Fuzzy Logic, Theory of Fuzzy sets , Approximate Reasoning, Fuzzy Systems Implementations, Fuzzy Rule System

Implementation.

UNIT -V

Computational Intelligence Implementations: Implementation Issues, Fuzzy Evolutionary Fuzzy Rule System Implementation, Best tools, Applying Computational Intelligence to Data Mining.

Performance Metrics: General Issues, Percent Correct, Average Sum-squared Error.

TEXT BOOKS:

1. Computational Intelligence - Concepts to Implementations by Dr. Russel Eberhart & Dr. Yuhui Shi

REFERENCES BOOKS:

1. Introduction to Genetic Algorithms by Melanie Mitchell
2. Handbook of Genetic Algorithms by Davis
3. Machine Learning by Tom Mitchell

COURSE OUTCOMES:

At the end of the course students will have the ability:

1. To compare and contrast soft computing & hard computing applications.
2. To devise solution using optimization.
3. To build a neural network for a given system
4. To design a fuzzy rule system
5. To implement computational intelligence concepts using the best tools.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY**III Year B. TECH–II-SEM****L/T/P/C****3/0/0/3****(R22A0570) SOFTWARE REQUIREMENTS AND ESTIMATION****COURSE OBJECTIVES:**

1. Learn the importance and scope of software requirements.
2. Understand the concepts of Requirements elicitation & Requirements modeling
3. Gain knowledge of principles and practices of Requirements Management.
4. Understand the process and methods of software estimation and size estimation.
5. Learn about Effort, Schedule and Cost Estimation techniques.

UNIT-I

Software Requirements: What and Why Essential Software requirement, Good practices for requirements engineering, Improving requirements processes, Software requirements and risk management

UNIT-II

Software Requirements Engineering Requirements elicitation, requirements analysis documentation, review, elicitation techniques, analysis models, Software quality attributes, risk reduction through prototyping, setting requirements priorities, verifying requirements quality, Software Requirements Modeling-Use Case Modeling, Analysis Models, Dataflow diagram, state transition diagram, class diagrams, Objectanalysis, Problem Frames.

UNIT-III

Software Requirements Management Requirements management Principles and practices, Requirements attributes, Change Management Process, Requirements Traceability Matrix, Links in requirements chain Requirements Management Tools: Benefits of using a requirements management tool, commercial requirements management tool, Rational Requisite pro, Caliber – RM, implementing requirements management automation,

UNIT-IV

Software Estimation Components of Software Estimations, Estimation methods, Problems associated with estimation, Key project factors that influence estimation. Size Estimation-Two views of sizing, Function Point Analysis, MarkII FPA, Full Function Points, LOC Estimation, Conversion between size measures

UNIT -V

Effort, Schedule and Cost Estimation What is Productivity? Estimation Factors, Approaches to Effort and Schedule Estimation, COCOMO II, Putnam Estimation Model, Algorithmic models, Cost Estimation

Software Estimation Tools: Desirable features in software estimation tools, IFPUG, USC's COCOMO II, SLIM (Software Life Cycle Management) Tools.

TEXT BOOKS:

1. Software Requirements and Estimation by Rajesh Naik and Swapna Kishore, Tata Mc Graw Hill

REFERENCES BOOKS:

1. Software Requirements by Karl E. Weigers, Microsoft Press.
2. Managing Software Requirements, Dean Leffingwell & Don Widrig, Pearson Education, 2003.
3. Estimating Software Costs, Second edition, Capers Jones, Tata McGraw-Hill, 2007.
4. Practical Software Estimation, M.A. Parthasarathy, Pearson Education, 2007.

COURSE OUTCOMES:

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

1. Develop an SRS for a business system.
2. Analyze and compare the various requirements elicitation techniques.
3. Construct the analysis models like DFD, UCD, ERD etc.
4. Apply Size Estimation methods to a specific data set.
5. Estimate the software in terms of size, cost, effort and schedule.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III Year B. TECH–II-SEM

L/T/P/C

(R22A6201) CYBER SECURITY ESSENTIALS

3/0/0/3

COURSE OBJECTIVES:

This course will enable the students:

1. To study cyber security challenges and implications.
2. To know about Cyber Security.
3. To familiarize various types of cyber-attacks and cyber-crimes
4. To give an overview of the cyber laws
5. To study the defensive techniques against these attacks

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, Spectrum of attacks, Taxonomy of various attacks, IP spoofing, Methods of defense, Security Models, risk management, 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.

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, Mobile Devices: Security Implications for Organizations, Organizational Measures for Handling Mobile, 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.

Cybercrime and Cyber terrorism: Introduction, intellectual property in the cyberspace, the ethical dimension of cybercrimes the psychology, mindset and skills of hackers and other cyber criminals.

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 indifferent domains- medical, financial,, etc.

Cybercrime: Examples and Mini-Cases

Mini-Cases: The Indian Case of online Gambling, An Indian Case of Intellectual Property Crime, Financial Frauds in Cyber Domain.

TEXT BOOKS:

1. Nina Godbole and Sunit Belpure, Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives, Wiley
2. 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, CRCPress.
2. Introduction to Cyber Security , Chwan-Hwa(john) Wu, J.David Irwin.CRC PressT&FGroup

COURSE OUTCOMES:

Student will be able to

1. Understand basic concepts of Cyber Crimes.
2. Ability to identify the attacks in Cyber Crimes
3. Able to specify the suitable methods used in Cyber Crime
4. Ability to face cyber security challenges
5. Understand Cyber laws

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L/T/P/C

-/0/2/1

(R22A1284) DATA WAREHOUSING AND DATA MINING LAB

COURSE OBJECTIVES:

Student should be able:

1. To identify how to build a data warehouse and query it (using open-source tools like Pentaho Data Integration and Pentaho Business Analytics)
2. To get an understanding of data mining tasks using a data mining toolkit (such as open source WEKA)
3. To understand the data sets and data preprocessing
4. To study the working of algorithms for data mining tasks such as association rule mining, classification, clustering and regression
5. To get acquainted to the data mining techniques with varied input values for different parameters

LIST OF EXPERIMENTS:

Experiments using Weka / Clementine Tools

1. Installation of WEKA Tool
2. Creating new Arff File
3. Data Processing Techniques on Data set.
4. Data cube construction – OLAP operations
5. Implementation of Apriori algorithm
6. Implementation of FP – Growth algorithm
7. Implementation of Decision Tree Induction
8. Calculating Information gain measures
9. Classification of data using Bayesian approach
10. Classification of data using K – Nearest Neighbor Approach.
11. Implementation of K – means algorithm

COURSE OUTCOMES:

Students will be able:

1. To specify which data processing technique can be applied
2. To construct a Data cube
3. To implement mining algorithms as a component to the existing tools
4. To differentiate the approaches based on classification
5. To associate mining techniques for realistic data

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-/0/2/1

(R22A0589) FULL STACK DEVELOPMENT LAB

COURSE OBJECTIVES:

This course will enable the students:

1. Usage of various front and backend 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 go down. 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 backend 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.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III Year B. TECH–II-SEM

L/T/P/C

-/0/2/1

(R22A0085) Professional Development Skills –II

COURSE OBJECTIVES:

1. To strengthen the students with the professional skill set.
2. To make the students recognize the role of technical English in their academic and professional fields.
3. To improve language proficiency and to develop the required professional ethics.
4. To equip students, organize, comprehend, write, and present, short and long forms of any technical work within the broad framework of the Scientific Method.
5. To facilitate communication about projects and ideas throughout the industry and also to the non-technical people.

