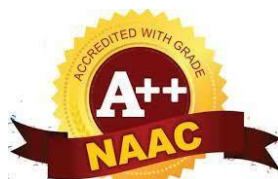


COURSE STRUCTURE AND DETAILED SYLLABUS

B.Tech-Four Year Degree Programme

(MR20 Regulations)

Effective from the Academic Year 2020-21 onwards



Department of Information Technology **Malla Reddy Engineering College**

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Department of Information Technology

VISION OF THE INSTITUTE

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

MISSION OF THE INSTITUTE

- M1.** To impart knowledge of advanced technologies using state-of-the-art infrastructural facilities.
- M2.** To inculcate innovation and best practices in education, training and research.
- M3.** To meet changing socio-economic needs in an ethical ambience.

DEPARTMENT VISION

To Attain Global Standards in the Teaching, Training, and Research of the IT Industry that Strike a Balance between the Rising Needs of the Sector and the Socio-Economic and Ethical Needs of the Society..

DEPARTMENT MISSION

- M1.** To impart quality education and research to undergraduate and postgraduate students in Information Technology (IT).
- M2.** To train students in advanced technologies using state-of-the-art facilities.
- M3.** To develop knowledge, skills and aptitude to function in the IT domain based on ethical values and social relevance.



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PROGRAMME EDUCATIONAL OBJECTIVES (PEO's)

- PEO-1.** To outshine in professional career with sound problem solving ability for providing IT solutions by proper plan, analysis, design, implementation and validation.
- PEO-2.** To pursue training, advance study and research using scientific, technical and communication base to cope with the evolution in the technology.
- PEO-3.** To utilize the acquired technical skills and knowledge for the benefit of society

PROGRAMME SPECIFIC OUTCOMES (PSO's)

- PSO-1.** Identify the mathematical abstractions and algorithm design techniques together with emerging Software Tools to solve complexities indulged in efficient programming.
- PSO-2.** Apply the core concepts of current technologies in the hardware, software mains in accomplishing IT enabled services to meet out societal needs.
- PSO-3.** Practice modern computing techniques by continual learning process with ethical concerns in establishing innovative career path

PROGRAMME OUTCOMES (POs)

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



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Course Structure and Syllabus

(MR20 Regulations–Effective from the Academic Year 2020-21 onwards)

I Year I Semester							
S. No.	Category	Course Code	Name of the Course	Contact Hours/Week			Credits
				L	T	P	
1	BSC	A0B01	Linear Algebra and Numerical Methods	3	1	-	4
2	BSC	A0B17	Engineering Chemistry	3	1	-	4
3	ESC	A0201	Basic Electrical and Electronics Engineering	3	-	-	3
4	ESC	A0501	Programming for Problem Solving	3	-	-	3
5	BSC	A0B18	Engineering Chemistry Lab	-	-	2	1
6	ESC	A0202	Basic Electrical and Electronics Engineering Lab	-	-	2	1
7	ESC	A0502	Programming for Problem Solving Lab	-	-	3	1.5
8	ESC	A1201	Engineering and IT Workshop	-	-	3	1.5
Total				12	2	10	19
Total Contact Hours				24			19

I Year II Semester							
S. No	Category	Course Code	Name of the Course	Contact Hours/Week			Credits
				L	T	P	
1	HSMC	A0H01	English	3	-	-	3
2	BSC	A0B02	Probability and Statistics	3	-	-	3
3	BSC	A0B09	Semiconductor Physics	3	1	-	4
4	ESC	A0504	Python Programming	3	1	-	4
5	ESC	A0301	Engineering Graphics	2	-	2	3
6	HSMC	A0H02	English Language Lab	-	-	2	1
7	BSC	A0B11	Applied Physics Lab	-	-	2	1
8	ESC	A0506	Python Programming Lab	-	1	2	2
Total				14	3	8	21
Total Contact Hours				25			



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Department of Information Technology

Course Structure and Syllabus

(MR20 Regulations–Effective from the Academic Year 2020-21 onwards)

II Year I Semester							
S. No	Category	Course Code	Name of the Course	Contact Hours/Week			Credits
				L	T	P	
1	PCC	A0507	Discrete Mathematics	3	-	-	3
2	PCC	A0508	Computer Organization and Architecture	3	-	-	3
3	PCC	A0509	Data Structures	3	-	-	3
4	PCC	A0510	Object Oriented Programming	3	-	-	3
5	PCC	A0511	Operating Systems	3	-	-	3
6	PCC	A0512	Data Structures Lab	-	-	3	1.5
7	PCC	A0513	Object Oriented Programming Lab	-	-	3	1.5
8	PCC	A0514	Operating Systems Lab	-	1	2	2
9	MC	A00M1	Gender Sensitization	-	-	2	-
Total				15	1	10	20
Total Contact Hours				26			

II Year II Semester							
S. No	Category	Course Code	Name of the Course	Contact Hours/Week			Credits
				L	T	P	
1	BSC	A0B07	Applied Statistics and Optimization Techniques	3	-	-	3
2	PCC	A0515	Database Management Systems	3	-	-	3
3	PCC	A0516	Design and Analysis of Algorithms	3	-	-	3
4	PCC	A1202	Web Technologies	3	-	-	3
5	PEC-I	Professional Elective –I					
		A1203	Computer Graphics	3	-	-	3
		A1204	Neural Network				
		A0519	Cloud Computing				
6	PCC	A0520	Database Management Systems Lab	-	1	2	2
7	PCC	A1205	Web Technologies Lab	-	-	3	1.5
8	PCC	A0521	Design and Analysis of Algorithms Lab	-	-	3	1.5
9	MC	A00M2	Environmental Science	2	-	-	-
Total				17	1	8	20
Total Contact Hours				26			



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Course Structure and Syllabus

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III Year I Semester							
S.No	Category	Course Code	Name of the Course	Contact Hours/ Week			Credits
				L	T	P	
1	PCC	A1206	Theory of Automata	4	-	-	4
2	PCC	A0524	Software Engineering and Modeling	3	-	-	3
3	PCC	A6201	Computer Networks	3	-	-	3
Professional Elective –II							
4	PEC-II	A6203	Cryptography and Network Security	3	-	-	3
		A0526	Artificial Intelligence				
		A1207	Virtual Reality				
		A1208	Principles of Programming Languages				
		A6706	R Programming				
Professional Elective –III							
5	PEC-III	A0530	Distributed Systems	3	-	-	3
		A1209	Android Application Development				
		A6217	Cyber Security				
		A1210	Information Retrieval Systems				
		A1211	Soft Computing				
6	PCC	A0535	Software Engineering and Modeling Lab	-	-	3	1.5
7	PCC	A1214	Android Application Development Lab	-	1	2	1
8	PCC	A6202	Computer Networks Lab	-	-	3	1.5
9	MC	A00M3	Quantitative Aptitude & Verbal Reasoning-I	2	-	-	-
Total				18	1	8	21
Total Contact Hours				27			



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Course Structure and Syllabus

(MR20 Regulations–Effective from the Academic Year 2020-21 onwards)

III Year II Semester							
S.No	Category	Course Code	Name of the Course	Contact Hours / Week			Credits
				L	T	P	
1	HS	A0H08	Engineering Economics and Accountancy	3	-	-	3
2	PCC	A1212	Machine Learning	3	-	-	3
3	ESC	A0536	Compiler Design	4	-	-	4
Professional Elective –IV							
4	PEC-IV	A1213	Data Analysis and Visualization	3	-	-	3
		A1216	Image Processing and Pattern Recognition				
		A1217	UI/UX Designing				
		A1218	Object Oriented Analysis and Design				
		A1219	Advanced Computer Architecture				
Professional Elective –V							
5	PEC-V	A1220	DevOps	3	-	-	3
		A0558	Software Quality Assurance and Testing				
		A1221	Mobile Communication				
		A1222	Social Media Analytics				
		A0550	Big Data Analytics				
6	OEC-I	Open Elective-I		3	-	-	3
7	HSMC	A0H03	English Communication and Presentation Skills Lab	-	-	2	1
8	PCC	A1215	Machine Learning Lab	-	-	2	1
9	ESC	A0543	Compiler Design Lab	-	1	2	2
10	MC	A00M4	Quantitative Aptitude & Verbal Reasoning-II	2	-	-	-
Total				21	1	6	23
Total Contact Hours				28			



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Department of Information Technology

Course Structure and Syllabus

(MR20 Regulations–Effective from the Academic Year 2020-21 onwards)

IV Year I Semester							
S.No	Category	Course Code	Name of the Course	Contact Hours / Week			Credits
				L	T	P	
1	HSMC	A0H09	Management Fundamentals	3	-	-	3
2	PCC	A0545	Data Mining	3	-	-	3
3	PCC	A1223	Internet of Things	3	-	-	3
Professional Elective –VI							
4	PEC-VI	A1224	IT Infrastructure Management	3	-	-	3
		A1225	AI for Robotics				
		A0548	Software Testing Methodologies				
		A0546	Blockchain Technologies				
		A6215	Digital Forensics				
5	OEC-II	Open Elective-II		3	-	-	3
6	OEC-III	Open Elective-III		3	-	-	3
7	PCC	A0544	Data Mining Lab	-	1	2	2
8	PCC	A1226	Internet of Things Lab	-	1	2	2
9	PROJ	A00P1	Internship/Mini Project	-	-	4	2
Total				18	2	8	24
Total Contact Hours				28			

IV Year II Semester							
S.No	Category	Course Code	Name of the Course	Contact Hours/ Week			Credits
				L	T	P	
1	PROJ	A00P2	Major Project	-	-	24	12
2	SEM	A00P3	Seminar	-	-	2	1
Total				-	-	26	13
Total Contact Hours				26			



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List of Open Electives

S.No	Course Code	Name of the Course	Credits
1	A1227	Information Theory & Coding	3
2	A1228	Software Project Management	3
3	A1229	Distributed Databases	3
4	A1230	Concurrent Programming	3
5	A1231	Network Programming	3
6	A1232	Scripting Languages	3

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech. I Semester		
Code:A0B01	Linear Algebra and Numerical Methods (Common for CSE and IT)	L	T	P
Credits: 4		3	1	-

Prerequisites:

Course Objectives:

Module – I

[12 Periods]

Matrices: Types of Matrices, Symmetric; Hermitian; **Skew**-Symmetric; Skew-Hermitian; orthogonal matrices; Unitary Matrices and its properties; Rank of a matrix by Echelon form and Normal form, Inverse of Non-singular matrices by Gauss-Jordan method; System of linear equations; Consistency of Homogeneous and Non-Homogeneous equations, LU Decomposition method.

Module – II

[12 Periods]

Eigen Values and Eigen Vectors: Eigen values and Eigen vectors and their properties, Diagonalization of matrices; Cayley-Hamilton Theorem (without proof), finding inverse and power of a matrix by Cayley-Hamilton Theorem. Quadratic Forms, Reduction of Quadratic form to canonical form using Orthogonal Transformations.

Module – III

[12 Periods]

Applications of First Order & First Degree ODE: Orthogonal trajectories, Newton's law of cooling, Law of natural growth and decay

Second and Higher Order ODE with Constant Coefficients: Introduction-Rules for finding complementary function –particular integral. Solution of Homogenous, non-homogeneous differential equations, Non-Homogeneous terms of the type e^{ax} , $\sin(ax)$, $\cos(ax)$, polynomials in x , $e^{ax} V(x)$, $x V(x)$. Method of variation of parameters

Module – IV

[12 Periods]

Algebraic & Transcendental equations and Interpolation:

Solution of Algebraic and Transcendental Equations: The Bisection Method, The Method of False Position – The Iteration Method – Newton-Raphson Method

Interpolation: Introduction- Errors in Polynomial Interpolation – Finite differences- Forward Differences-Backward differences, Central difference, Differences of a polynomial-Newton's formulae for interpolation Central difference interpolation Formulae – Gauss Central Difference Formulae –Interpolation with unevenly spaced points-Lagrange's Interpolation formula.

Module – V

[12 Periods]

Numerical solution of Ordinary Differential Equations

Introduction-Solution by Taylor's series method – Picard's Method of successive Approximations – Euler's Method-Modified Euler's Method – Runge-Kutta Methods. Predictor-Corrector Methods: Milne's method – Adams- Bashforth Method.

Proposed Text Books:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.
2. D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005.
3. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.

Proposed Reference Books:

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
3. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.

4.V. Krishnamurthy, V.P. Mainra and J.L. Arora, An introduction to Linear Algebra, Affiliated East–West press, Reprint 2005.

Course Outcomes:

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

CO	Statement	Blooms Taxonomy Level
CO1	Understand the concepts of vector spaces.	Understand
CO2	Understand the concepts of vector space, linear transformations and diagonalization	Understand
CO3	Apply the concept of inner product spaces in orthogonalization	Apply
CO4	Analyze suitable numerical techniques for solving system of linear equations.	Analyze
CO5	Apply interpolation in constructing approximate polynomial to represent the data and to find the intermediate values	Apply

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

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech. I Semester		
Code: A0B17	Engineering Chemistry (Common for All)	L	T	P
Credits: 4		3	1	-

Prerequisites: Nil

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

Module I: Water and its treatment

[10 Periods]

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

Module II: Molecular structure and Theories of Bonding:

[10 Periods]

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

Module III: Electrochemistry and Corrosion

A. Electrochemistry:

[7 Periods]

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

B. Corrosion:

[7 Periods]

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

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

Introduction to Isomers – classification of isomers – structural (chain, positional & functional) and stereoisomerism-geometrical (cis-trans & E-Z system) – characteristics of geometrical isomerism, optical isomerism (chirality – optical activity, specific rotation, enantiomers and diastereomers) of tartaric acid and lactic acid. Conformational isomerism of n-Butane. Introduction to bond cleavage (homo & hetero cleavage) – reaction intermediates and their stability. Types of organic reactions – Mechanism of substitution (SN^1 & SN^2) and ($E1$ & $E2$) reactions with suitable example. Ring opening (Beckmann rearrangement), oxidation and reduction (Cannizzaro reaction), cyclization (Components of Diels-Alder reaction-Mechanism of Diels-Alder reaction with suitable example) reactions. Synthesis of Paracetamol, Aspirin and their applications.

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

MODULE-V Fuels and Combustion [08 Periods]

Fuels: Classification- solid fuels: coal – analysis of coal – proximate and ultimate analysis and their significance. Liquid fuels – petroleum and its refining, cracking – types – moving bed catalytic cracking. Knocking – octane and cetane rating, synthetic petrol – Fischer-Tropsch's process; Gaseous fuels – composition and uses of natural gas, LPG and CNG. **Combustion:** Definition, Calorific value of fuel – HCV, LCV; Calculation of air quantity required for combustion of a fuel. Determination of calorific value by Junkers gas calorimeter-Numerical problems on combustion.

Text Books:

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

Reference Books:

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

e-Resources:

a) Concerned Website links:

- 1) <https://books.google.co.in/books?isbn=0070669325> (Engineering chemistry bySivasankar).
- 2) <https://www.youtube.com/watch?v=yQUD2vzfgh8> (Hot dipping Galvanization).
- 3) https://archive.org/stream/VollhardtOrganicChemistryStructureFunction6th/Vollhardt_Organic_Chemistry_Structure_Function_6th_djvu.txt.

b) Concerned Journals/Magazines links:

- 1) <http://americanhistory.si.edu/fuelcells/sources.htm> (Fuel Cell Information Sources)
- 2) <https://www.abctlc.com/downloads/courses/WaterChemistry.pdf> (Water Chemistry)

c) NPTEL Videos:

- 1) nptel.ac.in/courses/113108051/ (corrosion & electrochemistry web course)

2) <https://www.youtube.com/watch?v=V7-8EofZKeE> (Stereochemistry)

Course Outcomes:

CO	Statement	Blooms Taxonomy Level
CO1	Understand water treatment, specifically hardness of water and purification of water by various methods	Understand
CO2	Acquire knowledge on electrochemical cells, fuel cells, batteries and their applications	Understand
CO3	Analyze microscopic chemistry in terms of atomic and molecular orbital's splitting and band theory related to conductivity	Understand
CO4	Acquire basic knowledge on the concepts of stereo chemistry	Analyze
CO5	Acquire basic knowledge on chemical reaction mechanisms and that are used in the synthesis of molecules	Understand

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

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech. I Semester		
Code: A0201	Basic Electrical and Electronics Engineering (Common for ALL)	L	T	P
Credits: 3		3	-	-

Prerequisites:

Course Objectives

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

MODULE I: DC Circuits

[09 Periods]

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

MODULE II: AC Circuits

[09 Periods]

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

MODULE III: Introduction to Electrical Machines

[10 Periods]

A: DC Machines: Construction & Principle of Operation of DC Generators – E.M.F Equation. Principle of operation DC Motors – Back E.M.F. – Torque equation – Brake Test -Characteristics.

B: AC Machines: Construction and Principle of operation of Transformer- EMF Equation. Construction and Principle of Operation of 3 Phase Induction Motors – Brake test on 3-Phase Induction Motor – Applications.

MODULE IV: P-N Junction Diode

[10 Periods]

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

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

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

MODULE V: BJT and Junction Field Effect Transistor (JFET)

[10 Periods]

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

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

TEXT BOOKS

1. M.SuryaKalavathi, Ramana Pilla, Ch. Srinivasa Rao, Gulinindala Suresh, "Basic Electrical and Electronics Engineering", S.Chand and Company Limited, New Delhi, 1st Edition, 2017.
2. R.L.Boylestad and Louis Nashlesky, "Electronic Devices & Circuit Theory", Pearson Education, 2007.
- 3.

REFERENCES

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

e-Resources

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

Course Outcomes:

CO	Statement	Blooms Taxonomy Level
CO1	Understand water treatment, specifically hardness of water and purification of water by various methods	Understand
CO2	Acquire knowledge on electrochemical cells, fuel cells, batteries and their applications	Understand
CO3	Analyze microscopic chemistry in terms of atomic and molecular orbital's splitting and band theory related to conductivity	Understand
CO4	Acquire basic knowledge on the concepts of stereo chemistry	Analyze
CO5	Acquire basic knowledge on chemical reaction mechanisms and that are used in the synthesis of molecules	Understand

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

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech. I Semester		
Code: A0501	Programming for Problem Solving (Common for ALL)	L	T	P
Credits: 3		3	-	-

Prerequisites: NIL

Objectives

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

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

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

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

MODULE II: Conditional Statements and Repetition Statements [09 Periods]

Control Statements:if and switch statements, Repetition statements – while, for, do-while statements, Loop examples, other statements related to looping – break, continue, go to, Simple C Programming examples.

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

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

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

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

MODULE IV: Strings and Pointers [09 Periods]

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

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

MODULE V: Structures and File Handling [10 Periods]

Structures – Declaration, definition and initialization of structures, accessing structure elements, nested structures, arrays of structures, structures and functions, pointers to structures, self-referential

structures, unions, difference between structures and union, typedef, bitfields, enumerated types, C programming examples.

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

TEXTBOOKS

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

REFERENCES

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

E–RESOURCES

1. [http://oxford.universitypress.ac.in/eBooks/ Programming in C.](http://oxford.universitypress.ac.in/eBooks/Programming%20in%20C)
2. <https://www.journals.elsevier.com/science-of-computer-programming>
3. <http://www.ejournalofsciences.org>
4. http://onlinecourses.nptel.ac.in/iiitk_cs-101
5. <http://onlinevideolecture.com/ebooks/?subject=C-Programming>

Outcomes:

CO	Statement	Blooms Taxonomy Level
CO1	Understand the basic terminology, write, compile and debug programs in computer programming	Understand
CO2	Apply different types of control structures and arrays in a computer programming	Apply
CO3	Develop programs that make use of concepts such as strings and pointers in C language	Apply
CO4	structures , unions and Analyze file operations with computer programming	Analyze
CO5	searching and sorting methods and implementation of stack,queue and linear lists.	Apply

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

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech. I Semester		
Code: A0B18	Engineering Chemistry Lab (Common for ALL)	L	T	P
Credits: 1		-	-	2

Course objectives:

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

List of Experiments:

1. Calibration of Volumetric apparatus.
2. Estimation of Total Hardness of water by EDTA Method.
3. Estimation of pH of an acid (Three methods).
4. Estimation of alkalinity of water.
5. Estimation of strength of an acid by Conductometry.
6. Estimation of strength of an acid by Potentiometry.
7. Estimation of Mn^{+2} ion in $KmnO_4$ by Colorimetry.
8. Determination of viscosity of given liquids by Ostwald's viscometer.
9. Determination of surface tension of given sample using stalagmometer.
10. Estimation of iron (II) by dichrometry.
11. Determination of rate constant of hydrolysis of methyl acetate.
12. Preparation of Aspirin.

Course outcomes:

CO	Statement	Blooms Taxonomy Level
CO1	Develop skills to impart practical knowledge in real time solution	Analyze
CO2	Estimate the variations in characteristics by changing source values	Apply
CO3	Carry out scientific experiments as well as accurately record and analyze the results of such experiments	Analyze
CO4	Understand principle, concept, working, application and comparison of results with theoretical calculations	Understand
CO5	Explore new concepts in both chemistry and allied fields of science and technology	Understand

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

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech. I Semester		
Code: A0202	Basic Electrical and Electronics Engineering Lab (Common for ALL)	L	T	P
Credits: 1		-	-	2

Prerequisites: NIL

Course Objectives:

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

List of Experiments:

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

Course Outcomes:

CO	Statement	Blooms Taxonomy Level
CO1	Analyse electrical circuits by applying basic laws	Analyze
CO2	Analyse the performance of DC Motor, three phase Induction motor and transformer	Apply
CO3	Understand V-I Characteristics of various diodes	Analyze
CO4	Design Different Rectifier Circuits	Understand
CO5	Differentiate the Transistors and their Operations	Understand

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

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech. I Semester		
Code: A0502	Programming for Problem Solving Lab (Common for ALL)	L	T	P
Credits: 1.5		-	-	3

Prerequisites: NIL

Objectives:

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

Software Requirements: C

List of Programs:

1.
 - a. Practice various Internal and External DOS Commands.
 - b. Write sample examples of C programs to implement basic operations.
 2.
 - a. Write a C program to find smallest and largest of given three numbers.
 - b. Write a C program to find the roots of a quadratic equation.
 - c. Write a C program to check whether given character is alphabet, digit or special symbol
 3.
 - a. Write a C program to find the sum of individual digits of a positive integer.
 - b. Write a C program to generate the first 'n' terms of the sequence.
 4.
 - a. Write a C program to find whether the given number is palindrome, perfect, Armstrong or strong.
 - b. Write a C program to generate all the prime numbers between n1 and n2, where n1 and n2 are Values supplied by the user.
- Write C programs that use both recursive and non-recursive functions
5.
 - a. To find the factorial of a given integer.
 - b. To find the GCD (greatest common divisor) of two given integers.
 6.
 - a. Write a C program to find both the largest and smallest number in a list of integers.
 - b. Write a C program that uses non-recursive function to search for a Key value in a given list of integers using linear search.
 - c. Write a C program that uses recursive and non -function to search for a Key value in a given sorted list of integers using Binary search.
 7.
 - a. Write a C program that implements the Bubble sort method to sort a given array of integers in ascending order.
 - b. Write a C program that implements the Selection sort method to sort a given list of names in Ascending order.
 8.

Write a C program to perform the following:

 - a. Addition of Two Matrices
 - b. Multiplication of Two Matrices.
 9.

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

 - a. To insert a sub-string into given main string from a given position.
 - b. To delete n characters from a given position in a given string.
 - c. To find substring in a given string

10.
 - a. Write a C program to determine if the given string is a palindrome or not
 - b. Write a C program to count the lines, words and characters in a given text.
11.
 - a. Write a C program to swap two numbers, which implement call by value and call by reference.
 - b. Write a C program to display the below student details using structures

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

- c. Write a C program to find grade of a student using structures.
12.
 - a. Write a C program which copies one file to another
 - b. Write a C program to find sum of two numbers using command line arguments
13.
 - a. Develop a mini project which implement the Library Management System
 - b. Develop a mini project which implement the Student Record System

Text Books:

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

References:

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

Outcomes:

CO	Statement	Blooms Taxonomy Level
CO1	Understand the basic terminology, write, compile and debug programs in computer programming	Apply
CO2	Apply different types of control structures and arrays in a computer programming	Apply
CO3	Develop programs that make use of concepts such as strings and pointers in C language	Apply
CO4	structures , unions and Analyze file operations with computer programming	Analyse
CO5	searching and sorting methods and implementation of stack,queue and linear lists.	Apply

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

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech. I Semester		
Code: A1201	Engineering and IT Workshop (Common for CSE and IT)	L	T	P
Credits: 1.5		-	-	3

Pre requisites: NIL

Course Objectives:

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

Engineering Workshop:

Problem 1: Trades for Exercises

At least two exercises from each trade

1. House-wiring
2. Soldering

Problem 2: Trades for Demonstration & Exposure

1. Carpentry
2. Wood working lathe

PC Hardware:

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

Problem 3:

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

Problem 4:

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

Problem 5:

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

Problem 6:

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

Productivity tools: LaTeX and Word Word Orientation: An overview of LaTeX and Microsoft (MS) office / equivalent (FOSS) tool word should be learned: Importance of LaTeX and MS office / equivalent (FOSS) tool Word as word Processors, Details of the three tasks and features that should

be covered in each, using LaTeX and word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter.

Problem 7:

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

Problem 8:

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

Problem 9:

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

Problem 10:

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

Problem 11:

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

Problem 12:

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

Reference Books:

1. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
2. LaTeX Companion –Leslie Lamport, PHI/Pearson.
3. Comdex Information Technology course tool kit Vikas Gupta, WILEY Dream tech
4. IT Essentials PC Hardware and Software Companion Guide Third Edition by David Anfinson and Ken Quamme.–CISCO Press, Pearson Education.
5. PC Hardware and A+ Handbook –Kate J. Chase PHI (Microsoft

Course Outcomes:

CO	Statement	Blooms Taxonomy Level
CO1	Apply knowledge for computer assembling and software installation.	Understand
CO2	Ability how to solve the trouble shooting problems.	Analyze
CO3	Apply the tools for preparation of PPT, Documentation and budget sheet etc.	Analyze

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

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech. II Semester		
Code: A0H01	English (Common for ALL)	L	T	P
Credits: 3		3	-	-

Course Objective:

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

Module – I:

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

Module – II:

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

Module – III:

- Essay** : “Lucidity, Simplicity, Euphony” by W. Somerset Maugham
Poem : “The Mask” by Maya Angelou
Grammar : Tense and Aspect
Vocabulary : Homonyms, Homophones, Homographs
Reading : Reading for Topic and Theme
Writing : Letter Writing

Module – IV:

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

Module – V:

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

* Exercises from the texts not prescribed shall also be used for classroom tasks.

Prescribed Textbook:**Reference Books:**

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

Related Websites:

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

Course Outcomes:

CO	Statement	Blooms Taxonomy Level
CO1	Use English considerably well in written and spoken.	Understand
CO2	Enrich language accurately and fluently.	Understand
CO3	Employ extensive and intensive reading skills	Apply
CO4	Gain confidence in using English language and skills for writing in real life situations	Understand
CO5	Use standard grammar, punctuations and spelling in documents.	Apply

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

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech. II Semester		
Code: A0B02	Probability and Statistics (Common for CSE and IT)	L	T	P
Credits: 3		3	-	-

Prerequisites: Basic Probability

Course Objectives:

This course is meant to provide a grounding in Statistics and foundational concepts that can be applied in modeling processes, decision making and would come in handy for the prospective engineers in most branches.

Module – I

[12 Periods]

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

Module – II

[12 Periods]

Random variables – Discrete Probability distributions. Bernoulli, Binomial, Poisson, mean, variance, moment generating function–related problems. Continuous probability distribution, Normal distribution, mean, variance, moment generating function

Module – III

[12 Periods]

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

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

Large sample tests:

1. Test of Equality of means of two samples equality of sample mean and population mean (cases of known variance & unknown variance, equal and unequal variances)
- (ii) Tests of significance of difference between sample S.D and population S.D.
2. Tests of significance difference between sample proportion and population proportion & difference between two sample proportions

Module – IV

[12 Periods]

Small Sample Tests:

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

Module – V

[12 Periods]

Correlation, Regression: Correlation, Coefficient of correlation, the rank correlation. Regression, Regression Coefficient, The lines of regression: simple linear regression, Multiple Linear Regression, Polynomial Regression and Logistic regression.

Text Books:

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

References:

1. Sheldon M Ross, Introduction to Probability & Statistics, for Engineers & Scientists, 5th Edition, Academic Press.
2. Miller & Freund's, Probability & Statistics, for Engineers & Scientists, 6th Edition, Pearson Education.
3. Murray R Spiegel, Probability & Statistics, Schaum's Outlines, 2nd Edition, Tata Mc. Graw Hill Publications.
4. S Palaniammal, Probability & Queuing Theory, 1st Edition, Printice Hall.

E Resources:

1. <http://www.csie.ntu.edu.tw/~sdlin/download/Probability%20&%20Statistics.pdf> (Probability & Statistics for Engineers & Scientists text book)
2. http://www.stat.pitt.edu/stoffer/tsa4/intro_prob.pdf (Random variables and its distributions)
3. <http://users.wfu.edu/cottrell/ecn215/sampling.pdf> (Notes on Sampling and hypothesis testing)
4. <http://nptel.ac.in/courses/117105085/> (Introduction to theory of probability)
5. <http://nptel.ac.in/courses/117105085/9> (Mean and variance of random variables)
6. <http://nptel.ac.in/courses/111105041/33> (Testing of hypothesis)
7. <http://nptel.ac.in/courses/110106064/5> (Measures of Dispersion)

Course Outcomes:

CO	Statement	Blooms Taxonomy Level
CO1	Understand central tendency and variability for the given data	Understand
CO2	Find the Probability in certain realistic situation	Understand
CO3	Identify distribution in certain realistic situation	Apply
CO4	Calculate mean and proportions (large sample) and to make important decisions from few samples which are taken out of unmanageably huge populations.	Understand
CO5	Calculate mean and proportions (small sample) and to make Important decisions from few samples which are taken out of unmanageably huge populations.	Apply

[illegible]

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech. II Semester		
Code: A0B09	Semiconductor Physics (Common for CSE and IT)	L	T	P
Credits: 4		3	1	-

Prerequisites: Fundamentals of Physics

Course Objectives:

The main objective of this course is to provide an adequate exposure and develop insight about the basic principles of quantum mechanics and semiconductor physics along with their possible applications in various branches of engineering.

Module – I: Quantum mechanics

[8 Periods]

Introduction, Discussion on Black body radiation spectrum; Louis de Broglie's concept of matter waves; Davisson and Germer experiment; G P Thomson Experiment; Schrodinger's time independent wave equation; Physical significance and properties of wave function; Heisenberg's uncertainty principle – Why an electron cannot exist inside the nucleus?; Particle in one dimensional infinite potential well.

Module – II: Band theory of solids

[8 Periods]

Qualitative discussion of Classical free electron theory; Qualitative treatment of Fermi – Dirac distribution function; Qualitative discussion of Quantum free electron theory; Density of energy states; Bloch theorem; Qualitative treatment of Kronig – Penney model, E Vs k relationship, Origin of energy band gap; Classification of materials into Conductors, Semi conductors and insulators; Concept of Effective mass.