UNIT- I:

- Inter-personal & Intra-Personal Communication
- Sub Skill of Reading: Skimming
- Writing: Resume Writing: Functional, Chronological, Targeted
- Innovative Leadership and Design Thinking

UNIT-2:

- Group Discussion: Factual, Opinion-Based, Abstract
- Sub Skill of Reading: Scanning
- Writing: Cover Letter
- Trust and Collaboration

UNIT-3:

- Debate
- Sub Skill of Reading: Intensive Reading
- Writing: Report Writing: Research Report, Analytical and Projects
- Managing Personal Finance

UNIT-4:

- Interview skills
- Sub Skill of Reading: Extensive reading
- Writing: Précis Writing
- Leadership and Managerial Skills

UNIT-5:

- Mock Interviews
- Reading: Cloze-Test
- Writing: Mini Projects

- Entrepreneurial Skills

COURSE OUTCOMES:**Students will be able to**

1. Understand information which assists in completion of the assigned job tasks more successfully
2. Market them with the rich professional skills that they acquire
3. Adhere to ethical norms of scientific communication
4. Strengthen their individual and collaborative work strategies
5. Successfully market them and sell themselves to the employer of their choice.

REFERENCE BOOKS:

1. Curriculum and Guide line for Life Skills, By UGC, August 2023
2. David F. Beer and David McMurrey, Guide to writing as an Engineer, John Willey. New York, 2004
3. Diane Hacker, Pocket Style Manual, Bedford Publication, New York, 2003. (ISBN 0312406843)
4. Shiv Khera, You Can Win, Macmillan Books, New York, 2003.
5. Raman Sharma, Technical Communications, Oxford Publication, London, 2004.
6. Meenakshi Raman, Prakash Singh, Business communication, Oxford Publication, New Delhi 2012.
7. Dale Jung k, Applied Writing for Technicians, McGraw Hill, New York, 2004. (ISBN: 07828357-4)
8. Sharma, R. and Mohan, K. Business Correspondence and Report Writing, TMH New Delhi 2002.
9. Xebec, Presentation Book, TMH New Delhi, 2000. (ISBN 0402213)

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

IV Year B. TECH-I-SEM

L/T/P/C

3/0/0/3

(R22A0522) CLOUD COMPUTING

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.

COURSE OUTCOMES:

1. To distinguish the different models and computing paradigms.
2. To explain the levels of virtualization and resources virtualization
3. To analyze the reasons for migrating into cloud
4. To effectively use the cloud services in terms of infrastructure and operating platforms.
5. To apply the services in the cloud for real world scenarios

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

IV Year B. TECH-I-SEM

L/T/P/C

3/0/0/3

(R22A0524) BLOCKCHAIN TECHNOLOGY

COURSE OBJECTIVES:

1. To enable the student to understand and appreciate the importance of fundamentals of block chain technology, its usage in Business industry
2. To enable the students to know the types of Block chains and purposes.
3. To enable the students to provide an understanding of Cryptographic techniques in Block chain
4. To gain the awareness about various implementations of block chain technology such as bitcoin, Ethereum, and Hyper ledger
5. To get familiarity with crypto currencies

UNIT-I:

Introduction to Blockchain Technology – Distributed systems – The history of blockchain – Introduction to blockchain – CAP theorem and blockchain – Benefits and limitations of blockchain – Decentralization using blockchain - Methods of decentralization – Routes to decentralization

UNIT-II:

Cryptography in Blockchain: Introduction – cryptographic primitives – Assymmetric cryptography – public and private keys -line interface – Bitcoin improvement proposals (BIPs) – Consensus Algorithms.

UNIT-III:

BitCoin Introduction – Transactions – Structure - Transactions types – The structure of a block– The genesis block – The bitcoin network– Wallets and its types– Bitcoin payments– Bitcoin investment and buying and selling bitcoins – Bitcoin installation – Bitcoin programming and the command-line interface – Bitcoin improvement proposals (BIPs).

UNIT-IV:

Ethereum - Ethereum block chain- Elements of the Ethereum block chain– Precompiled contracts – Accounts and its types – Block header- Ether – Messages – Mining - Clients and wallets – Trading and investment – The yellow paper - The Ethereum network - Applications developed on Ethereum - Scalability and security issues.

UNIT-V:

Smart Contract and Hyper ledger – History of Smart Contract – Ricardian contracts - The DAO. Hyper ledger projects – Hyperledger as a protocol – Fabric - Hyperledger Fabric - Sawtooth lake – Corda Architecture.

TEXT BOOKS:

1. Bashir, Mastering Blockchain: Distributed ledger technology, decentralization, and smart contracts explained, 2nd Edition, 2nd Revised edition edition. Birmingham: Packt Publishing, 2018.

REFERENCE BOOKS:

1. A. M. Antonopoulos, Mastering bitcoin, First edition. Sebastopol CA: O'Reilly, 2015.
2. Z. Zheng, S. Xie, H. Dai, X. Chen, and H. Wang, —An Overview of Blockchain Technology: Architecture, Consensus, and Future Trends,|| in 2017 IEEE International Congress on Big Data (BigData Congress), 2017, pp.557–564.

COURSE OUTCOMES:

Student will be able to understand the fundamentals of block chain technology.

1. Apply knowledge of implementations of Bitcoin, Ethereum and Hyperledger to develop solutions in the appropriate domains.
2. Understand the modern currencies and its market usage
3. Demonstrate the application of hashing and public key cryptography in protecting the Blockchain
4. Use smart contract in real world applications.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

IV Year B. TECH–I-SEM

L/T/P/C

3/0/0/3

(R22A0517) BIG DATA ANALYTICS

COURSE OBJECTIVES:

The objectives of this course are,

1. To learn the need of Big Data and the various challenges involved and to acquire Knowledge about different analytical architectures.
2. To understand Hadoop Architecture and its ecosystems.
3. To Understand Hadoop Ecosystem and acquire knowledge about the NoSQL database.
4. To acquire knowledge about the NewSQL, MongoDB and Cassandra databases.
5. To imbibe the processing of Big Data with advanced architectures like Spark.