Module –III: Semiconductor Physics

[13 Periods]

Elemental and compound semiconductors; Intrinsic and Extrinsic Semiconductors; Expression for carrier concentration in intrinsic and extrinsic semiconductors; Qualitative treatment of Fermi energy level in Intrinsic and extrinsic semiconductors.

Direct and indirect band gap semiconductors; Carrier generation and Recombination; Drift and Diffusion; Equation of Continuity; P-N Junction diode – Formation & V-I Characteristics; LED – Construction and Working Principle; Solar Cell – Construction & I-V Characteristics.

Module – IV

[12 Periods]

LASER: Introduction, Characteristics of LASER; Absorption, Spontaneous and Stimulated emission; Einstein's coefficients derivation; Population inversion; Pumping mechanisms; Basic components of a LASER system; three and four level LASER systems; Ruby LASER, He-Ne LASER, Semiconductor diode LASER (Homo junction and hetero junction); Applications of LASER – Computers, Medical, Military.

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

Module – V: Introduction to Digital Electronics

[9 Periods]

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

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

Text Books:

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

Reference Books:

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

e-RESOURCES

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

Journals:

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

NPTEL VIDEOS:

1. <http://nptel.ac.in/courses/113104012/>
2. <https://www.youtube.com/watch?v=4a0FbOdH3dY>

Course Outcomes:

CO	Statement	Blooms Taxonomy Level
CO1	Explain the dual nature of the matter and evaluate the energy of a particle trapped in 1D infinite potential well.	Understand
CO2	Classify the materials into conductors, semiconductors and insulators based on the outcomes of Kronig – Penney model.	Understand
CO3	Analyze the working of semiconductor devices like PN junction diode, LED and Solar cell.	Apply
CO4	Explain the working of three LASERs.	Understand
CO5	Explain the applications of LASER and optical fibres.	Apply

[illegible]

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech. II Semester		
Code: A0504	Python Programming (Common for ALL)	L	T	P
Credits: 4		3	1	-

Course Objectives:

This course will enable students to

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

MODULE – I

[10 Periods]

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

MODULE – II

[9 Periods]

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

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

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

MODULE – III

[10 Periods]

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

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

MODULE – IV

[10 Periods]

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

MODULE – V

[9 Periods]

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

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

Text Books

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

Reference Books

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

E–Resources

1. “Learn Python – Free Interactive Python Tutorial”, <https://www.learnpython.org/>
2. “Free Python Tutorial – Python For Beginner,” <https://www.udemy.com/share/101EfoBUcccV1SQHW>
3. “Basics of Python for Data Science”, <https://olympus.greatlearning.in/courses/11265>
4. “Beginners Guide / Programmers – Python Wiki”, <https://wiki.python.org/moin/BeginnersGuide/Programmers>
5. “Introduction to Python”, <https://www.datacamp.com/courses/intro-to-python-for-data-science>

Course Outcomes

CO	Statement	Blooms Taxonomy Level
CO1	Understand the basics of python programming languages	Understand
CO2	Illustrate simple programs with control structures	Apply
CO3	Apply advanced concepts like data structures and make use of functions.	Apply
CO4	Develop simple applications by using MODULE s, packages and exception handling mechanisms.	Apply
CO5	Demonstrate projects that make use of libraries and generate test cases for the projects.	Apply

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

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech. II Semester		
Code: A0301	Engineering Graphics (Common for ALL)	L	T	P
Credits: 3		2	-	2

Prerequisites: Nil

Course Objectives:

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

Module-I: Introduction to Engineering Drawing, Scales and Curves [12 Periods]

Introduction to Engineering Drawing: Principles of Engineering Graphics and their significance. Lettering and dimensioning. Geometrical Constructions: Regular polygons only.

Scales: Plane Scale, Comparative Scale, Diagonal Scale, Vernier Scale

Curves: Conic Sections, Cycloidal Curves and Involutives.

Module-II: Projection of Points, Lines and Planes [12 Periods]

Projection of Points: Principles of Orthographic Projections – Conventions – First and Third Angle projections. Projection of points including all four quadrants.

Projection of Lines: Projection of Lines – parallel, perpendicular, inclined to one reference plane and inclined to both reference planes. True length and true angle of a line.

Projection of Planes: Projection of Planes – Axis inclined to one reference plane.

Module-III: Projection of Solids, Section of Solids and Development of Surfaces [12 Periods]

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

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

Development of Surfaces: Development of lateral surfaces of simple Solids.

Module-IV: Isometric Projections and Transformation of Projections [10 Periods]

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

Transformation of Projections: Conversion of Isometric Views to Orthographic Views and vice versa– simple objects.

Module-V: Introduction to Computer Aided Drafting [10 Periods]

CAD workstation, Advantages of CAD, CAD Software, AutoCAD – Opening and Creating Drawings-Exploring the AutoCAD interface-Zooming and Panning, AutoCAD Commands and Toolbars-Basic Drawing and Editing Commands.

Text Books

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

References

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

E-Resources:

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

Course Outcomes

CO	Statement	Blooms Taxonomy Level
CO1	Understand the basics of drawings and importance of curves.	Understand
CO2	Draw the projection of points, lines and planes.	Apply
CO3	Draw the projection of solids and section of solids with software.	Understand
CO4	Produce development of surface and isometric projections with software.	Apply
CO5	Convert orthographic views to isometric views and vice-versa by drafting software.	Analyze

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

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech. II Semester		
Code: A0H02	English Language Lab (Common for ALL)	L	T	P
Credits: 1		-	-	2

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

Course Objective:

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

Listening Skills:

Objectives:

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

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

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

Speaking Skills:

Objectives:

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

Syllabus: English Language Communication Skills Lab shall have two parts:

a. Computer Assisted Language Learning (CALL) Lab

b. Interactive Communication Skills (ICS) Lab

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

Module – I:

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

ICS Lab: Ice-Breaking activity and JAM session; Listening: listening for sounds in context, for ideas;

Speaking: ideation and translation of ideas into sentences.

Module – II:

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

ICS Lab: Situational Dialogues – Role-Play- Expressions in Various Situations – Self-introduction and Introducing others – Greetings – Apologies – Requests – Social and Professional Etiquette –

Telephone Etiquette; Listening: listening for specific purposes, for details; Speaking: speaking in the above situations with clarity, connectivity, maintaining voice characters.

Module – III:

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

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

Module – IV:

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

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

Module – V:

CALL Lab: Neutralization of Mother Tongue Influence and Conversation Practice

ICS Lab: Information Transfer, Debate

Minimum Requirement of infra structural facilities for EL Lab:

1. Computer Assisted Language Learning (CALL) Lab:

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

System Requirement (Hardware component):

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

- | | | |
|-----------------------|-------------------------------|----------------------|
| a) i3 Processor | b) Speed – 3.6 GHZ | c) RAM – 4GB Minimum |
| d) Hard Disk – 500 GB | e) Headphones of High quality | |

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

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

Prescribed Lab Manual:

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

Reference Books:

1. Gairns, Ruth and Redman, Stuart. *Oxford Word Skills: Learn and Practice English Vocabulary*. 2nd edition, Oxford University Press, 2008.
2. Hughes, John and Mallett, Andrew. *Successful Presentations DVD and Student's Book Pack*. Oxford University Press, 2013.
3. Hancock, Mark. *English Pronunciation in Use* (Intermediate). 2nd edition, Cambridge University Press, 2009.
4. Karia, Akash. *Public Speaking Mastery: Speak Like a Winner*. Kindle edition, 2013.
5. Lucas, Stephen. *The Art of Public Speaking*. 11th edition, Tata McGraw Hill, 2011.

Websites:

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

Course Outcomes:

CO	Statement	Blooms Taxonomy Level
CO1	Understand the nuances of language through audio- visual experience and group activities	Understand
CO2	Neutralize the accent for intelligibility.	Apply
CO3	Realize the importance of listening skills and speaking skills and their application in real life situations	Analyze
CO4	Recognize significance of non-verbal communication and develop confidence to face audience and shed inhibition.	Understand
CO5	Speak with clarity and confidence thereby enhance employability skills of the students	Apply

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

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech. II Semester		
Code:A0B11	Applied Physics Lab (Common for EEE, ECE, CSE and IT)	L	T	P
Credits: 1		-	-	2

Prerequisite: NIL

Course Objectives:

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

List of Experiments:

- 1. Planck's constant:**
To determine Planck's constant using Photo electric effect.
- 2. ENERGY BAND –GAP OF A SEMICONDUCTOR:**
To determine the energy band gap of a semiconductor
- 3. V-I AND P-I CHARACTERISTICS OF LIGHT EMITTING DIODE**
Plot V-I and P-I characteristics of light emitting diode
- 4. LASER DIODE:**
To study the Characteristics of Laser diode
- 5. SOLAR CELL:**
To study the V-I Characteristics of solar cell
- 6. LCR CIRCUIT:**
To determination of resonant frequency, bandwidth and quality factor of RLC circuit.
- 7. NUMERICAL APERTURE OF AN OPTICAL FIBER:**
To determine the Numerical aperture of the given fiber
- 8. BENDING LOSS OF A FIBER:**
To determine the bending loss of the given fiber.
- 9. LIGHT DEPENDENT RESISTANCE (LDR):**
To determine the characteristics of a LDR
- 10. STEWART AND GEE'S EXPERIMENT**
Determination of Magnetic field along the axis of current carrying circular coil
- 11. TORSIONAL PENDULUM:**
To determine the rigidity modulus of a given wire.
- 12. SONOMETER**
To verify the frequency of AC power supply

COURSE OUTCOMES:

CO	Statement	Blooms Taxonomy Level
CO1	Apply the basic principles of crystals and analysis of crystal structures using X-ray diffraction	Analyze
CO2	Understand type of defects in crystals	Understand
CO3	Distinguish free, damped and forced vibrations, develop basic knowledge on the distribution functions and simple applications	Analyze
CO4	Acquire the theoretical information about matter in terms of quantum physics	Understand
CO5	Analyze the formation the bands thereby classification of materials on the basis of transport properties	Apply

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

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech. II Semester		
Code: A0506	Python Programming Lab (Common for ALL)	L	T	P
Credits: 2		-	1	2

Prerequisites: NIL

Course Objectives:

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

Software Requirements: Python

List of Programs:

- 1 a) Write a program to purposefully raise Indentation Error and correct it.
- 1 b) Write a program to compute distance between two points taking input from the user (Pythagorean Theorem).
- 2 c) Write a program add.py that takes 2 numbers as command line arguments and prints its sum.
- 2 a) Write a Program for checking whether the given number is a even number or not.
- 2 b) Using for loop, write a program that prints out the decimal equivalents of $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, . . . , $\frac{1}{10}$.
- 2 c) Write a program using for loop that loops over a sequence. What is sequence?
- 2 d) Write a program using a while loop that asks the user for a number, and prints a countdown from that number to zero.
- 3 a) Find the sum of all the primes below two million.
- 3 b) Each new term in the Fibonacci sequence is generated by adding the previous two terms. By starting with 1 and 2, the first 10 terms will be: 1, 2, 3, 5, 8, 13, 21, 34, 55, 89
- 3 c) By considering the terms in the Fibonacci sequence whose values do not exceed four million, find the sum of the even-valued terms.
- 4 d) Write a program to count the numbers of characters in the given string and store them in a dictionary data structure
- 4 e) Write a program to use split and join methods in the given string and trace a birthday with a dictionary data structure.
- 4 a) Write a program to combine two lists into a dictionary.
- 4 b) Write a program to count frequency of characters in a given file. Can you use character frequency to tell whether the given file is a Python program file, C program file or a text file?
- 5 a) Write a program to print each line of a file in reverse order.
- 5 b) Write a program to compute the number of characters, words and lines in a file.
- 6 a) Write a function ball_collide that takes two balls as parameters and computes if they are colliding. Your function should return a Boolean representing whether or not the balls are colliding.
- 6 **Hint:** Represent a ball on a plane as a tuple of (x, y, r), r being the radius. If (distance between two balls centers) \leq (sum of their radii) then (they are colliding)
- 7 b) Find mean, median, mode for the given set of numbers in a list.
- 7 a) Write a function nearly_equal to test whether two strings are nearly equal. Two strings a and b are nearly equal when a can be generated by a single mutation on b.
- 7 b) Write a function dups to find all duplicates in the list.
- 7 c) Write a function unique to find all the unique elements of a list.
- 8 a) Write a function cumulative product to compute cumulative product of a list of numbers.
- 8 b) Write a function reverse to reverse a list. Without using the reverse function.
- 9 Create a Regular Expression and implement the following
- 9 a) Recognize the following strings: "bat," "bit," "but," "hat," "hit," or "hut."
- 9 b) Match any pair of words separated by a single space, i.e., first and last names.
- 9 c) Match any word and single letter separated by a comma and single space, as in last name, first initial.
- 10 Write a python program to implement multithreading scenarios.
- 11 Write a python program to simulate the banking operations using Class.
- 12 Write a python program to demonstrate the Queue / Stack operations using Class.

Text Books

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

Reference Books

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

Course Outcomes

CO	Statement	Blooms Taxonomy Level
CO1	Develop simple applications using python basic statements.	Apply
CO2	Make use of functions in python scripts.	Apply
CO3	Deploy applications and packages necessary for applications.	Apply

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

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech. III Semester		
Code: A0507	Discrete Mathematics	L	T	P
Credits: 3	(Common for CSE, IT, CSE(DS), CSE(AIML), CSE(CS), and CSE(IOT))	3	-	-

Prerequisites: NIL

Course Objectives:

The main objectives of the course are to:

- Introduce concepts of mathematical logic for analyzing propositions and proving theorems.
- Use sets for solving applied problems, and use the properties of set operations algebraically.
- Work with relations and investigate their properties.
- Investigate functions as relations and their properties.
- Introduce basic concepts of graphs, digraphs and trees.

Module-I: Mathematical Logic

[10 Periods]

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

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

Module-II: Predicate Logic and Relations

[10 Periods]

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

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

Module-III: Functions and Algebraic Structures

[10 Periods]

Functions–Inverse Function, Composition of functions, recursive Functions – Lattice and its Properties.

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

Module-IV: Counting Techniques and Theorems

[09 Periods]

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

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

Module-V: Generating functions and Recurrence Relation

[09 Periods]

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

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

Text Books:

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

References:

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

E-Resources:

1. <http://www.cse.iitd.ernet.in/~bagchi/courses/discrete-book/fullbook.pdf>
2. <http://www.medellin.unal.edu.co/~curmat/matdiscretas/doc/Epp.pdf>
3. <http://ndl.iitkgp.ac.in/document/yVCWqd6u7wgye1qwH9xY7xPG734QA9tMJN2ncqS12ZbN7pUSSIWxCxSgPOZJEokyWJlxQLYsrFyeITA70W9C8Pg>
4. <http://nptel.ac.in/courses/106106094/>

Course Outcomes:

CO	Statement	Blooms Taxonomy Level
CO1	Apply the concepts of connectives and normal forms in real time applications	Apply
CO2	Summarize predicate logic, relations and their operations	Summarize
CO3	Describe functions, algebraic systems, groups and Boolean algebra	Describe
CO4	Illustrate practical applications of basic counting principles, permutations, combinations, and the pigeonhole methodology	Illustrate
CO5	Analyze techniques of generating functions and recurrence relations	Analyze

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

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech. III Semester		
Code: A0508	Computer Organization and Architecture (Common for CSE, IT, CSE(DS), CSE(AIML), CSE(CS), and CSE(IOT))	L	T	P
Credits: 3		3	-	-

Prerequisites: No prerequisites

Objectives:

- Discuss the basic concepts and structure of computers.
- Understand concepts of register transfer logic and arithmetic operations.
- Explain different types of addressing modes and memory organization.
- Learn the different types of serial communication techniques.
- Summarize the Instruction execution stages.