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 RDDspark 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. TomWhite, "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 BigData.
2. Analyze Hadoop Framework and eco systems.
3. Analyze MapReduce and Yarn, Work on NoSQL environment.
4. Work on NewSQL environment, MongoDB and Cassandra.
5. Apply the Big Data using Map-reduce programming in Both Hadoop

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

IV Year B. TECH-I-SEM

Professional Elective-III

(R22A6608) TEXT ANALYTICS

L/T/P/C

3/0/0/3

COURSE OBJECTIVES:

1. Describe text extraction techniques.
2. Differentiate clustering and classification techniques on text.
3. Analyze visualization methodologies.
4. Illustrate about event detection methods and embedding semantics in models.
5. 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 modelling, 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 & Business Media, 2012.

REFERENCE BOOKS:

1. Miner, Gary, et al. Practical text mining and statistical analysis for non-structured text data

- applications. 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

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

IV Year B. TECH–I-SEM

Professional Elective-III

L/T/P/C

3/0/0/3

(R22A6705) DATA VISUALIZATION TECHNIQUES

COURSE OBJECTIVES:

1. To learn different statistical methods for Data visualization.
2. To understand the basics of Python.
3. To understand the usage of the Matplotlib, Seaborn Packages
4. To Learn about Excel and various operations using Excel
5. 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 – multidimensional techniques – visualizing cluster analysis – matrix visualization in Bayesian data analysis

UNIT II (Python-PANDAS)

Getting Started with Pandas: Arrays and vectorized computation, 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 in Python- 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 Visualizations and 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 reparation: 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. Nageswara Rao, DreamtechPress.
2. A To Z Of MS EXCEL: A Book For Learners & Trainers (MS Excel Comprehensive Guide by Rinkoo Jainn
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, Igal, 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 ,Dick Kusleika
4. Python for Data Analysis by William McKinney, Second Edition, O'Reilly MediaInc.

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

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

IV Year B. TECH-I-SEM

Professional Elective-III
(R22A6606) COMPUTER VISION

L/T/P/C

3/0/0/3

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, Fifth Edition, 2015.
2. Muhammad Sarfraz, "Computer Vision and Image Processing in Intelligent Systems and Multimedia Technologies", IGI Global, 2014.
3. Theo Gevers, Arjan Gijsenij, 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.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

IV Year B. TECH-I-SEM

Professional Elective-III

L/T/P/C

3/0/0/3

(R22A0530) GAME THEORY

COURSE OBJECTIVE:

The course will explain in depth the standard equilibrium concepts (such as Nash equilibrium, Subgame-Perfect Nash Equilibrium, and others) in Game Theory.

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

UNI -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 Game.

TEXT BOOKS:

1. A course in Game Theory, M. J. Osborne and A. Rubinstein, MIT Press.

REFERENCE BOOKS:

1. Game Theory, Roger Myerson, Harvard University Press.
2. Game Theory, D. Fudenberg and J. Tirole, MIT Press.
3. Theory of Games and Economic Behavior, J. von Neumann and O. Morgenstern, New York: John Wiley and Sons.
4. Games and Decisions, R.D. Luce and H. Raiffa, New York: John Wiley and Sons.
5. Game Theory, G. Owen, 2nd Edition, New York: Academic Press.

COURSE OUTCOMES:

1. Understand the basic concepts of game theory and solutions
2. Understand different types of equilibrium interpretations
3. Understand and analyze knowledge and solution concepts
4. Analyze extensive games with perfect information

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

IV Year B. TECH-I-SEM

Professional Elective-IV

L/T/P/C

3/0/0/3

(R22A0525) AUGMENTED REALITY AND VIRTUAL REALITY

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.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

IV Year B. TECH-I-SEM

Professional Elective-IV
(R22A0530) EDGE COMPUTING

L/T/P/C

3/0/0/3

COURSE OBJECTIVES:

- Understand the basics of Edge computing
- Understand the Edge computing Architecture
- Explore the need for edge computation

UNIT - I

Introduction to Edge Computing: Characteristics, Application Scenarios, Issues of Edge Computing, Cloud-Hierarchy of Edge Computing, Business Models-Opportunities and Challenges.Communication and Network Model, Programming Models, Architecture for smart cities, healthcare and vehicles.

UNIT - II

Management and Orchestration of Network Slices in 5G, Edge and Clouds: Introduction, Background, Network Slicing in 5G, Network Slicing in Software defined Clouds, Network Slicing Management in Edge and Fog.

UNIT - III

Middleware for Edge Computing: Need for Edge Computing Middleware, Clusters for Lightweight Edge Clouds , IoT Integration , Security Management for Edge Cloud Architectures.

Edge Computing Realization for Big Data Analytics: Introduction to Edge Data Analytics, Data Analytics in the Edge, Prototypes and Evaluation.

UNIT - IV

IoT and Edge Computing Definition and Use Cases Introduction to Edge Computing Scenario's and Use cases - Edge computing purpose and definition, Edge computing use cases, Edge computing hardware architectures, Edge platforms, Edge vs Fog Computing, Communication Models - Edge and M2M.

UNIT - V

IoT Architecture and Core IoT Modules-A connected ecosystem, IoT versus machine-to-machine versus, SCADA, The value of a network and Metcalfe's and Beckstrom's laws, IoT and edge architecture, Role of an architect, Understanding Implementations with examples-Example use case and deployment, Case study – Telemedicine palliative care, Requirements, Implementation, Use case retrospective.

TEXT BOOKS:

1. IoT and Edge Computing for Architects - Second Edition, by Perry Lea, Publisher: Packt Publishing, 2020, ISBN: 9781839214806
2. Fog and Edge Computing: Principles and Paradigms (Wiley Series on Parallel and Distributed Computing) by Rajkumar Buyya and Satish Narayana Srirama, wiley publication, 2019, ISBN: 9781119524984

REFERENCE BOOKS:

1. Flavio Bonomi, Rodolfo Milito, Jiang Zhu, Sateesh Addepalli, —Fog Computing and Its Role in the Internet of Things||, MCC'12, August 17, 2012, Helsinki, Finland.
2. John Mutumba Bilay, Peter Gutsche, Mandy Krimmel and Volker Stiehl ,SAP Cloud Platform Integration: The Comprehensive Guide, 2nd edition, Rheinweg publishing, 2019
3. Flavio Bonomi, Rodolfo Milito, Preethi Natarajan and Jiang Zhu, —Fog Computing: A Platform for Internet of Things and Analytics, Big Data and Internet of Things: A Roadmap for Smart Environments, Studies in Computational Intelligence 546.

COURSE OUTCOMES:

1. Understand the principles, architectures of edge computing
2. Understand the communication and management of Edge computing
3. Understand storage and computation in edge computing
4. Analyse the performance of the applications developed using edge architectures
5. Understand the security and privacy issues

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

IV Year B. TECH-I-SEM

Professional Elective-IV
(R22A6602) MACHINE LEARNING

L/T/P/C

3/0/0/3

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 OUTCOMES:

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

IV Year B. TECH-I-SEM

Professional Elective-IV

L/T/P/C

3/0/0/3

(R22A0528) QUANTUM COMPUTING

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 Matrices, 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

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

IV Year B. TECH-IT-I-SEM

L/T/P/C

(R22A0590) BIG DATA ANALYTICS LAB

-/0/2/1

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:

1. Install, configure and run python, numPy and Pandas.
2. Install, configure and run Hadoop and HDFS.
3. Visualize data using basic plotting techniques in Python.
4. Implement NoSQL Database Operations: CRUD operations, Arrays using MongoDB.
5. Implement Functions: Count – Sort – Limit – Skip – Aggregate using MongoDB.
6. Implement word count / frequency programs using MapReduce.
7. Implement a MapReduce program that processes a dataset.
8. Implement clustering techniques using SPARK
9. 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, 4th Edition, 2015.
3. Nick Pentreath, "Machine Learning with Spark", Packt Publishing, 2015.
4. Mohammed Guller, "Big Data Analytics with Spark", Apress, 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 Frameworks.
2. Apply various visualization techniques to explore data.
3. Demonstrate database operations using MongoDB.
4. Process big data using Hadoop framework.
5. Build and apply Map-Reduce & NoSQL Concepts.
6. Perform data analysis with machine learning methods.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

IV Year B. TECH–II-SEM

L/T/P/C

(R22A0334) INNOVATION, START-UP & ENTREPRENEURSHIP

4/0/0/4

COURSE OBJECTIVES:

1. To understand the concept of innovation, new product development
2. To know the startup opportunities and startup equation
3. To understand new venture creation opportunities, its resources, and Requirements
4. To understand the Entrepreneurial Mindset and new trends in entrepreneurship
5. To understand the strategic perspectives in entrepreneurship

UNIT-I:

Innovation Management: Concept of Innovation-Levels of Innovation-Incremental Vs Radical Innovation-Inbound and Outbound Ideation-Open and Other Innovative Ideation Methods-Theories of outsourcing New Product Development: Transaction Cost, Resource Based, Resource Dependence ,Knowledge Based Theories.

UNIT-II:

Startup opportunities: The New Industrial Revolution–The Big Idea- Generate Ideas with Brain storming Business Startup - Ideation- Venture Choices - The Rise of The startup Economy -The Six Forces of Change- The Startup Equation

UNIT-III:

Startup Capital Requirements and Legal Environment: Identifying Startup capital Resource Requirements - estimating Startup cash requirements - Develop financial assumptions- Constructing a Process Map - Positioning the venture in the value chain - Launch strategy to reduce risks- Startup financing metrics – **Business plan**-The Legal Environment- Approval for New Ventures- Taxes or duties payable for new ventures.

UNIT-IV:

Understanding Entrepreneurial Mindset- The revolution impact of entrepreneurship-The evolution of entrepreneurship- Functions of Entrepreneurs– types of entrepreneurs- Approaches to entrepreneurship- Process approach- Role of entrepreneurship in economic development-Twenty first century trends in entrepreneurship.

UNIT-V:

Strategic perspectives in entrepreneurship – Strategic planning- Strategic actions strategic positioning-Business stabilization- Building the adaptive firms-Understanding the growth stage– Internal growth strategies and external growth strategies, Unique managerial concern of growing ventures. Initiatives by the Government of India to promote entrepreneurship, Social and women entrepreneurship.

TEXTBOOKS AND REFERENCE BOOKS:

1. Kathleen Allen, Launching New Ventures, An Entrepreneurial Approach, Engage Learning,2016 AnjanRaichaudhuri, Managing New Ventures Concepts and Cases, Prentice Hall International,2010.
2. Innovation Management, C.S.G. Krishnamacharyulu ,R. Lalitha, Himalaya Publishing House,2010.
3. S.R. Bhowmik & M.Bhowmik, Entrepreneurship, New Age International,2007.
4. Stuart Read, Effectual Entrepreneurship,Routledge,2013
5. RajeevRoy,Entrepreneurship,2e,Oxford publications,2012.
6. Nandan. H, Fundamentals of Entrepreneurship,PHI,2013

COURSE OUTCOMES:

1. Students will be able to understand the concept of innovation and new product development; startup opportunities and startup equation; new venture creation opportunities, its resources, and Requirements; the Entrepreneurial Mindset and new trends in entrepreneurship; strategic perspectives in entrepreneurship.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

IV Year B. TECH-IT-II-SEM

L/T/P/C

3/0/0/3

Professional Elective-V
(R22A0529) DEEP LEARNING AND ITS APPLICATIONS**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.
To understand the concept of Auto-encoders and enhancing GANs using auto-encoders
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.

[Note: Theory Questions on any of the above topic, Numerical type question on Backpropagation algorithm's weight updates]

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.[Note: Theory Questions on any of the above topic, Numerical type question on Convolutional operation, pooling operation (avg, min, max pooling)]

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.[Note: Theory Questions only]

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 [Note: Theory Questions only]

UNIT- V:

Applications: Detection and Segmentation: Discussion on detection, segmentation problem definition, challenges, Evaluation, Datasets and Localization by regression. Discussion on detection as classification, region proposals, RCNN and YOLO architectures, fully convolutional segmentations, Mask-RCNNs.

TEXT BOOKS:

1. Deep Learning : An MIT Press Book by Ian Good fellow 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

REFERENCE BOOKS:

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

COURSE OUTCOMES:

1. Identify the features of deep learning models that are helpful in resolving practical issues.
2. Choose and use the best deep learning algorithms to analyze the data for a range of issues.
3. Use various deep learning algorithms
4. Create the test protocols to evaluate the developed model's effectiveness.
5. Integrate many models to achieve superior outcomes.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

IV Year B. TECH–II-SEM

Professional Elective-V
(R22A0523) DESIGN PATTERNS USING PYTHON

L/T/P/C

3/0/0/3

COURSE OBJECTIVES:

1. Understand the python programming concepts
2. Understand the concept of Design patterns and its importance.
3. Understand the behavioral knowledge of the problem and solutions.
4. Relate the Creational, Structural , behavioral Design patterns.
5. Apply the suitable design patterns to refine the basic design for given context.

UNIT-I

A Brief Introduction to Python: Variables and Syntax in Python, Making Decisions in Python Development Environments, Python Collections and Files, Functions, Running Python programs Introduction: Introduction to Objects, Visual Programming in Python, Visual Programming of Tables of Data, What Are Design Patterns.