Module-I

[10 Periods]

Sequential Circuits Fundamentals: Basic Architectural Distinctions between Combinational and Sequential circuits, SR Latch, Flip Flops: SR, JK, JK Master Slave, D and T Type Flip Flops, Excitation Table of all Flip Flops, Timing and Triggering Consideration, Conversion from one type of Flip-Flop to another.

Registers and Counters: Shift Registers – Left, Right and Bidirectional Shift Registers, Applications of Shift Registers – Design and Operation of Ring and Twisted Ring Counter, Operation of Asynchronous and Synchronous Counters.

Module-II

[10 Periods]

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

Register Transfer Language and Micro Operations: Register Transfer Language, Register Transfer, Bus and Memory Transfers, Arithmetic Micro Operations, Logic Micro Operations, Shift Micro Operations, Arithmetic Logic Shift Unit.

Basic Computer Organization and Design: Instruction Codes, Computer Registers Computer Instructions, Timing and Control, Instruction Cycle, Memory Reference Instructions, Input – Output and Interrupt.

Module-III

[9 Periods]

Micro Programmed Control: Control Memory, Address Sequencing, Micro Program Example, Design of Control Unit.

Central Processing Unit: General Register Organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control.

Module-IV

[10 Periods]

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

Computer Arithmetic: Addition and Subtraction, Multiplication Algorithms, Division Algorithms, Floating Point Arithmetic Operations. Decimal Arithmetic Unit, Decimal Arithmetic Operations.

Module-V

[9 Periods]

Input-Output Organization: Input-Output Interface, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupt, Direct Memory Access.

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

Textbook:

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

References:

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

E-Resources:

<https://books.google.co.in/books?isbn=8131700704>

http://ndl.iitkgp.ac.in/document/yVCWqd6u7wgye1qwH9xY7Eh9eBOsT1EloYpKlg_xngrkluevXOJLs1TbxS8q2icgUs3hL4_Kai5So5FgXcVg

http://ndl.iitkgp.ac.in/document/yVCWqd6u7wgye1qwH9xY7xAYUzYSIXI4zudlsolre7wQNrNXLxbgGFxbkoyx1iN3YbHuFrzI2jc_70rWMEwQ

<http://nptel.ac.in/courses/106106092/>

Outcomes:

CO	Statement	Blooms Taxonomy Level
CO1	Develop the ability and confidence to use the fundamentals of computer organization as a tool in the engineering of digital systems	Develop
CO2	Classify the impact of instruction set architecture of computer design	Classify
CO3	Design memory organization and control unit operations	Design
CO4	Evaluate computer arithmetic operations of binary number system and different hardware components associated with the input-output organization	Evaluate
CO5	Ability to conceptualize instruction level parallelism and pipeline	Ability

[illegible]

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech. III Semester		
Code: A0509	Data Structures	L	T	P
Credits: 3	(Common for CSE, IT, CSE(DS), CSE(AIML), CSE(CS), and CSE(IOT))	3	-	-

Prerequisites: A course on “Programming for Problem Solving “

Course Objectives:

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

Module-I:

[10 Periods]

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

Module-II:

[09 Periods]

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

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

Module-III:

[10 Periods]

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

Module-IV:

[10 Periods]

Graphs: Graph Implementation Methods. Graph Traversal Methods.

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

Module-V:

[09 Periods]

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

Text Books:

1. Jean Paul Tremblay, Paul G Sorenson, “An Introduction to Data Structures with Applications”, Tata McGraw Hills, 2nd Edition, 1984.
2. Richard F. Gilberg, Behrouz A. Forouzan, “Data Structures: A Pseudo code approach with C “, Thomson (India), 2nd Edition, 2004.

References:

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

E-Resources:

1. <http://gypcse.azurewebsites.net/pdf/data.pdf>
2. <http://www.sncwgs.ac.in/wp-content/uploads/2015/11/Fundamental-Data-Structures.pdf>
3. <http://www.learnerstv.com/Free-Computer-Science-Video-lectures-ltv247-Page1.htm>
4. <http://ndl.iitkgp.ac.in/document/yVCWqd6u7wgye1qwH9xY7-3lcmoMApVUMmjIExpIb1zste4YXX1pSpX8a2mLgDzZ-E41CJ6PvmY4S0MqVbxsFQ>
5. <http://nptel.ac.in/courses/106102064/1>

Course Outcomes:

CO	Statement	Blooms Taxonomy Level
CO1	design and analyze simple linear and nonlinear data Structures	Analyze
CO2	strengthen the ability to identify and apply the suitable data structure for the given real world problem	Apply
CO3	Implement Stacks and Queues using array and linked-list representations.	Apply
CO4	Develop programs by using non linear data structures such as trees and graphs.	Apply
CO5	Design and Implement applications of advanced data structures.	Apply

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

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech. III Semester		
Code: A0510	Object Oriented Programming	L	T	P
Credits: 3	(Common for CSE, IT, CSE(DS), CSE(AIML), CSE(CS), and CSE(IOT))	3	-	-

Prerequisites: Computer Programming

Course Objectives:

This course will make students able

- To learn and understand the concepts and features of object-oriented programming
- To acquire the knowledge in Java's exception handling mechanism, multithreading
- To explore concepts of Applets and event handling mechanism.
- To gain the knowledge in programming using Layout Manager and swings.
- To design interactive applications for internet purpose

Module-I: OOP Concepts & Introduction to C++, Java [9 Periods]

OOP concepts & Introduction to C++: Introduction to object-oriented concepts: Object, class, methods, instance variables; C++ program structure; accessing class data members; Overview of Inheritance, Overloading, Polymorphism, Abstraction, Encapsulation.

Introduction to Java – History of JAVA, Java buzzwords, data types, variables, scope and life time of variable, arrays, operators, expressions, control statements, type conversion and type casting, simple Java program.

Module II: Basics of Java [11 Periods]

Classes and Objects – Concepts of Classes, Objects, Constructors, Methods, This Key Word, Garbage Collection, Overloading Methods, Constructors, Parameter Passing, Recursion, String Handling: String, String Buffer, String Tokenizer.

Inheritance – Base Class Object, Subclass, Member Access Rules, Super Uses, Using Final with Inheritance, Method Overriding, Abstract Classes

Module III: Interfaces and Exception Handling [10 Periods]

Interfaces – Defining an interface, implementing interface, differences between classes and interfaces, extending interfaces. Packages – Defining, creating and accessing a package, importing packages, access control, exploring package-java.io (file handling).

Exception handling – Concepts of Exception handling, benefits of exception handling, exception hierarchy, checked and unchecked exceptions, usage of try, catch, throw, throws and finally, built-in exceptions, creating own exception subclasses

Module IV: Multithreading and Collection Classes [09 Periods]

Multithreading–Differences between multithreading and multitasking, thread life cycle, creating threads, synchronizing threads, daemon threads, thread groups.

Collection Classes–ArrayList, LinkedList, HashSet, LinkedHashSet, TreeSet, PriorityQueue, ArrayDeque, EnumSet.

Module V: Event Handling, Layout Manager and Swings [09 Periods]

Event Handling–Events, Event sources, event classes, event listeners, delegation event model, handling mouse and keyboard events, adapter classes. Layout manager – border, grid, flow, card and grid bag.

Swings–Introduction, limitations of AWT, components, containers, exploring swing-JApplet, JFrame and JComponent, Icons and Labels, TextFields, buttons – the JButton class, Checkboxes, Radio buttons, Combo boxes, Tabbed Panes, ScrollPanels, Trees and Tables.

Text Books:

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

References:

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

E-Resources:

1. http://ndl.iitkgp.ac.in/document/xttk-4kfhvUwVlXBW-RPf64_TFk2i4LJhgQFPQ_WAEt-Zobbm3twyubjRA1Yoe9WVwkN2qGcxBwdHaPdI_mMQ
2. [https://ndl.iitkgp.ac.in/result?q={"t":"search","k":"object%20oriented%20programming","s":\["type="video"\]},{"b":{"filters":\[\]}}](https://ndl.iitkgp.ac.in/result?q={"t":"search","k":"object%20oriented%20programming","s":["type="video"]},{"b":{"filters":[]}})
3. <http://www.rehancodes.com/files/oop-using-c++-by-joyce-farrell.pdf>
4. <http://www.nptel.ac.in/courses/106103115/36>

Course Outcomes:

CO	Statement	Blooms Taxonomy Level
CO1	Differentiate structured programming and object oriented programming and know the concepts of classes, objects, members of a class.	Analyze
CO2	Apply object oriented programming features and concepts for solving given problems using inheritance and will know how to organize files in packages and concept of interface.	Apply
CO3	Capable of handling run time errors using Exceptional Handling and develop applications for concurrent processing using Thread Concept.	Apply
CO4	Design Applets that take user response through various peripheral devices such as mouse and keyboard by event handling mechanism.	Apply
CO5	Design interactive applications for use on internet	Apply

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

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech. III Semester		
Code: A0511	Operating Systems	L	T	P
Credits: 3	(Common for CSE, IT, CSE(DS), CSE(AIML), CSE(CS), and CSE(IOT))	3	-	-

Prerequisites: NIL

Course Objectives:

1. **Determine** the interfaces between OS and other components of a computer system.
2. **Illustrate** the main principles and techniques used to implement processes and threads as well as the different algorithms for process scheduling. Analyze the main problems related to concurrency and the different synchronization mechanisms.
3. **Describe** the different approaches for deadlock detection, avoidance, recovery and dead lock handling techniques.
4. **Describe** different approaches of memory management and Apply different page replacement algorithms to resolve page faults.
5. **Describe** the structure and organization of file system, analyze the data storage in secondary storage and **understand** the protection issues in computer systems.

Module-I: Computer System and Operating System Overview [10 Periods]

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

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

Module-II: Scheduling and Concurrency [9 Periods]

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

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

Module-III: Deadlocks [10 Periods]

Deadlocks–System Model, Deadlock Characterization, Methods for handling Deadlocks, Deadlock Prevention.

Detection and Recovery–Deadlock avoidance, Deadlock detection, Recovery from Deadlocks.

Module-IV: Memory [10 Periods]

Memory Management -Basic concepts, Swapping, Contiguous memory allocation, Paging, Segmentation, Virtual memory, Demand paging, Page-replacement algorithms, Thrashing.

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

Module-V: Files [08 Periods]

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

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

Text Books:

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

References:

1. Crowley, “**Operating System a Design Approach**”, TMH.
2. Andrew S Tanenbaum, “**Modern Operating Systems**”, 2nd edition Pearson/PHI.
3. Pramod Chandra P. Bhat, “**An Introduction to Operating Systems, Concepts and Practice**”, PHI, 2003
4. DM Dhamdhare, “**Operating Systems: A conceptbased approach**”, 2nd Edition, TMH

E-Resources:

1. https://www.tutorialspoint.com/operating_system/operating_system_tutorial.pdf
2. <https://archive.org/details/2005OperatingSystemConcepts7thEditionAbrahamSilberschatz>
3. https://ndl.iitkgp.ac.in/document/BN1jh1UjGAJr_Zl4CiGeVCT3CaRCi4AlvzVWgkNQLQcFt_1b03ZmqLHrc1tBe3aA6pjyl3jlrBqPLRxX2VQUvQ
4. <http://nptel.ac.in/courses/106108101/>

Course outcomes

CO	Statement	Blooms Taxonomy Level
CO1	Compare the types of os, communication between application, programs and hardware devices through system calls	Apply
CO2	Compare and Apply various process scheduling algorithms, evaluation, process synchronization	Analyze
CO3	Illustrate the schemes used to address the issues of deadlocks, handling deadlocks, detection and recovery	Apply
CO4	Analyze various memory management techniques, scheduling, and stable storage	Apply
CO5	Explain the need of access control and protection, security in an operating system	Analyze

[illegible]

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech. III Semester		
Code: A0512	Data Structures Lab	L	T	P
Credits: 1.5	(Common for CSE, IT, CSE(DS), CSE(AIML), CSE(CS), and CSE(IOT))	-	-	3

Prerequisites: A Course on “Programming for problem solving”

Objectives:

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

Software Requirements: C

List of Programs:

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

Text Books

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

References

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

Course outcomes

CO	Statement	Blooms Taxonomy Level
CO1	Understand basics of C language with simple programs	Apply
CO2	Construct both recursive and non-recursive functions	Apply
CO3	Analyze functions to perform basic operations	Analyze

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

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech. III Semester		
Code: A0513	Object Oriented Programming Lab	L	T	P
Credits: 1.5	(Common for CSE, IT, CSE(DS), CSE(AI ML), CSE(CS), and CSE(IoT))	-	-	3

Prerequisites: NIL

Course Objectives:

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

Software Requirements: Java

List of Programs:

- Write Java Programs that implement the following.
 - Constructor
 - Parameterized constructor
 - Method Overloading
 - Constructor overloading
- Write a Java program
 - checks whether a given string is a palindrome or not.
 - for sorting a given list of names in ascending order.
 - that reads a line of integers and then displays each integer and the sum of all integers (use string tokenizer class of java.util).
- Write Java programs that use the following keywords...
 - this
 - super
 - static
 - final
- Write a Java program to implement
 - Method Overriding.
 - dynamic method dispatch.
 - multiple inheritance.
 - access specifiers.
- Write a Java program that
 - reads a file name from the user, and then displays information about whether the file exists, whether the file is readable, whether the file is writable, the type of file and the length of the file in bytes.
 - reads a file and displays the file on the screen, with a line number before each line.
 - displays the number of characters, lines and words in a test file.
- Write a Java program for handling
 - Checked exceptions.
 - unchecked exceptions.
- Write a Java program
 - Creates three threads. First thread displays "Good Morning" for every one second, the second thread displays "Hello" for every two seconds, the third thread displays "Welcome" for every three seconds.
 - that correctly implements producer consumer problem using concept of inter thread communication.

8. Write a Java program which demonstrates the use of following collection classes
 - a) Array List
 - b) Hash Set
 - c) Deque
9. Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -, *, / operations. Add a text field to display the result.
10. Write a Java program for handling
 - a) mouse events.
 - b) key events.
11. Write a Java program that creates a user interface to perform integer divisions. The user enters two numbers in the text fields num1 and num2. The division of num1 and num2 is displayed in the result field when the divide button is clicked. If num1 or num2 were not an integer, the program would throw number format exception. If num2 were zero, the program would throw an arithmetic exception and display the exception in the message dialogue box.
12. Write a Java program that
 - a) Simulates traffic light. The program lets the user select one of three lights: red, yellow or green. When a radio button is selected, the light is turned on and only one light can be on at a time. No light is on when the program starts.
 - b) Allows the user to draw lines rectangles and ovals.