UNIT-II

Creational Patterns: The Factory Pattern, the Factory Method Pattern, the Abstract Factory Pattern, the Singleton Pattern, the Builder Pattern, the Prototype Pattern

UNIT-III

Structural Patterns: The Adapter Pattern , The Bridge Pattern , The Composite Pattern , The Decorator Pattern , The Façade Pattern , The Flyweight Pattern , The Proxy Pattern

UNIT-IV

Behavioral Patterns I: Chain of Responsibility Pattern , The Command Pattern , The Interpreter Pattern , The Iterator Pattern , The Mediator Pattern , The Memento Pattern

UNIT-V

Behavioral Patterns II: The Observer Pattern, the State Pattern, the Strategy Pattern, the Template Pattern,
The Visitor Pattern

TEXT BOOK:

Python Programming with Design Patterns BY James W. Cooper, Addison- Wesley publisher

REFERENCE BOOKS:

1. Design patterns by Erich gamma, Pearson Education publisher
2. Mastering Python Design Patterns: A Guide to Creating Smart, Efficient, and Reusable Software, 2nd Edition by Kamon Ayeva and Sakis Kasampalis

COURSE OUTCOMES:

1. Demonstrate python programming concepts
2. Identify the appropriate design patterns to solve object oriented design problems.
3. Develop design solutions using creational patterns.
4. Apply structural patterns to solve design problems.
5. Construct design solutions by using behavioral patterns.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

IV Year B. TECH-II-SEM

Professional Elective-V
(R22A0569) WEB SECURITY

L/T/P/C
3/0/0/3

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:

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.

REFERENCEBOOKS:

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.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

IV Year B. TECH-II-SEM

Professional Elective-V
(R22A6621) GENERATIVE AI

L/T/P/C
3/0/0/3

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, **Auto encoders:** 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

COURSE OUTCOMES:

1. Understand the core concepts of Generative AI.
2. Build a Variational Auto Encoder architecture.
3. Differentiate between the Generator and Discriminator neural networks in GAN.
4. Gain knowledge on Transformers in building Language Learning Models (LLM).
5. Estimate the future scope of Generative AI.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

IV Year B. TECH-II-SEM

Professional Elective-VI
(R22A0519) DIGITAL FORENSICS

L/T/P/C

3/0/0/3

COURSE OBJECTIVES:

1. This course will cover the fundamentals of digital forensics.
2. Provides an in-depth study of the rapidly changing and fascinating field of computer forensics.
3. Combines both the technical expertise and the knowledge required to investigate, detect and Prevent digital crimes.
4. Knowledge on digital forensics legislations, digital crime, forensics processes and procedures, data Acquisition and validation, e-discovery tools E-evidence collection
5. It provides preservation, investigating operating systems and file systems, network forensics, Art of steganography and mobile device forensics.

UNIT-I

Digital Forensics Science: Forensics science, computer forensics, and digital forensics. Computer Crime: Criminalistics as it relates to the investigative process, analysis of cyber-criminalistics area, challenges Faced by digital forensics.

UNIT-II

Cyber Crime Scene Analysis: Identifying digital evidence, collecting evidence in private-sector incident Scenes, processing law enforcement crime scenes, preparing for a search, securing a computer incident or Crime scene, seizing digital evidence at the scene.

UNIT-III

Evidence Management & Presentation: Create and manage shared folders using operating system, Importance of the forensic mindset, define the workload of law enforcement, Types of Evidence, Define Who should be notified of a crime, parts of gathering evidence.

UNIT-IV

Computer Forensics: Preparing a computer case investigation, Procedures for corporate hi-tech Investigations, conducting an investigation, Complete and critiquing the case.
Network Forensics: Overview of network forensics, open-source security tools for network forensic Analysis.

UNIT-V

Mobile Forensics: mobile forensics techniques, mobile forensics tools, recent trends in mobile forensic Technique and methods to search and seizure electronic evidence. Legal Aspects of Digital Forensics: IT Act 2000, amendment of IT Act 2008.

TEXT BOOKS:

1. B. Nelson, A. Phillips, and C. Steuart, Guide to Computer Forensics and Investigations, 4th Edition, Course Technology, 2010

REFERENCE BOOKS:

1. John Sammons, The Basics of Digital Forensics, 2nd Edition, Elsevier, 2014
2. John Vacca, Computer Forensics: Computer Crime Scene Investigation, 2nd Edition, Laxmi Publications, 2005.

COURSE OUTCOMES:

1. Understand relevant legislation and codes of ethics.
2. Investigate computer forensics and digital detective and various processes, policies and procedures data acquisition and validation, e-discovery tools.
3. Analyze E-discovery, guidelines and standards, E-evidence, tools and environment.
4. Apply the underlying principles of Email, web and network forensics to handle real life problems
5. Use IT Acts and apply mobile forensics techniques

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

IV Year B. TECH–II-SEM

Professional Elective-VI
(R22A0572) DISTRIBUTED DATABASES**L/T/P/C**
3/0/0/3**COURSE OBJECTIVES:**

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

UNIT-I

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

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

UNIT-II

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

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

UNIT-III

Transaction Management: Definition, properties of transaction, types of transactions, distributed concurrency control: serializability, concurrency control mechanisms & algorithms, time - stamped & optimistic concurrency control Algorithms, deadlock Management.

UNIT-IV

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

Parallel Database Systems: Parallel database system architectures, parallel data placement, parallel

query processing, load balancing, database clusters.

UNIT-V

Distributed object Database Management Systems: Fundamental object concepts and models, object distributed design, architectural issues, object management, distributed object storage, object query Processing.

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

TEXT BOOKS:

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

REFERENCE BOOK:

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

COURSE OUTCOMES:

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

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

IV Year B. TECH–II-SEM

Professional Elective-VI
(R22A06613) COGNITIVE COMPUTING

L/T/P/C

3/0/0/3

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:

1. Understand cognitive computing
2. Plan and use the primary tools associated with cognitive computing.
3. Plan and execute a project that leverages cognitive computing.
4. Understand and develop the business implications of cognitive computing.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

IV Year B. TECH–II-SEM

Professional Elective-VI
(R22A0533) SEMANTIC WEB & SOCIAL NETWORKS

L/T/P/C

3/0/0/3

COURSE OBJECTIVES:

1. To learn Web Intelligence
2. To learn Knowledge Representation for the Semantic Web
3. To learn Ontology Engineering
4. To learn Semantic Web Applications, Services and Technology
5. To learn Social Network Analysis and semantic web

UNIT-I

Thinking and Intelligent Web Applications, The Information Age ,The World Wide Web,Limitations of Today's Web, The Next Generation Web.Machine Intelligence, Artificial Intelligence, Ontology, Inference engines, Software Agents, Berners-Lee www, Semantic Road Map, Logic on the semantic Web.

UNIT-II

Ontologies and their role in the semantic web, Ontologies Languages for the Semantic Web – Resource Description Framework(RDF) / RDF Schema, Ontology WebLanguage(OWL),UML, XML/XML Schema.Ontology Engineering, Constructing Ontology, Ontology Development Tools, OntologyMethods, Ontology Sharing and Merging, Ontology Libraries and Ontology Mapping.