TEXT BOOKS:

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

REFERENCES:

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

Course Outcomes:

CO	Statement	Blooms Taxonomy Level
CO1	Build simple java programs using Object Oriented Programming.	Apply
CO2	Apply OOP features and concepts for solving given problems using inheritance	Apply
CO3	Create the packages & how to organize files in packages and concept of interface.	Apply
CO4	Capable of handling run time errors using Exceptional Handling and develop applications for concurrent processing using Thread Concept.	Apply
CO5	Construct GUI applications using Applets and Swings	Apply

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

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech. III Semester		
Code: A0514	Operating Systems Lab	L	T	P
Credits: 2	(Common for CSE, IT, CSE(DS), CSE(AIML), CSE(CS), and CSE(IoT))	-	1	2

Prerequisites: NIL

Course Objectives:

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

Software Requirements: C++/JDK

List of Programs:

1. Simulate the following CPU scheduling algorithms
a) FCFS b) SJF
2. Simulate the following CPU scheduling algorithms
a) Priority b) Round Robin
3. Simulate the Producer Consumer Problem
4. Simulate Bankers Algorithm for Dead Lock Avoidance
5. Simulate MVT and MFT techniques.
6. Simulate Paging Technique of memory management
7. Simulate page replacement algorithms a) FIFO b) LRU c) Optimal
8. Simulate the following Disk Scheduling Algorithms
(a) First Come-First Serve (FCFS)
(b) Shortest Seek Time First (SSTF)
9. Simulate the following Disk Scheduling Algorithms
(a) Elevator (SCAN)
(b) LOOK
10. Simulate all file allocation strategies a) Sequential b) Indexed c) Linked
11. Simulate File Organization Techniques
a) Single level directory b) Two level
12. Simulate File Organization Techniques
a) Hierarchical b) DAG

Text Books:

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

References:

1. Crowley,” **Operating System A Design Approach**”, TMH.
2. Andrew S Tanenbaum,” **Modern Operating Systems**”, 2nd edition Pearson/PHI.
3. Pramod Chandra P. Bhat, “**An Introduction to Operating Systems**”, Concepts and Practice”, PHI, 2003
4. DM Dhamdhare,” **Operating Systems A concept-based approach**” ,2nd Edition, TMH

Course Outcomes:

CO	Statement	Blooms Taxonomy Level
CO1	Implement various CPU scheduling algorithms, Bankers algorithms used for deadlock avoidance and prevention	Implement
CO2	Develop disk scheduling algorithms and apply File organization techniques	Develop
CO3	Simulate file allocation method	Analyze

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

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech. III Semester		
Code: A00M1	Gender Sensitization (An Activity-based Course) (Common for CE, EEE, ME, ECE, MiE, CSE, IT, CSE(DS), CSE(AI ML), CSE(CS), and CSE(IoT))	L	T	P
Credits: NIL		-	-	2

Prerequisites: NIL

Course Description

This course offers an introduction to Gender Studies, an interdisciplinary field that asks critical questions about the meanings of sex and gender in society. The primary goal of this course is to familiarize students with key issues, questions and debates in Gender Studies, both historical and contemporary. It draws on multiple disciplines – such as literature, history, economics, psychology, sociology, philosophy, political science, anthropology and media studies – to examine cultural assumptions about sex, gender, and sexuality.

This course integrates analysis of current events through student presentations, aiming to increase awareness of contemporary and historical experiences of women, and of the multiple ways that sex and gender interact with race, class, caste, nationality and other social identities. This course also seeks to build an understanding and initiate and strengthen programmes combating gender-based violence and discrimination. The course also features several exercises and reflective activities designed to examine the concepts of gender, gender-based violence, sexuality, and rights. It will further explore the impact of gender-based violence on education, health and development.

Objectives of the Course:

- To develop students' sensibility with regard to issues of gender in contemporary India.
- To provide a critical perspective on the socialization of men and women.
- To introduce students to information about some key biological aspects of genders.
- To expose the students to debates on the politics and economics of work.
- To help students reflect critically on gender violence.
- To expose students to more egalitarian interactions between men and women.

Module-I: Understanding Gender [06 Periods]

Introduction: Definition of Gender-Basic Gender Concepts and Terminology-Exploring Attitudes towards Gender-Construction of Gender-Socialization: Making Women, Making Men
- Preparing for Womanhood. Growing up Male. First lessons in Caste.

Module II: Gender Roles and Relations [06 Periods]

Two or Many? -Struggles with Discrimination-Gender Roles and Relations-Types of Gender Roles-Gender Roles and Relationships Matrix-Missing Women-Sex Selection and Its Consequences-Declining Sex Ratio. Demographic Consequences-Gender Spectrum: Beyond the Binary

Module III: Gender and Labour [07 Periods]

Division and Valuation of Labour-Housework: The Invisible Labor- "My Mother doesn't Work." "Share the Load."-Work: Its Politics and Economics -Fact and Fiction. Unrecognized and Unaccounted work. -Gender Development Issues-Gender, Governance and Sustainable Development-Gender and Human Rights-Gender and Mainstreaming.

Module-IV: Gender-Based Violence

[07 Periods]

The Concept of Violence- Types of Gender-based Violence-Gender-based Violence from a Human Rights Perspective-Sexual Harassment: Say No! -Sexual Harassment, not Eve-teasing- Coping with Everyday Harassment- Further Reading: “*Chupulu*”.

Domestic Violence: Speaking Out Is Home a Safe Place? -When Women Unite [Film]. Rebuilding Lives. Thinking about Sexual Violence Blaming the Victim-“I Fought for my Life....”

Module-V: Gender and Culture

[06 Periods]

Gender and Film-Gender and Electronic Media-Gender and Advertisement-Gender and Popular Literature- Gender Development Issues-Gender Issues-Gender Sensitive Language-Gender and Popular Literature – Just Relationships: Being Together as Equals

Mary Kom and Onler. Love and Acid just do not Mix. Love Letters. Mothers and Fathers. Rosa Parks-The Brave Heart.

Note: Since it is Interdisciplinary Course, Resource Persons can be drawn from the fields of English Literature or Sociology or Political Science or any other qualified faculty who has expertise in this field from engineering departments.

- *Classes will consist of a combination of activities: dialogue-based lectures, discussions, collaborative learning activities, group work and in-class assignments. Apart from the above prescribed book, Teachers can make use of any authentic materials related to the topics given in the syllabus on “Gender”.*
- **ESSENTIAL READING:** The Textbook, “*Towards a World of Equals: A Bilingual Textbook on Gender*” written by A.Suneetha, Uma Bhrugubanda, Duggirala Vasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Tharup published by Telugu Akademi, Telangana Government in 2015.

ASSESSMENT AND GRADING:

- Discussion & Classroom Participation: 20%
- Project/Assignment: 30%
- End Term Exam: 50%

TEXT BOOKS:

1. Towards a World of Equals: A bilingual Textbook on Gender, A Suneetha -etall

REFERENCES:

1. Sen, Amartya. “More than One Million Women are Missing.’ New York Review of Books 37.20 (20 December 1990). Print. We Were Making History...’ Life Stories of Women in the Telangana People’s Struggle. New Delhi: Kali for Women, 1989.
2. Tripti Lahiri. “By the Numbers: Where Indian Women Work.” Women’s Studies Journal (14 November 2012) Available online at: <http://blogs.visj.com/India-real-time/2012/11/14/by-the-numbers-where-Indian-women-work/>
3. K. Satyanarayana and Susie Thant (Ed.) Steel Nibs Are Sprouting: New Dalit Writing From South India, Dossier 2: Telugu And Kannada <http://harooreollins.co.in/BookDetail.asp?FlookCndet,3732>
4. Vimata. “Vantillu (The Kitchen)”. Women Writing in India: 600 BC to the Present. Volume II: The 20th Century. Ed. Susie Thaw and K. Lalita. Delhi: Oxford University Press 1995. 599-601.
5. Shatrughna, Veena et al. Women’s Work and its Impact on Child Health and Nutrition, Hyderabad, National Institute of Nutrition, Indian Council of Medical Research. 1993.
6. Stree Shakti Sanghatana. ‘We Were Making History ...’ Life Stories of Women in the Telangana People’s Struggle. New Delhi: Kali for Women, 1989.

E-Resources:

1. http://www.actforyouth.net/resources/rf/rf_gender1_1213.cfm (UNDERSTANDING GENDER)
2. <https://www.simplypsychology.org/gender-biology.html> (GENDER AND BIOLOGY)
3. <http://www.yourarticlelibrary.com/essay/essay-on-gender-issues-in-labour-market-in-india/40442/> (GENDER AND LABOUR)
4. <http://journals.sagepub.com/doi/abs/10.1177/1077801200006007004> (ISSUES OF VIOLENCE)
5. <http://www.nordiclbourjournal.org/emner/likestilling> (GENDER AND BIOLOGY)

Course Outcomes:

CO	Statement	Blooms Taxonomy Level
CO1	Develop a better understanding of important issues related to gender in contemporary India.	Apply
CO2	Sensitize about the basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.	Understand
CO3	Attain a finer grasp of how gender discrimination works in our society and how to counter it.	Analyze
CO4	Acquire insight into the gendered division of labour and its relation to politics and economics.	Understand
CO5	Develop a sense of appreciation of women in all walks of life.	Apply

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

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech. IV Semester		
Code: A0B07	Applied Statistics and Optimization Techniques (Common for CSE, IT, CSE(DS), CSE(AIML), CSE(CS), and CSE(IoT))	L	T	P
Credits: 3		3	-	-

Module – I

[12 Periods]

Analysis of Variance & Analysis of Co-variance

Analysis of Variance (ANOVA): one-way & two-way ANOVA and multiple comparisons. Introduction to Factorial design – 2^2 and 2^n . Factorial design, Analysis of Co-variance (ANCOVA) Conducting ANCOVA

Module – II

[12 Periods]

Design of Experiments

Importance and applications of design of experiments, Principles of experimentation, Analysis of Completely randomized Design (C.R.D), Randomized Block Design (R.B.D) and Latin Square Design (L.S.D) including one missing observation, expectation of various sum of squares. Comparison of the efficiencies of above designs

Module III

[13 Periods]

Transportation and Assignment

Transportation: Optimal Solution by North West Corner Method- VAM- Least Cost Method- MODI Method.

Assignment: Formulation-Unbalanced Assignment Problem-Hungarian Algorithm- Travelling Salesman Problem.

Module IV: Game Theory

[13 Periods]

Game Theory, Theory of Games, Competitive games, rules for game theory, Saddle point –minmax (maxmin) method of optimal strategies, mixed strategies –Value of the game- two-person zero sum game, method of dominance, graphical method

Method V: Queuing Theory

[10Periods]

Structure of a queuing system, operating Characteristics of queuing system, Transient and Steady states, Terminology of Queuing systems, Arrival and service Processes, Pure Birth-Death process.

Deterministic queuing Models (M/M/1) : (FIFO) Model, (M/M/1) FIFO) Model.

Proposed Text Books:

1. Monte Gomery, “Applied Statistics and Probability for Engineers”, 6th Edition, Wiley Publications.
2. J K Sharma, “Operations research Theory and applications” Macmillan publishers india limited, 4th edition.
3. Paul A Maeyer Introductory Probability and Statistical Applications, John Wiley Publicaitons.

Proposed Reference Books:

1. Willam Feller: “Introduction to Probability theory and its applications”. Volume–I,Wiley
2. Goon AM, Gupta MK, Das Gupta B: “Fundamentals of Statistics”, Vol-I, the World Press Pvt. Ltd. ,Kolakota.
3. V.K. Kapoor and S.C. Gupta: “Fundamentals of Mathematical Statistics”, Sultan Chand & Sons, New Delhi

Course Outcomes:

CO	Statement	Blooms Taxonomy Level
CO1	Perform Analysis of variance, ANCOVA and design of experiments in manufacturing firms.	Apply
CO2	Advanced design of experiments and their applications.	Understand
CO3	The students will learn the concept of quality control, Six Sigma and its importance to real lifeproblems.	Analyze
CO4	The student will be able to understand the concept of Multiple regression and Application ofTime-series,	Understand
CO5	The students would be able to find the expected queue length, the ideal time, the traffic intensityand the waiting time.	Apply

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

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech. IV Semester		
Code: A0515	Database Management Systems	L	T	P
Credits: 3	(Common for CSE, IT, CSE(DS), CSE(AIIML), CSE(CS), and CSE(IoT))	3	-	-

Prerequisites: A course on “Data Structures”

The purpose of learning this course is to:

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

Module-I: Introduction

[10 Periods]

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

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

Module II:

[09 Periods]

Introduction to the Relational Model: Relational Model, Conversion of ER to Relational Table, Structure Creation, alteration. Integrity constraint over relations, enforcing integrity constraints – Defining Constraints, Primary Key, Foreign Key, Unique, not null, check, Introduction to views, destroying/altering tables and views. Transaction Control Commands, Commit, Rollback, Savepoint. **Relational Algebra** – Fundamental Operators and syntax, relational algebra queries, Tuple relational calculus.

Module III:

[10 Periods]

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

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

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

Module IV: Transaction Management and Concurrency Control

[10 Periods]

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

Module V: Storage and Indexing**[09 Periods]**

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

Text Books

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

References

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

E-RESOURCES:

1. <https://kakeboksen.td.org.uit.no/Database%20System%20Concepts%206th%20edition.pdf>
2. <http://agce.sets.edu.in/cse/ebook/DBMS%20BY%20RAGHU%20RAMAKRISHNAN.pdf>
3. <http://airccse.org/journal/ijdms/ijdms.html>
4. <http://textofvideo.nptel.iitm.ac.in/video.php?courseId=106106093>
5. <http://www.nptelvideos.in/2012/11/database-management-system.html>

Course Outcomes:

CO	Statement	Blooms Taxanomy Level
CO1	Gain knowledge of fundamentals of DBMS, database design and normal forms and apply the fundamentals of data models to model an application's data requirements using conceptual modeling tools like ER diagrams	Understand
CO2	Apply the method to convert the ER model to a database schema based on the conceptual relational model	Apply
CO3	Apply the knowledge to create, store and retrieve data using Structure Query Language (SQL) and PL/SQL and apply the knowledge to improve database design using various normalization criteria and optimize queries	Apply
CO4	Appreciate the fundamental concepts of transaction processing-concurrency control techniques and recovery procedures.	Apply
CO5	Familiarity with database storage structures and access techniques and comparing various indexing and hashing techniques.	Analyze

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

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

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech. IV Semester		
Code: A0516	Design and Analysis of Algorithms	L	T	P
Credits: 3	(Common for CSE, IT, CSE(DS), CSE(AI ML), CSE(CS), and CSE(IoT))	3	-	-

Prerequisites: Data Structures

Course Objectives:

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

Module I: Basics of Algorithm Design

[09 Periods]

Introduction: Algorithm, Pseudo code for expressing algorithms, Performance Analysis-Space complexity, Time complexity, Asymptotic Notations, Amortized analysis.

Disjoint Sets: Disjoint set operations, union and find algorithms, spanning trees, connected components and bi connected components.

Module II: Algorithm Methods

[10 Periods]

Divide and Conquer – General method, applications-Binary search, Quick sort, Merge sort, Strassen's matrix multiplication

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

Module III: Dynamic Programming and Optimization Techniques

[10 Periods]

Dynamic Programming–General method, applications-Matrix chain multiplication, Optimal binary search trees, 0/1 knapsack problem

Optimization Techniques–All pairs shortest path problem, travelling sales person problem, Reliability design.

Module IV: Backtracking and Branch and Bound

[10 Periods]

Backtracking-General method, n-queen problem, sum of subsets problem, graph coloring, Hamiltonian cycles

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

Module V: NP-Hard and NP-Complete problems

[09 Periods]

NP-Hard and NP-Completeness: Basic concepts, NP – Hard and NP Complete classes, Cook's theorem, Deterministic and Non-Deterministic algorithms, NP-hard graph problems and scheduling problem

Textbooks:

1. Ellis Horowitz, Satraj Sahni and Rajasekharan, “**Fundamentals of Computer Algorithms**” Galgotia publications pvt. Ltd
2. T.H.Cormen, C.E.Leiserson, R.L.Rivest, and C.Stein, “**Introduction to Algorithms**”, second edition, PHI Pvt. Ltd./ Pearson Education

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

1. <https://comsciers.files.wordpress.com/2015/12/horowitz-and-sahani-fundamentals-of-computer-algorithms-2nd-edition.pdf>
2. <https://books.google.co.in/books?id=7qKXCzF1XC8C&printsec=frontcover&dq=T.H.Cormen,C.E.Leiserson,+R.L.Rivest,and+C.Stein,+%22Introduction+to+Algorithms%22,+second+edition,+PHI+Pvt.+Ltd./+Pearson+Education,ebook,pdf&hl=en&sa=X&ved=0ahUKEwjFupORxdXTAhXLQo8KHU7FC5cQ6AEIKjAB#v=onepage&q&f=false>
3. http://en.cnki.com.cn/Article_en/CJFDTOTAL-JFYZ200208019.htm
4. <http://nptel.ac.in/courses/106101060/>

CO	Statement	Blooms Taxonomy Level
CO1	Analyze the performance of algorithms asymptotic notations	Understand
CO2	Describe and analyze paradigms for designing good algorithms using Divide-and-Conquer and Greedy Techniques	Apply
CO3	Synthesize dynamic-programming algorithms, and analyze them	Apply
CO4	Learn and apply backtracking and branch and bound techniques to solve some complex problems.	Apply
CO5	Apply algorithm design techniques to solve certain NP-complete problems	Apply

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

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech. IV Semester		
Code:A1202	Web Technologies (Common for CSE, IT, CSE(DS), CSE(AIML), CSE(CS), and CSE(IOT))	L	T	P
Credits: 3		3	-	-

Pre-requisites:

Objectives

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

Module I:

[10 Periods]

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

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

Module II:

[09 Periods]

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

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

Module III:

[10 Periods]

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

Module IV:

10 Periods]

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

Module V:

[09 Periods]

Client-side Scripting: Introduction to Java script, Java script language – declaring variables, scope of variables, functions, Event handlers (onclick, onsubmit etc.), Document Object Model, Form validation.

Text Books:

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

References:

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

E-RESOURCES:

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

Outcomes

CO	Statement	Blooms Taxonomy Level
CO1	Analyze the concepts of designing static and dynamic web pages with HTML, DHTML, java script and Cascading Styles sheets.	Analyze
CO2	Identify the role of XML and Java Beans in Web Programming.	Analyze
CO3	Build server-side web applications using APIs like Servlets	Apply
CO4	Design real time dynamic web application with database	Apply
CO5	Construct web applications for Data Handling using JSP in web programming	Apply

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

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech. IV Semester		
Code: A1203	Computer Graphics [Professional Elective – I]	L	T	P
Credits: 3		3	-	-

Prerequisites: NIL

Course Objectives:

This course is to enable the students to understand the fundamental concepts of display devices and output primitives, to demonstrate 2D transformations, viewing and clipping algorithms, explore different representations of 3D objects and illumination models, to understand 3D transformations and viewing, discuss surface detection and animation methods.

Module I: Introduction of Graphics **[10 Periods]**

Basics of Graphics - Introduction, Application areas of Computer Graphics, overview of graphics systems, video-display devices, raster-scan systems, random scan systems, graphics monitors, work stations and input devices.

Output Primitives: Points and lines, line drawing algorithms, mid-point circle and ellipse algorithms, Filled area primitives-Scan line polygon fill algorithm, boundary-fill and flood-fill algorithms.

Module II: Transforming and Viewing **[10 Periods]**

2-D Geometrical Transforms-Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms, transformations between coordinate systems.

2-D viewing - Viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, Cohen-Sutherland and Cyrus-beck line clipping algorithms, Sutherland–Hodgeman polygon clipping algorithm.

Module III: 3D Objects Representation **[10 Periods]**

A: Surfaces and Curve: Polygon surfaces, quadric surfaces, spline representation, Hermite curve, Bezier curve and B-Spline curves.

B: Models and Methods: Bezier and B, Spline surfaces, Basic illumination models, polygon rendering methods.

Module IV: 3D Geometric transformations and Viewing **[09 Periods]**

3-D Geometric Transformations: Translation, rotation, scaling, reflection and Shear transformations, composite transformations.

3-D Viewing: Viewing pipeline, viewing coordinates, view volumes and general projection transforms, clipping.

Module V: Surface detection Methods and Animation **[09 Periods]**

Visible Surface Detection Methods: Classification, back-face detection, depth-buffer, scan-line, depth sorting, BSP- tree methods, area sub-division and octree methods.

Computer Animation – Design of animation sequence, general computer animation functions, raster animation, computer animation languages, key frame systems, motion specifications.

Text Books:

1. Donald Hearn and M. Pauline Baker, “**Computer Graphics C Version**”, Pearson Education.
2. Foley, VanDam, Feiner and Hughes, “**Computer Graphics Principles & practice**”, 2nd edition in C, Pearson Education.

References:

1. Donald Hearn and M. Pauline Baker, “**Computer Graphics**”, 2nd Edition, PHI/Pearson Education.
2. Zhi-gang Xiang, Roy Plasterock, Schaum’s outlines, “**Computer Graphics**”, 2nd edition, Tata Mc-Grawhill.
3. David F. Rogers, “**Procedural Elements for Computer Graphics**”, Tata Mc Grawhill, 2nd

E-RESOURCES:

- ### Course Outcomes:

[illegible]

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech. IV Semester		
Code: A1204	Neural Networks [Professional Elective – I]	L	T	P
Credits: 3		3	-	-

Prerequisite: NIL

Course Objectives: To understand the neural activities and learning process.

Module I: Basic Learning Algorithms [09 Periods]

Biological Neuron – Artificial Neural Model – Types of Activation Functions – Architecture– Feed Forward and Feedback – Learning Process – Error Correction Learning – Memory Based Learning – Hebbian Learning – Competitive Learning – Boltzman Learning – Supervised and Unsupervised Learning – Learning Tasks – Pattern Space– Weight Space – Pattern Association – Pattern Recognition – Function Approximation – Control – Filtering – Beam forming – Memory – Adaptation – Statistical Learning Theory – Single Layer Perception – Perception Learning Algorithm– Perception Convergence Theorem – Least Mean Square Learning Algorithm – Multilayer Perception – Back Propagation Algorithm – XOR problem – Limitations of Back Propagation Algorithm

Module II: Radial Basis Function Networks and Support Vector Machines [09 Periods]

Cover's Theorem On The Separability Of Patterns – Exact Interpolator – Regularization Theory – Generalized Radial Basis Function Networks – Learning In Radial Basis Function Networks – Applications – Xor Problem – Image Classification

Support Vector Machines

Optimal Hyperplane for Linearly Separable Patterns and Nonseparable Patterns – Support Vector Machine for Pattern Recognition – XOR Problem – –insensitive Loss Function – Support Vector Machines for Nonlinear Regression

Module III: A: Committee Machines [12 Periods]

Ensemble Averaging – Boosting – Associative Gaussian Mixture Model – Hierarchical Mixture of Experts Model (HME) – Model Selection using a Standard Decision Tree – Apriori and Posteriori Probabilities – Maximum Likelihood Estimation – Learning Strategies for the HME Model – EM Algorithm – Applications of EM Algorithm to HME Model

B: Neuro dynamics Systems

Dynamical Systems – Attractors and Stability – Non-linear Dynamical Systems – Lyapunov Stability – Neurodynamical Systems – The Cohen–Grossberg Theorem

Module IV: Attractor Neural Networks [09 Periods]

Associative Learning – Attractor Neural Network Associative Memory – Linear Associative Memory – Hopfield Network – Content Addressable Memory – Strange Attractors and Chaos -Error Performance of Hopfield Networks – Applications of Hopfield Networks – Simulated Annealing – Boltzmann Machine – Bidirectional Associative Memory – BAM Stability Analysis – Error Correction in BAMs – Memory Annihilation of Structured Maps in BAMS –Continuous BAMs – Adaptive BAMs – Applications

Module V: Self Organizing Maps [09 Periods]

Self-organizing Map – Maximal Eigenvector Filtering – Sanger's Rule – Generalized Learning Law – Competitive Learning – Vector Quantization – Mexican Hat Networks – Self-organizing Feature Maps – Applications PULSED NEURON MODELS – Spiking Neuron Model – Integrate-and-Fire Neurons– Conductance Based Models – Computing with Spiking Neurons

Text Books:

1. Satish Kumar —Neural Networks, A Classroom Approach, Tata McGraw -Hill, 2004.
2. Simon Haykin, —Neural Networks, A Comprehensive Foundation, 2nd Edition, Addison Wesley Longman, 2001.

References:

1. Martin T.Hagan, Howard B. Demuth and Mark Beale,Neural Network Design, Thomson Learning, 2003.
2. James A. Freeman and David M. Skapura., Neural Networks Algorithms, Applications and Programming Techniques, Pearson Education, 2003.

Course Outcomes:

CO	Statement	Blooms Taxonomy Level
CO1	Learn basic neural network architecture	Analyze
CO2	Learn Basic Learning Algorithms.	Understand
CO3	Understand data pre and post processing	Analyze
CO4	Learn training, verification and validation of neural networkmodels	Apply
CO5	Design Engineering application that can learn using neuralnetworks	Apply

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

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech. IV Semester		
Code: A0519	Cloud Computing [Professional Elective – I] (Common for CSE, IT, CSE(DS), CSE(AIML), CSE(CS), and CSE(IOT))	L	T	P
Credits: 3		3	-	-

Prerequisites

1. A course on “Operating Systems”

Objectives

1. This course provides an insight into cloud computing
2. Topics covered include- distributed system models, different cloud service models, service-oriented architectures, cloud programming and software environments, resource management.

Module– I

[09 Periods]

Computing Paradigms: High-Performance Computing, Parallel Computing, Distributed Computing, Cluster Computing, Grid Computing, Cloud Computing, Bio computing, Mobile Computing, Quantum Computing, Optical Computing, Nano computing.

Module – II

[09 Periods]

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

Module – III

[09 Periods]

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

Module – IV

[12 Periods]

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

Module – V

[12 Periods]

Cloud Service Providers: EMC, EMC IT, Captiva Cloud Toolkit, Google, Cloud Platform, Cloud Storage, Google Cloud Connect, Google Cloud Print, Google App Engine, Amazon Web Services, Amazon Elastic Compute Cloud, Amazon Simple Storage Service, Amazon Simple Queue, service, Microsoft, Windows Azure, Microsoft Assessment and Planning Toolkit, SharePoint, IBM, Cloud Models, IBM Smart Cloud, SAP Labs, SAP HANA Cloud Platform, Virtualization Services Provided by SAP, Sales force, Sales Cloud,

Service Cloud: Knowledge as a Service, Rack space, Vmware, Manjra soft, Aneka Platform.

Textbook:

1. Essentials of cloud Computing: K. Chandra sekhran , CRC press, 2014

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

1. <https://azure.microsoft.com/en-in/overview/what-is-cloud-computing/>
2. https://en.wikipedia.org/wiki/Cloud_computing
3. <https://opencirrus.org/cloud-computing-important/>
4. <https://www.inforisktoday.com/5-essential-characteristics-cloud-computing-a-4189>
5. <https://www.sam-solutions.com/blog/four-best-cloud-deployment-models-you-need-to-know/>
6. <https://medium.com/@chrysaliss.transformation/cloud-computing-architecture-components-cloud-based-delivery-865c33f51cd2>
7. https://www.itu.int/en/ITU-D/Regional-Presence/AsiaPacific/Documents/Events/2015/July-Could-Computing/S3_M_I_Deen.pdf
8. <https://www.fingent.com/blog/cloud-service-models-saas-iaas-paas-choose-the-right-one-for-your-business/>
9. <https://www.bluepiit.com/blog/different-types-of-cloud-computing-service-models/>
10. <https://data-flair.training/blogs/cloud-service-providers-companies/>
11. <https://www.salesforce.com/products/service-cloud/features/>

CO	Statement	Blooms Taxonomy Level
CO1	Understand the cloud enabling technologies and the Cloud servicemodels	Analyze
CO2	Choose the levels of virtualization and tools for resourceprovisioning	Understand
CO3	Compare the cloud platform architectures of virtualized data centers andInter- cloud ResourceManagement	Analyze
CO4	Analyze the principles of Security and Trust management to protect confidentiality of data in theCloud	Apply
CO5	Propose the standards of Parallel and Distributed Programming Paradigmsfor improving user Access to CloudComputing	Apply

[illegible]

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech. IV Semester		
Code: A0520	Database Management Systems Lab	L	T	P
Credits: 2	(Common for CSE, IT, CSE(DS), CSE(AIML), CSE(CS), and CSE(IoT))	-	1	2

Co-requisites

1. Co-requisite of course “Database Management Systems”

Course Objectives:

This course enables the students to practice the concepts learnt in the subject DBMS by developing a database for an example project.

1. The student is expected to practice the designing a database system using ER diagram, developing and querying a relational database using normalization techniques in the context of example database.
2. Students are expected to Learn SQL basics for data definition and data manipulation using “MySQL” database.
3. Students are expected to apply the learn developing database applications using procedures, cursors and triggers.

List of experiments:

Railway Reservation System –(Redesigning IRCTC database)

Train (train Number, name, source, destination, start_time, reach_time, traveltime, distance, class, days, type)

Ticket (PNRNo, Transactionid, from_station, To_station, date_of_journey, class date_of_booking, total_ticket_fare, train number)

Passenger (PNR No, Serial no, Name, Age, Reservation_status)

Train_Route(Train No, route no, station_code, name, arrival_time, depart_time, distance, day)

Train Ticket fare(Train No, class, base_fare, reservation_charge, superfast_charge, other_charge, tatkal_charge, service_tax)

Create all the tables specified above. Make underlined columns as primary key.(use number, number(m,n), varchar(n), date, time, timestamp data types appropriately) Insert atleast 5 rows to each table. (Check www.irctc.co.in website for actual data)

1. Use Interactive insertion for inserting rows to the table.
2. Use ADT (varray) for class and days column in Train table.

Write simple DDL/DML Queries to

1. Remove all the rows from Passenger table permanently.
2. Change the name of the Passenger table to Passenger_Details.
3. List all train details.
4. List all passenger details.
5. Give a list of trains in ascending order of number.
6. List the senior citizen passengers details.
7. List the station names where code starts with ‘M’.
8. List the trains details within a range of numbers.
9. Change the super fast charge value in train fare as zero, if it is null.
10. List the passenger names whose tickets are not confirmed.
11. List the base_fare of all AC coaches available in each train.

Find the ticket details where transaction id is not known.

- 1) Use Interactive updation for updating the seat no for particular PNR NO.
- 2) Find the train names that are from Secunderabad to Mumbai, but do not have the source or

destination in its name.

3) Find the train details that are on Thursday (Use the ADT column created).

Create (Alter table to add constraint) the necessary foreign keys by identifying the relationships in the table.

1) Add a suitable constraint to train table to always have train no in the range 10001 to 99999.

2) Add a suitable constraint for the column of station name, so that does not take duplicates.

3) Change the data type of arrival time, depart time (date -> timestamp or timestamp to date), and do the necessary process for updating the table with new values.

4) Add a suitable constraint for the class column that it should take values only as 1A, 2A, 3A, SL, C.

5) Add a not null constraint for the column distance in train_route.

Use SQL PLUS functions to.

1. Find the passengers whose date of journey is one month from today.

2. Print the train names in upper case.

3. Print the passenger names with left padding character.

4. Print the station codes replacing K with M.

5. Translate all the LC in class column (Train_fare) to POT and display.

6. Display the fare details of all trains, if any value is ZERO, print as NULL value.

7. Display the pnrno and transaction id, if transaction id is null, print 'not generated'.

8. Print the date_of_journey in the format '27th November 2010'.

9. Find the maximum fare (total fare).

10. Find the average age of passengers in one ticket.

11. Find the maximum length of station name available in the database.

12. Print the fare amount of the passengers as rounded value.

13. Add the column halt time to train route.

14. Update values to it from arrival time and depart time.

High Level:

15. Update values to arrival time and depart time using conversion functions.

16. Display the arrival time, depart time in the format HH:MI (24 hours and minutes).

Write Queries to.