UNIT-III:

Logic, Rule and Inference Engines. Semantic Web applications and services, SemanticSearch, e-learning, Semantic Bioinformatics, Knowledge Base.

UNIT-IV:

XML Based Web Services, Creating an OWL-S Ontology for Web Services, Semantic Search Technology, Web Search Agents and Semantic Methods,What is social Networks analysis, development of the social networks analysis, Electronic Sources for Network Analysis – Electronic Discussion networks.

UNIT- V:

Blogs and Online Communities, Web Based Networks. Building Semantic Web Applications with social network features.

TEXT BOOKS:

1. Thinking on the Web - Berners Lee, Godel and Turing, Wiley interscience.
2. Social Networks and the Semantic Web, Peter Mika, Springer.

REFERENCE BOOKS:

1. Semantic Web Technologies, Trends and Research in Ontology Based Systems, J. Davies, Rudi Studer, Paul Warren, John Wiley & Sons.
2. Semantic Web and Semantic Web Services -Liyang Lu Chapman and Hall/CRC Publishers,(Taylor & Francis Group)
3. Information sharing on the semantic Web - Heiner Stucken schmidt; Frank Van Harmelen, Springer Publications.
1. Programming the Semantic Web, T. Segaran, C. Evans, J. Taylor, O'Reilly, SPD.

COURSE OUTCOMES:

1. Ability to understand and knowledge representation for the semantic web.
2. Ability to create ontology.
3. Ability to build a blogs and social networks

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OPEN ELECTIVE- I
(R22A0551) JAVA PROGRAMMING**COURSE OBJECTIVES:**

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

UNIT I

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

UNIT II

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

UNIT III

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

UNIT IV

Applets – Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets, passing parameters to applets. Event Handling: Events, Handling mouse and keyboard events

Files- Streams, Byte streams, Character streams, Text input/output.

UNIT V

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

TEXT BOOKS:

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

REFERENCE BOOKS:

1. Java for Programmers, P.J.Deitel and H.M.Deitel, PEA (or) Java: How to Program, P.J.Deitel and H.M.Deitel, PHI
2. Object Oriented Programming through Java, P. Radha Krishna, Universities Press.

COURSE OUTCOMES:

1. An understanding of the principles and practice of object-oriented programming and design in the construction of robust, maintainable programs which satisfy their requirements;
2. A competence to design, write, compile, test and execute straightforward programs using a high-level language;
3. An awareness of the need for a professional approach to design and the importance of good documentation to the finished programs.
4. Be able to make use of members of classes found in the Java API.
5. Demonstrate the ability to employ various types of constructs and a hierarchy of Java classes to provide solution to a given set of requirements.

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OPEN ELECTIVE- I

(R22A1251) WEB DEVELOPMENT

COURSE OBJECTIVES:

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

UNIT I

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

UNIT II

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

UNIT III

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

UNIT IV

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

UNIT V

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

TEXT BOOKS:

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

REFERENCE BOOKS:

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

COURSE OUTCOMES:

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

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OPEN ELECTIVE- I
(R22A2151) INTELLECTUAL PROPERTY RIGHTS**COURSE OBJECTIVES:**

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

UNIT I

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

UNIT II

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

UNIT III

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

UNIT IV

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

UNIT V

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

TEXT BOOKS:

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

REFERENCE BOOKS:

1. Intellectual property rights by P. Radhakrishnan.

COURSE OUTCOMES:

1. Learner should be able to demonstrate understanding of basic concepts of IPR.
2. Able to differentiate between Trademarks, Trade secrets and GI of goods.
3. Able to understand Copyrights, Patents and Industrial Designs.
4. Able to manage and protect IP 5. Will gain Knowledge on Cyber law

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OPEN ELECTIVE -I
(R22A0351) ROBOTICS & AUTOMATION**COURSE OBJECTIVES:**

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

UNIT -I:

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

UNIT – II:

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

UNIT- III:

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

UNIT-IV:

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

UNIT V:

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

TEXT BOOKS:

- 1) Subrata Ghoshal, "Embedded Systems & Robots", Cengage Learning
- 2) Stuart Russell, Peter Norvig, "Artificial Intelligence: A modern approach", Pearson Education, India 2003.
- 3) ARM System Developer's Guide: Designing and Optimizing System Software- Andrew N. Sloss, Dominic Symes, Chris Wright, Elsevier Inc., 2007

REFERENCE BOOKS:

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

COURSE OUTCOMES:

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

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

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OPEN ELECTIVE- I

(R22A0451) ELECTRONICS FOR HEALTHCARE

COURSE OBJECTIVES:

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

UNIT I

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

UNIT II

X-RAY DIAGNOSTIC METHODS: Conventional X-ray radiography, Fluoroscopy, Angiography, Mammography and Xeroradiography, Image subtraction.

COMPUTED TOMOGRAPHY: Conventional tomography, Computed tomography, Algorithms for image reconstruction: parallel and Fan beam data, Spiral CT. Recent developments – Digital radiography.

UNIT III

ULTRASOUND IMAGING: Generation and detection of Ultrasound- Piezoelectric effect, Ultrasonic transducers,

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

UNIT IV

RADIO NUCLIDE IMAGING: Generation & Detection of Nuclear Emission – Radionuclide generators, nuclear radiation detectors, Collimators, Radionuclide imaging systems-Gamma Camera, SPECT, PET.

BASICS OF MAGNETIC RESONANCE IMAGING: fundamentals of nuclear magnetic resonance- Angular momentum, magnetic dipole moment, magnetization, Larmor frequency, Rotating frame of reference and RF magnetic field, Free induction decay (FID), Fourier spectrum of the NMR signal, Spin density, Relaxation times, Pulse sequences.

UNIT V

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

COURSE OUTCOMES:

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

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

TEXTBOOKS:

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

REFERENCE BOOK:

1. Fundamentals of Medical Imaging, Paul Suetens, Cambridge University Press, 2002

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OPEN ELECTIVE-I

(R22A0251) RENEWABLE ENERGY SOURCES

COURSE OBJECTIVES:

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

UNIT-I

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

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

UNIT-II

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

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

UNIT-III

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

UNIT-IV

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

UNIT-V

Integration of Alternative Sources of Energy: Principles of Power Injection-Instantaneous Active and Reactive Power Control Approach Integration of Multiple Renewable Energy Sources-Islanding and Interconnection Control-DG Control and Power Injection. Inter connection Of Alternative Energy Sources with the Grid: Inter connection Technologies-Standards and Codes for Inter connection-Inter connection Considerations-Inter connection Examples for Alternative Energy Sources.

COURSE OUT COMES:

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

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

TEXTBOOKS:

1. Felix A. Farret, M. Godoy Simoes, "Integration of Alternative Sources of Energy", John Wiley & Sons, 2006.
2. Solanki: Renewable Energy Technologies: Practical Guide For Beginners, PHI Learning Pvt. Ltd., 2008.