Use SET Operators

1. Find the train numbers for which reservation have not yet been made.

2. Find the train names that donot have a first AC class coach.

3. Print all the PNR nos available in the database.

4. Find passenger names who have booked to 'Pune'.

Use Nested Query(in Operators)

1. Find the train names that stop in 'Warangal'.

2. Find the train names that are superfast and the service tax is zero.

3. Find the Passenger name who have booked for the train that starts from 'Secunderabad'.

4. Find the trains names that have all the AC coaches and the base fare is less than 3000 for each case.

Use Join Query

1. Find the train names that stop in 'Warangal'.

2. Find the train names that are superfast and the service tax is zero.

3. Find the Passenger name (and train name) who have booked for the train that starts from 'Secunderabad'.

4. Display the trains names, each type of class and the total fare for each type of class.

5. Display all the train details and the ticket details (if booked any).

6. Create a sequence to provide values for the PNR no.

7. Write a query for full outer join using any of the tables above.

Write Queries to.

Use Coorelated (and nested) Query

1. Find the train names for which ten tickets have been reserved.
2. Find the trains that have more than ten substations.
3. Find the passengers who do not pass through 'Kachiguda'.
4. Find passengers who have booked for super fast trains.

Complex queries (use groupby/groupby having/join/nested)

1. Take the start station code and end station code and display the train details.
2. List the train names and the number of sub stations it has.
3. List the stations where all types of trains stop.
4. List the trains names that has atleast four bookings.
5. Create a table cancellation history (Insert values from ticket and passenger table).
6. Create a table for all the train numbers and class available in train_ticket_fare with total seats.

1. Find the station name that has highest number of trains stopping at.

Write a simple PL/SQL block to.

1. Print the fibonacci series.
2. Print the factorial of a given number.
3. Print 'NOT confirmed' based on the reservation status, of a particular passenger.
4. Print the total seats available for a particular train and for a particular class.

Write a cursor for the following.

1. Retrieve the passenger details for —X train number and given journey date.
2. Display the train name (once) and the substation names.
3. Display the fare details of a particular train(use basic exceptions)
4. Write a cursor to update the reservation status of the passengers (generate seat number, if seats have reached maximum, put waiting list number (30% of total seats), if waiting list number reaches maximum, put PQWL (10%of total seats), RAC-20%)

1. Write a PL/SQL procedure to.

- a. List the details of passengers who has reserved next to —Mr. X.
- b. PNR No. of a passengers for a given source and a destination.

2. Write a PL/SQL function to.

- a. Get the PNRNo and return the total ticket fare.
- b. Get the Passenger name, train no and return the total journey time in hour's and minutes.

Write a Trigger for the following:

- 1) When a passenger cancels a ticket, do the necessary process and update the cancellation history table.

- 2) When train number is changed, update it in referencing tables.

- 3) When a passenger record is inserted reservation status should be automatically updated.

- 1) Use TCL commands for your transactions. (commit, rollback ,save point)

- 2) Create a role named 'clerk', and give permission for him to select only the trains starting from 'Warangal' along with fare details.

- 3) Create a nested table containing trainno,name,source,destination and passengers who have booked for it (PNR no,sno, name,age). Find the passengers whose name start with 'S' and train starts from 'Warangal'

Textbooks:

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

References:

1. Database Systems design, Implementation, and Management, Peter Rob & Carlos Coronel, 7th Edition.
2. SQL The Complete Reference, James R. Groff, Paul N. Weinberg, 3rd Edition,
3. Oracle for Professionals, The X Team, S.Shah and V. Shah, SPD.
4. Database Systems Using Oracle: A Simplified guide to SQL and PL/SQL, Shah, PHI.

Outcomes:

CO	Statement	Blooms Taxonomy Level
CO1	Design and implement a database schema for a given problem	Analyze
CO2	Generate queries on a database using SQL commands	Understand
CO3	Declare and enforce integrity constraints on a database using a state-of-the-art RDBMS	Analyze

[illegible]

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech. IV Semester		
Code: A1205	Web Technologies Lab (Common for CSE, IT, CSE(DS), CSE(AIML), CSE(CS), and CSE(IoT))	L	T	P
Credits: 1.5		-	-	3

Pre-requisites

A Course on “Objected Oriented Programming”

Course Objectives:

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

Experiments:

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

Textbook:

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

References:

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

Course Outcomes:

CO	Statement	Blooms Taxonomy Level
CO1	Demonstrate the important HTML tags for designing static pages and separate design from content using Cascading Style sheet.	Understand
CO2	Design and implement dynamic websites with good aesthetic sense of designing and latest technical know-how's.	Apply
CO3	Utilize the concepts of JavaScript and Java to efficient front end web applications.	Apply

[illegible]

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech. IV Semester		
Code: A0521	Design and Analysis of Algorithms Lab	L	T	P
Credits: 1.5	(Common for CSE, IT, CSE(DS), CSE(AIML), CSE(CS), and CSE(IoT))	-	-	3

Course Objectives:

This course will make students

1. To analyze asymptotic performance of algorithms, understand different methods postfix, infix expressions, spanning tree algorithms, Strassen's matrix multiplication.
2. To develop solutions to Job sequencing problems, Knapsack algorithm, shortest path algorithms.
3. To implement solutions traveling sales person.
4. To apply dynamic programming method N-Queen's Problem.
5. To learn and apply synthesizing branch and bound, NP problems.

Software Requirements: Turbo C

LIST OF PROGRAMS:

1. Write a program to evaluate a postfix expression E. Assume E is presented data String.
2. Write a program to obtain the postfix form of an infix expression E. Again assume E has only the binary operators +, -, *, /, ^.
3. Implement the minimum cost spanning tree algorithm (Kruskal's algorithm).
4. Implement the minimum cost spanning tree algorithm (Prim's algorithm).
5. Implement Strassen's matrix multiplication.
6. Implement Job sequencing problem with deadlines.
7. Implement the Knapsack Algorithm.
8. Implement the shortest path Dijkstra's Algorithm.
9. Implement SSSP (Single Source Shortest Path) in DAG (Directed Acyclic Graphs).
10. Implement travelling sales person problem.
11. Implement N-Queen's Problem using Backtracking.
12. Implement sum of subsets problem.

TEXTBOOKS

1. Ellis Horowitz, Satraj Sahnian and Rajasekharan, "Fundamentals of Computer Algorithms" Galgotia publications pvt. Ltd
2. T.H. Cormen, C.E. Leiserson, R.L. Rivest, and C. Stein, "Introduction to Algorithms", second edition, PHI Pvt. Ltd./ Pearson Education
3. Parag Himanshu Dave, Himanshu Balchandra Dave, "Design and Analysis of algorithms" Pearson.

REFERENCES

1. M.T. Goodrich and R. Tomassia "Algorithm Design, Foundations, Analysis and Internet examples", John Wiley and sons.
2. R.C.T. Lee, S.S. Tseng, R.C. Chang and T. Tsai, "Introduction to Design and Analysis of Algorithms A strategic approach", Mc Graw Hill.

Course Outcomes:

CO	Statement	Blooms Taxonomy Level
CO1	Analyze asymptotic performance of algorithms, understand different methods	Analyze
CO2	Develop solutions to Job sequencing problems, Knapsack algorithm, shortest path algorithms,	Understand
CO3	Implement solutions traveling sales person.	Analyze
CO4	Apply dynamic programming method N-Queen's Problem.	Apply
CO5	Apply synthesizing branch and bound NP problems.	Apply

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

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech. IV Semester		
Code: A00M2	Environmental Science	L	T	P
Credits: NIL	(Common for CSE, IT, CSE(DS), CSE(AI ML), CSE(CS), and CSE(IoT))	2	-	-

Pre-Requisites: NIL

Course Objectives:

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

Module – I: Multidisciplinary Nature of Environmental Studies

Definition, Scope and Importance – Need for Public Awareness

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

Module– II: Ecosystems

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

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

Module–III: Biodiversity and its Conservation

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

Module–IV

Environmental Pollution and control:

Environmental Pollution: Classification of pollution, **Air Pollution:** Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards.

Water pollution: Sources and types of pollution, drinking water quality standards. **Soil Pollution:** Sources and types, Impacts of modern agriculture, degradation of soil.

Noise Pollution: Sources and Health hazards, standards, Solid waste: Municipal Solid Waste management, composition and characteristics of e-Waste and its management. Pollution control technologies: Wastewater Treatment methods: Primary, secondary and Tertiary. Overview of air pollution control technologies, Concepts of bioremediation. Climate change and impacts on human

[illegible]

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech. V Semester		
Code: A1206	Theory of Automata	L	T	P
Credits: 4		4	-	-

Prerequisites: NIL

Course Objectives:

Introduce central concepts in theory of computation and to design grammars and recognizers for different formal languages, and also to determine the decidability and intractability of computational problems.

Module-I: Finite Automata

[10 Periods]

Finite Automata: Introduction, Central Concepts of Automata Theory, Deterministic Finite Automata, Nondeterministic Finite Automata, NFA to DFA Conversion, Finite Automata with Epsilon Transitions, Equivalence between NFA with and without Epsilon Transitions.

Regular Expressions: Regular Expressions, Identity Rules for Regular Expressions, Algebraic Laws for Regular Expressions, Equivalence between Finite Automata and Regular Expressions, Applications of Finite Automata and Regular Expressions.

Module-II: Regular Expression and Languages

[10 Periods]

Properties of Regular Languages: Pumping Lemma for Regular Languages, Closure Properties of Regular Languages, Decision Properties of Regular Languages, Equivalence between two FSM's, Minimization of Finite Automata.

Grammars and Languages: Chomsky Hierarchy of Languages, Grammars and Languages Generated, Context-Free Grammars, Derivations, Parse Trees, Ambiguity in Grammars and Languages.

Module-III: Context Free Grammars and Push Down Automata

[10 Periods]

Properties of Context Free Languages: Simplification of CFG's, Normal Forms for CFG's: CNF and GNF, Pumping Lemma for Context Free Languages, Closure Properties of Context Free Languages, Decision Properties of Context Free Languages

Pushdown Automata: Introduction, Formal Definition and Behavior of PDA, Language of PDA, Design of PDA, Equivalence of PDA and CFG's, DPDA.

Module-IV: Turing Machines

[9 Periods]

Turing Machines: Introduction, Formal Definition and Behavior of TM, Language of a TM, Design of TM's, Programming Techniques for TM's, Extensions to the TM's, Restricted TM's.

Module-V: Undecidability

[9 Periods]

Recursive and Recursively Enumerable Languages, Properties of Recursive and Recursively Enumerable Languages, The Church-Turing Thesis, A Language that is not Recursively Enumerable, An Undecidable Problem that is RE, PCP and MPCP

Text Book:

1. John E. Hopcroft, Rajeev Motwani, Jeffery D Ullman, "Introduction to Automata Theory Languages and Computation", 3rd Edition, Pearson Education, 2007.
2. Theory of Computer Science- Automata languages and computation –Mishra and Chandrashekar, Third edition, PHI

Reference Books:

1. John C Martin, "Introduction to Language and Theory of Computation", 3rd Edition, TMH, 2003.
2. Daniel Cohen "Introduction to Computer Theory", 2nd Edition, Wiley Publications, 2007.

3. Mishra K., Chandrasekaran N.,” Theory of Computer Science (Automata, Languages and Computation), 3rd Edition, Prentice Hall of India 2008.
4. Shyamalendra Kandar” Introduction to Automata Theory, Formal Languages and Computation, Pearson, 2013.

E-Resources:

1. <https://books.google.co.in/books?isbn=8184313020>
2. <https://www.iitg.ernet.in/dgoswami/Flat-Notes.pdf>
3. <http://freevideolectures.com/Course/3379/Formal-Languages-and-Automata-Theory>
4. <http://nptel.ac.in/courses/106106049/>
5. <https://nptel.ac.in/courses/106104028/>
6. <http://online.stanford.edu/course/automata-theory>

Course Outcomes:

CO	Statement	Blooms Taxonomy Level
CO1	Explain the theory of automata types of automata and FA with outputs.	Understand
CO2	Illustrate the properties of regular grammar, regular language, regular expression & their relationship with finite automata. Apply pumping lemma	Apply
CO3	Demonstrate grammar Derivative trees, CNF, GNF and to Apply pumping lemma for CFL and design various types of PDA.	Apply
CO4	Design Turing machine to solve problems using computers.	Apply
CO5	Analyze P vs NP-Class problems and NP-Hard vs NP-complete problems, LBA, LR Grammar, Counter machines, Decidability of Problems	Analyze

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

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech. V Semester		
Code: A0524	Software Engineering & Modeling	L	T	P
Credits: 3	Common for CSE, CSE (Cyber Security), CSE (AI and ML), CSE (DS), CSE (IOT), AIML and IT)	3	-	-

Course Objectives:

1. Student will be able to learn fundamental aspects of Software Engineering and analyze various process models.
2. To identify various types of requirements and the process for Requirements Engineering.
3. To make use of various System Models to conceptualize and construct a system.
4. To demonstrate different testing tactics and define metrics for software measurement.
5. To classify and mitigate the Software Risks and learn to achieve quality standards.

Module I: Introduction to Software Engineering [09 Periods]

Basics terms of Software Engineering: Evolving role of software, changing nature of Software, Software Myths. A Generic View of Process:-Software engineering-A layered technology, The Capability Maturity Model Integration (CMMI)

Process Models: The water fall model, Incremental process models, evolutionary process models, and the unified process.

Module II: Requirements of Software Engineering [09Periods]

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

System Models: Context models, Behavioral models, Data models, Object models, Structured methods

Module III: Phases of Software Engineering [09 Periods]

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.

Module IV: Test Strategies [09 Periods]

Methods of Testing: A strategic approach to software testing, Black box and White box Testing, Validation Testing, and System Testing.

Product Metrics: Software Quality, Metrics for analysis model, Metrics for design model, Metrics for source code, Metrics for testing, Metrics for maintenance Metrics for process and products: Software measurement, Metrics for software quality

Module V: Risk Management [09Periods]

Management of Risk Process: Reactive Vs proactive risk strategies, Software risks, Risk identification, Risk projection Risk refinement, RMMM, RMMM plan 95

Quality Management: Quality concepts, Software quality assurance, Software reviews, Formal technical reviews, Statistical Software Quality Assurance, Software Reliability, ISO 9000 Quality standards

Text Books:

1. Roger S. Pressman, Software engineering- A practitioner's Approach, McGraw Hill International Edition, 5th edition, 2001.
2. Ian Sommerville, Software engineering, Pearson education Asia, 6th edition, 2000.

References:

1. Pankaj Jalote- An Integrated Approach to Software Engineering, Springer Verlag, 1997.
2. James F Peters and Witold Pedrycz, —Software Engineering – An Engineering Approach, John Wiley and Sons, New Delhi, 2000.
3. Ali Behforooz and Frederick J Hudson, —Software Engineering Fundamentals, Oxford University Press, New Delhi, 1996.

E Resources:

1. https://books.google.co.in/books?id=bL7QZHtWvaUC&printsec=frontcover&dq=software+engineering+by+roger+pressman+vth+edition+free+download&hl=en&sa=X&ved=0ahUKEwiLkOz-pL_TAhWiuI8KHZSxD2cQ6AEIMDAC#v=onepage&q&f=false
2. <http://ieeexplore.ieee.org/document/4807670/>
1. <https://link.springer.com/search?facet-journalid=40411&package=openaccessarticles&query=&facet-sub-discipline=%22Software+Engineering%22>
2. <http://freevideolectures.com/Course/2318/Software-Engineering>
3. <http://freevideolectures.com/Course/2318/Software-Engineering/5>

Course Outcomes:

CO	Statement	Blooms Taxonomy Level
CO1	Obtain knowledge about principles of software engineering and software process models.	Understand
CO2	Interpret the functional, non-functional requirements and requirement engineering process.	Apply
CO3	Focus on the fundamentals of modeling a software project.	Understand
CO4	Obtain knowledge about Identifying appropriate test strategies, estimation and maintenance of software systems.	Analyze
CO5	Analyse various Risk Management and Quality Management Techniques.	Analyze

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

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech. V Semester		
Code: A6201	Computer Networks	L	T	P
Credits: 3	Common for CSE, CSE (Cyber Security), CSE (AI and ML), CSE (DS), CSE (IOT), AIML and IT)	3	-	-

Prerequisites: NIL

Course Objectives:

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

MODULE I: Basics of Networking and Physical Layer

[10 Periods]

Basics of Networking: Components–Direction of Data flow–Networks–Components and Categories–Types of Connections–Topologies–Protocols and Standards–ISO / OSI model, TCP/IP model.