REFERENCE BOOKS:

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

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OPEN ELECTIVE -I

(R22A6751) PRINCIPLES OF DATA SCIENCE

COURSE OBJECTIVES:

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

UNIT I:

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

UNIT II:

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

UNIT III:

DESCRIBING DATA - II Normal distributions – z scores – normal curve problems – finding proportions – finding scores – more about z scores – correlation – scatter plots – correlation coefficient for quantitative data – computational formula for correlation coefficient – regression – regression line – least squares regression line – standard error of estimate – interpretation of r^2 – multiple regression equations – regression toward the mean.

UNIT IV:

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

UNIT V:

DATA SCIENCE USE CASES Data Science Use cases Specifications and Discussion – Data Sources Identification – Data Types – Data Classification – Data Characteristics of Big V's – Data Science P's – Applications of AI: Domains: Customer Insights – Behavioral Analysis – Marketing – Retail – Insurance – Risk and Security –

Health care – Supply Chain Logistics.

TEXT BOOKS:

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

REFERENCE BOOKS:

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

COURSE OUTCOMES:

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

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

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OPEN ELECTIVE- I

(R22A6752) BUSINESS ANALYTICS

COURSE OBJECTIVES:

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

Unit-I: Understanding Business Analytics

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

Unit-II: Dealing with Data and Data Science

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

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

Unit-III: Data Mining and Machine Learning

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

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

Unit-IV: Applications of Business Analytics

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

Unit-V: Ethical, Legal and Organizational Issues

Issues & Challenges: Business Analytics Implementation Challenges - Privacy and Anonymization - Hacking and Insider Threats - Making Customer Comfortable.

REFERENCE BOOKS:

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

COURSE OUTCOMES:

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

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OPEN ELECTIVE-II
(R22A0553) DATABASE SYSTEMS**COURSE OBJECTIVES:**

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

UNIT - I

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

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

UNIT - II

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

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

UNIT - III

Transaction Management: Definition, properties of transaction, types of transactions, distributed concurrency control: serializability, concurrency control mechanisms & algorithms, time - stamped & optimistic concurrency control Algorithms, deadlock Management.

UNIT - IV

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

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

UNIT - V

Distributed object Database Management Systems: Fundamental object concepts and models, object distributed design, architectural issues, object management, distributed object storage, object query Processing.

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

TEXT BOOKS:

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

REFERENCE BOOK:

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

COURSE OUTCOMES:

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

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OPEN ELECTIVE-II
(R22A6753) BIG DATA ARCHITECTURE

COURSE OBJECTIVES:

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

UNIT - I:

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

UNIT - II:

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

UNIT - III:

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

UNIT - IV:

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

UNIT - V:

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

TEXT BOOKS:

1. Big Data Analytics, Seema Acharya, Subhasini Chellappan, Wiley 2015.
2. Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Business, Michael Minelli, Michehe Chambers, 1st Edition, Ambiga Dhiraj, Wiely CIO Series, 2013
3. Hadoop: The Definitive Guide, Tom White, 3rd Edition, O'Reilly Media, 2012.

REFERENCE BOOKS:

1. Big Data and Business Analytics, Jay Liebowitz, Auerbach Publications, CRC press (2013).

2. Professional Hadoop Solutions, Boris lublinsky, Kevin t. Smith, Alexey Yakubovich, Wiley, ISBN: 9788126551071, 2015.
3. Understanding Big data, Chris Eaton, Dirk deroos et al. McGraw Hill, 2012.

COURSE OUTCOMES:

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

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OPEN ELECTIVE II
(R22A0352) DESIGN THINKING**COURSE OBJECTIVES:**

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

UNIT-I

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

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

UNIT-II

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

UNIT-III

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

UNIT-IV

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

UNIT-V

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

TEXT BOOKS:

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

REFERENCE BOOKS

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

COURSE OUTCOMES:

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

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OPEN ELECTIVE-II
(R22A0552) PRINCIPLES OF CLOUD COMPUTING**COURSE OBJECTIVES:**

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

UNIT - I

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

UNIT- II

Migrating into a Cloud: Introduction, Broad Approaches to Migrating into the Cloud, 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.

UNIT- V

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

TEXT BOOKS:

1. Cloud Computing Principles and Paradigms, by Rajkumar Buyya
2. Essentials of cloud Computing: K. Chandrasekhran, CRC press, 2014
3. Michael Miller, Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online, Que Publishing, August 2008.

REFERENCE BOOKS:

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

COURSE OUTCOMES:

1. Ability to analyze various service delivery models of cloud computing
2. Ability to interpret the ways in which the cloud can be programmed and deployed.
3. Ability to comprehend the virtualization and cloud computing concepts
4. Assess the comparative advantages and disadvantages of Virtualization technology
5. Analyze security issues in cloud computing

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OPEN ELECTIVE II

(R22A6951) INTERNET OF THINGS & ITS APPLICATIONS

COURSE OBJECTIVES:

1. To study IoT Networking Core
2. To study IoT related network fundamentals
3. To study IoT Architecture.
4. To study IoT Application Development procedure
5. To study various case studies and IoT applications.

UNIT I: FUNDAMENTALS OF IoT- Evolution of Internet of Things, Enabling Technologies, M2M Communication, IoT World Forum (IoTWF) standardized architecture, Simplified IoT Architecture, Core IoT Functional Stack, Fog, Edge and Cloud in IoT, Functional blocks of an IoT ecosystem, Sensors, Actuators, Smart Objects and Connecting Smart Objects.

UNIT II: IoT PROTOCOLS- IoT Access Technologies: Physical and MAC layers, topology and Security of IEEE 802.15.4, 802.11ah and Lora WAN, Network Layer: IP versions, Constrained Nodes and Constrained Networks, 6LoWPAN, Application Transport Methods: SCADA, Application Layer Protocols: CoAP and MQTT.

UNIT III: DESIGN AND DEVELOPMENT- Design Methodology, Embedded computing logic, Microcontroller, System on Chips, IoT system building blocks IoT Platform overview: Overview of IoT supported Hardware platforms such as: Raspberry pi, Arduino Board details

UNIT IV: DATA ANALYTICS AND SUPPORTING SERVICES: Data Analytics: Introduction, Structured Versus Unstructured Data, Data in Motion versus Data at Rest, IoT Data Analytics Challenges, Data Acquiring, Organizing in IoT/M2M, Supporting Services: Computing Using a Cloud Platform for IoT/M2M Applications/Services, Everything as a service and Cloud Service Models.

UNIT V: CASE STUDIES/INDUSTRIAL APPLICATIONS: IoT applications in home, infrastructures, buildings, security, Industries, Home appliances, other IoT electronic equipment, Industry 4.0 concepts

TEXT BOOKS:

1. 6LoWPAN: The Wireless Embedded Internet, Zach Shelby, Carsten Bormann, Wiley
2. Internet of Things: Converging Technologies for Smart Environments and Integrated Eco systems, Dr. Ovidiu Vermesan, Dr. Peter Friess, River Publishers
3. Interconnecting Smart Objects with IP: The Next Internet, Jean-Philippe Vasseur, Adam Dunkels, Morgan Kuffmann

REFERENCE BOOKS:

1. The Internet of Things: From RFID to the Next-Generation Pervasive Networked Lu Yan, Yan Zhang, Laurence T. Yang, Huansheng Ning
2. Internet of Things (A Hands-on-Approach), Vijay Madiseti, Arshdeep Bahga
3. Designing the Internet of Things, Adrian McEwen (Author), Hakim Cassimally
4. Asoke K Talukder and Roopa R Yavagal, "Mobile Computing," Tata Mc Graw Hill, 2010.
5. Vijay Madiseti and Arshdeep Bahga, "Internet of Things (A Hands-on-Approach)", 1st Edition, VPT, 2014
6. Computer Networks; By: Tanenbaum, Andrew S; Pearson Education Pte.Ltd., Delhi, 4th Edition
7. Data and Computer Communications; By: Stallings, William; Pearson Education Pte.Ltd., Delhi, 6th Edition

COURSE OUTCOMES:

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

- 1) Understand IoT Networking Core
- 2) Understand IoT related network fundamentals
- 3) Understand IoT Architecture.
- 4) Understand IoT Application Development procedure
- 5) Understand various case studies and IoT applications.

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OPEN ELECTIVE II

(R22A0252) ELECTRICAL AND HYBRID VEHICLES

COURSE OBJECTIVES:

- To understand the fundamentals of Electric Vehicles (EVs), especially in Indian Context.
- To examine technology associated with each element of EV drive-train;
- To get in to the economics of EVs in India v is-à-v is petrol vehicles.

UNIT-I:

Introduction Overview of Electric Vehicles in India, India's EV program, Charging and Swapping Infrastructure, brief introduction of batteries, Lithium for batteries, EV Subsystems.

UNIT-II:

Vehicle Dynamics: Forces acting when a vehicle move, Aerodynamic drag, Rolling Resistance and Uphill Resistance, Power and Torque to accelerate.

Drive Cycle: Concept of Drive Cycle, Drive Cycles and Energy used per km.

UNIT-III:

EV Power train: Design of EV Drive Train, Introduction to Battery Parameters, Why Lithium Ion Battery? Batteries in Future, Li-Ion Battery Cells, SoH and SoC estimation and Self Discharge, Battery Pack Development, Computation of Effective cost of battery, Charging Batteries.

Fundamentals of EV Battery Pack design: Mechanical, Thermal and Electrical Design, BMS Design of Electric Vehicle.

UNIT-IV:

EV Motors and Controllers: Fundamentals and Design, Understanding Flow of Electricity, Magnetism and Heat, Power and Efficiency, Torque Production, Speed and Back EMF, the d-q Equivalent circuit, Field-oriented Control, Understanding Three phase AC and DC to AC conversion systems, Understanding the thermal design of the motors, Engineering Considerations, Future Frontiers.

UNIT-V:

EV Charging: Introduction, Slow or Fast EV Chargers, Battery Swapping, Standardization and On board Chargers, Public Chargers, Bulk Chargers/Swap Stations, Economics of Public Chargers in context, Analytics and Tools for EV systems.

TEXT BOOKS:

1. Electric Power train- Energy Systems, Power electronics and drives for Hybrid, electric and fuel cell vehicles by John G. Hayes and A. Goodarzi, Wiley Publication
2. MehrdadEhsani,YimiGao,SebastianE.Gay,AliEmadi,ModernElectric,Hybrid Electric and Fuel Cell Vehicles: Fundamentals, Theory and Design, CRC Press, 2004
3. Iqbal Hussein, Electric and Hybrid Vehicles: Design Fundamentals, CRCPress,2003

REFERENCE BOOKS:

1. James Larminie, John Lowry, Electric Vehicle Technology Explained, Wiley,2003
2. Chris Mi, M.Abul Masrur, David Wenzhong Gao, Hybrid Electric Vehicles:Principles and Applications with Practical Perspectives, John Wiley & Sons Ltd., 2011
3. Fundamentals of Electric Vehicles: technology and economics
https://onlinecourses.nptel.ac.in/noc20_ee99/previewhttps://archive.nptel.ac.in/courses/108/106/108106170/

COURSE OUTCOMES:

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

2. Understand the fundamentals of Electric Vehicles.
3. Design of batteries, EV motors and Power electronic controllers for EV systems.
4. Analyze the economics of EV market and E data using Analytical tools.

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OPEN ELECTIVE-II
(R22A6251) CYBER GOVERNANCE**COURSE OBJECTIVES:**

1. To learn Principles of Cyber Security.
2. To learn various types of attacks and the precautions.
3. To gain the knowledge of security and governance measurements
4. To learn the analytical and various security compliance in Cyber Security through
5. governance.
6. To gain the knowledge of various countries Cyber Security Principles and Governance.

UNIT - I

Principles of cyber-security governance, Assessment of cyber security maturity, Theories of governance – introduction, Governance – definitions and typologies, Tools, methods and processes

UNIT - II

Vulnerability management, Threat management, Endpoint management, Intrusion detection and prevention (IDPS), Security incident management, Security operations center (SOC) and related concepts.

UNIT - III

Measurement of governance: Metrics – concepts, Application security metrics, Network security metrics, Security incident metrics, Vulnerability metrics, Service level objectives / agreement (SLO / SLA), NIST metrics

UNIT - IV

Basics of security analytics, Threat intelligence and governance, Data driven security governance, Impact of cognitive security on security governance, Industry specific security compliance

UNIT - V

Cyber security governance India and Other countries, NIST mandates for compliance, Security reporting basics, CISO – role and organization structure

TEXT BOOKS:

1. Hayden, Lance. IT Security Metrics: A Practical Framework for Measuring Security & Protecting Data. McGraw-Hill Education Group, 2010.
2. Jacobs, Jay, and Bob Rudis. Data-driven security: analysis, visualization and dashboards. John Wiley & Sons, 2014
3. Collins, Michael. Network Security Through Data Analysis: From Data to Action. "O'Reilly Media, Inc.", 2017.
4. Jaquith, Andrew. Security metrics: replacing fear, uncertainty, and doubt. Pearson Education, 2007.

REFERENCE BOOKS:

1. Cybersecurity, Critical Infrastructure. "Framework for Improving Critical Infrastructure Cybersecurity." Framework 1 (2014): 11.

Course Outcomes:

1. Students will be able to understand the basis of cyber-security.
2. Students will be able to know various governance principles
3. Students will learn about various types of attacks and threats in Security
4. Students will gain the knowledge of other countries standards, methods in governance