Physical Layer: Digital transmission, Multiplexing, Transmission Media, Switching, Circuit Switched Networks, Datagram Networks, Virtual Circuit Networks.

MODULE II: Data Link Layer

[11 Periods]

Functionalities of Data Link Layer: Introduction, Framing, Error Detection and Correction–Parity–LRC–CRC–Hamming code, Flow and Error Control, Noiseless Channels, Noisy Channels, HDLC, Point to Point Protocols. Random access, Controlled access, Channelization, Collision Free Protocols.

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

MODULE III: Network Layer

[09 Periods]

Basics of Network Layer: Logical Addressing, Internetworking, Tunneling, Address mapping, **Communication Protocols:** ICMP, IGMP, Forwarding, Unicast Routing Protocols, Multicast Routing Protocols.

MODULE IV: Transport Layer

[09 Periods]

Connection Oriented and Connectionless Protocols: Process to Process Delivery, UDP and TCP protocols, SCTP.

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

MODULE V: Application layer

[09 Periods]

DNS: Domain Name Space, DNS in internet, Electronic mail

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

Text Books:

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

References:

1. P.C .Gupta, “Data communications and computer Networks”, PHI.
2. S.Keshav, “An Engineering Approach to Computer Networks”, 2nd Edition, Pearson Education.

3. W.A. Shay, “**Understanding communications and Networks**”, 3rd Edition, Cengage Learning.
4. James F.Kurose & Keith W. Ross, “**Computer Networking: A Top-Down Approach Featuring the Internet**”, 3rd Edition, Pearson Education.

2020-21 Onward (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech. V Semester		
Code: A6203	Cryptography and Network Security [Professional Elective –II]	L	T	P
Credits: 3	Common for CSE, CSE (Cyber Security), CSE (AI and ML), CSE (DS), CSE (IOT), AIML and IT)	3	-	-

Prerequisites: Computer Networks

Course Objectives:

This course provides the students to understand security concepts, ethics in Network Security, analyze security threats, security services, mechanisms to counter them, comprehend and apply relevant cryptographic techniques, implement security services and mechanisms in the network protocol stack.

Module-I: Basic Principles

[09 Periods]

Security Goals, Cryptographic Attacks, Services and Mechanisms, Mathematics of Cryptography

Module-II: Symmetric Encryption

[10 Periods]

Mathematics of Symmetric Key Cryptography, Introduction to Modern Symmetric Key Ciphers, DataEncryption Standard, Advanced Encryption Standard.

Module-III: Asymmetric Encryption

[10 Periods]

Mathematics of Asymmetric Key Cryptography: Primes, Primality Test, Factorization, Chinese Remainder Theorem, Quadratic Congruence, Exponentiation and Logarithm, Asymmetric Key Cryptography: Difference between Symmetric-Key and Asymmetric key cryptosystems, RSA Cryptosystem, Rabin Cryptosystem, Elgamal Cryptosystem, Elliptic curve Cryptosystems

Module-IV: Data Integrity, Digital Signature Schemes and Key Management

[09

Periods] Message Integrity and Message Authentication, Cryptographic Hash Functions, Digital Signature, KeyManagement. Security at the Network Layer: IPSec, System Security

Module-V: Security in Transport Layer and Application Layer

[10 Periods]

E-mail Security, PGP and S/MIME, Security at the Transport Layer: SSL and TLS, System security.

Text Books:

1. Behrouz A Forouzan, Debdeep Mukhopadhyay,” **Cryptography and NetworkSecurity**”, (3e)Mc GrawHill.
2. William Stallings, “**Cryptography and Network Security**”, (6e)Pearson.
3. Keith M.Martin ,”**Everyday Cryptography** ”,Oxford.

References:

1. Bernard Meneges ,”Network Security and Cryptography”, Cengage Learning.

E -Resources

1. http://www.inf.ufsc.br/~bosco.sobral/ensino/ine5680/material-crypto-seg/2014-1/Stallings/Stallings_Cryptography_and_Network_Security.pdf
2. <http://www.ijcsmc.com/docs/papers/January2015/V4I1201544.pdf>
3. <http://nptel.ac.in/syllabus/106105031/>

Course Outcomes:

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

CO	Statement	Blooms Taxonomy Level
1	Comprehend information security awareness and a clear understanding of its importance.	Analyze
2	Understand fundamentals of secret and public cryptography.	Analyze
3	Implement protocols for security services.	Apply
4	Analyze network security threats and counter measures.	Apply
5	Deploy network security designs using available secure solutions (such as PGP, SSL, IPsec, etc).	Analyze

[illegible]

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech. V Semester		
Code: A0526	Artificial Intelligence [Professional Elective - II]	L	T	P
Credits: 3		3	-	-

Prerequisites: Discrete Mathematics

COURSE OBJECTIVES:

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

MODULE I: INTRODUCTION [10 PERIODS]

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

MODULE II: Problem Solving [09 Periods]

Problem solving: state-space search and control strategies: Introduction, general problem solving, characteristics of problem, exhaustive searches, heuristic search techniques, iterative deepening a*, constraint satisfaction.

Problem reduction and game playing: Introduction, problem reduction, game playing, alphabeta pruning, two-player perfect information games.

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

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

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

MODULE IV: Expert System and Applications [10 Periods]

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

MODULE V: Uncertainty Measure [09 Periods]

Probability theory: Introduction, Bayesian belief networks, certainty factor theory, Dempster-Shafer theory.

Fuzzy Sets and Fuzzy Logic: Introduction, fuzzy sets, fuzzy set operations, types of membership functions, multi valued logic, fuzzy logic, linguistic variables and hedges, fuzzy propositions, inference rules for fuzzy propositions, fuzzy systems.

1. Saroj Kaushik, “**Artificial Intelligence**”, CENGAGE Learning,
2. Stuart Russel, Peter Norvig, “**Artificial intelligence, A modern Approach**”, 2nd ed, PEA
3. Rich, Kevin Knight, Shiv Shankar B Nair, “**Artificial Intelligence**”, 3rd Ed, TMH
4. Patterson,”**Introduction to Artificial Intelligence**”, PHI

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

1. <https://i4iam.files.wordpress.com/2013/08/artificial-intelligence-by-rich-and- knight.pdf>
2. https://books.google.co.in/books?id=pVR9W5LEZUwC&printsec=frontcover&source=gsbs_ge_summary_r&cad=0#v=onepage&q&f=false
3. <https://www.journals.elsevier.com/artificial-intelligence/>
4. <http://www.ceser.in/ceserp/index.php/ijai>
5. http://ndl.iitkgp.ac.in/document/yVCWqd6u7wgye1qwH9xY7_M07uyea_7zp_zRG3BvdUVy2TIab45fvPeNJfynQsAbmBEGDSUqzidwcse6xwotJA
6. http://ndl.iitkgp.ac.in/document/xttk-4kfhvUwVIXBW-YWRBg_vrHK12-lgOzTVbb5oZ6eQOBjCWDfRvquHJLEOFENjI5AmOqRc9Ar3eJF4CGFrw

CO	Statement	Blooms Taxonomy Level
1	Describe the key components of the artificial intelligence (AI) field	Understand
2	Classify knowledge representation techniques	Analyze
3	Interpret various types of reasoning and processing	Analyze
4	Discover game playing and apply knowledge representation	Apply
5	Demonstrate learning and the analyze aspects of leaning	Understand

[illegible]

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech. V Semester		
Code: A1207	Virtual Reality [Professional Elective – II]	L	T	P
Credits: 3		3	-	-

Prerequisites:

Course Objectives:

1. To familiarize the students with the fundamentals of Virtual Reality.
2. To impart the knowledge of 2D and 3D orientation for understanding the behavior of VR system with the environment.
3. To introduce the dynamics of the objects.
4. To deal with the factors involved to create virtual environment.
5. To introduce the applications of Virtual Reality Systems.

Module-I:

[09 Periods]

Introduction to Virtual Reality: Virtual Reality and Virtual Environment: Introduction, Computer graphics, Real time computer graphics, Flight Simulation, Virtual environment requirement, benefits of virtual reality, Historical development of VR, Scientific Landmark.

3D Computer Graphics: Introduction, The Virtual world space, positioning the virtual observer, the perspective projection, human vision, stereo perspective projection, 3D clipping, Colour theory, Simple 3D modelling, Illumination models, Reflection models, Shading algorithms, Radiosity, Hidden Surface Removal, Realism-Stereographic image

Module II:

[10 Periods]

Geometric Modelling: Geometric Modelling: Introduction, from 2D to 3D, 3D spaces curves, 3D boundary representation.

Geometrical Transformations: Introduction, Frames of reference, Modelling transformations, Instances, Picking, Flying, Scaling the VE, Collision detection.

Generic VR System: Introduction, Virtual environment, Computer environment, VR technology, Model of interaction, VR Systems.

Module III:

[10 Periods]

Virtual Environment: Animating the Virtual Environment: Introduction. The dynamics of numbers, Linear and Nonlinear interpolation, the animation of objects, linear and non-linear translation, shape & object inbetweening, free from deformation, particle system.

Physical Simulation: Introduction, Objects falling in a gravitational field, Rotating wheels, Elastic collisions, projectiles, simple pendulum, springs, Flight dynamics of an aircraft.

Module IV:

[09 Periods]

VR Hardware and Software: Human factors: Introduction, the eye, the ear, the somatic senses.

VR Hardware: Introduction, sensor hardware, Head-coupled displays, Acoustic hardware. Integrated **VR Systems.** VR Software: Introduction, Modelling virtual world, Physical simulation, VR toolkits, Introduction to VRML.

Module V:

[10 Periods]

VR Applications: Introduction, Engineering, Entertainment, Science, Training. The Future: Virtual environment, modes of interaction.

Text Books

1. John Vince, "Virtual Reality Systems ", Pearson Education Asia, 2007.
2. Anand R., "Augmented and Virtual Reality", Khanna Publishing House, Delhi.

Suggested Reading:

1. Adams, "Visualizations of Virtual Reality", Tata McGraw Hill, 2000.
2. Grigore C. Burdea, Philippe Coiffe, "Virtual Reality Technology", Wiley Inter Science, 2nd Edition, 2006.
3. Kelly S. Hale, Kay M. Stanney, "Handbook of Virtual Environments: Design, Implementation, and Applications", CRC Press, 2nd Edition, 2014.

Web Resource:

1. <https://nptel.ac.in/courses/106106138/>

Course Outcomes:

CO	Statement	Blooms Taxonomy Level
CO1	UNDERSTAND fundamental Computer Vision, Computer Graphics and Human Computer Interaction Techniques related to VR	Understand
CO2	UNDERSTAND Geometric Modeling Techniques	Understand
CO3	ANALYZE and EVALUATE VR Technologies	Analyze
CO4	APPLY various types of Hardware and Software in Virtual Reality systems	Apply
CO5	DESIGN and FORMULATE Virtual/Augmented Reality Applications	Design

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

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech. V Semester		
Code: A1208	Principles of Programming Languages	L	T	P
Credits: 3	[Professional Elective – II]	3	-	-

Pre-requisites: Basic Mathematics in Computer Science

Course Objectives:

1. To briefly describe various programming paradigms.
2. To provide the Preliminary concepts of programming languages.
3. To familiarize with Syntax and Semantic Descriptions.
4. To acquire knowledge on ADT, Concurrency control, Exception handling Mechanisms
5. To provide conceptual understanding of High-level language design and implementation.

Module-I

[10 Periods]

Preliminary Concepts: Reasons for studying programming languages, Programming domains, Language Evaluation Criteria, Influences on Language design, Language categories.
Programming Paradigms: Imperative, Object Oriented, functional Programming, Logic Programming. Implementation–Compilation and Virtual Machines, Programming Environments.

Syntax and Semantics: General Problem of describing Syntax and Semantics, Formal methods of describing syntax - BNF, EBNF for common programming languages features, parse trees, ambiguous grammars, Attribute grammars. Describing the Meanings of Programs: Dynamic Semantics.

Module-II

[9 Periods]

Data Types: Primitive Data Types, Character String Types, Enumeration Types, Array Types, Associative Arrays, Record Types, Tuple Types, List Types, Union Types, pointer and reference types, Names, Variables, Concept of Binding, Named Constants, Type checking, Strong Typing, Type compatibility.

Expressions and Assignment Statements: Arithmetic, Relational and Boolean expressions, Short-Circuit Evaluation, Assignment Statements, Mixed Mode Assignment.

Module-III

[9 Periods]

Statement Level-Control Structures: Selection, Iteration Statements, Unconditional Branching, Guarded commands.

Subprograms: Fundamentals of subprograms, Scope of life time of variables, static and dynamic scope, Design issues of subprograms and operations, Local Referencing Environments, Parameter Passing Methods, Parameters that are Subprogram, Design Issues for Functions, Overloaded Subprograms, Generic Subprograms, User Defined Overloaded Operators, Coroutines.

Module-IV

[9 Periods]

Abstract Data types and Encapsulation: Introductions to Data Abstraction, Design Issues, Language Examples, Parameterized ADT, Encapsulation Constructs, Object Oriented Programming in small talk, C++, Java, C#.

Concurrency: Subprogram Level Concurrency, Semaphores, Monitors, Message Passing, Java Threads, C# Threads.

Exception Handling: Exceptions, Exception Propagation, Exception handler in C++ and Java.

Module-V**[10 Periods]**

Functional Programming Languages: Introduction, Mathematical Functions, Fundamentals of Functional Programming Languages, The First Functional Programming Language: LISP, An Introduction to Scheme, Common Lisp, ML, Haskell, Support for Functional Programming in Primarily Imperative Languages, A Comparison of Functional and Imperative Languages

Logic Programming Language: Introduction and Overview of Logic Programming, Basic Elements of Prolog, Applications of Logic Programming.

Text Books:

1. Robert W. Sebesta “Concepts of Programming Languages”, 10th Edition, Pearson Education, 2012.
2. D. A. Watt-Programming Language Design Concepts, Wiley Dreamtech, 2007.

Suggested Reading:

1. A. B. Tucker, R. E. Noonan “Programming Languages”, 2nd Edition, TMH.
2. K. C. Loudon, “Programming Languages”, 2nd Edition, Thomson, 2003.
3. Patric Henry Winston and Paul Horn, “LISP”, 3rd Edition, Pearson Education.

E-Resources:

1. <https://nptel.ac.in/courses/106102067/>
2. <https://web.cs.dal.ca/~nzeh/Teaching/3136/index.html>

Course Outcomes:

CO	Statement	Blooms Taxonomy Level
CO1	Understand preliminaries of programming paradigms and formal notations of syntax.	Understand
CO2	Identify suitable data type and write optimal expressions.	Understand
CO3	Apply appropriate control structures and modularize the program.	Analyze
CO4	Apply the concepts of encapsulation, concurrency and exception handling in programming	Apply
CO5	Compare the features of functional, imperative and logical programming languages	Design

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

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

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech. V Semester		
Code: A6706	R Programming [Professional Elective–II]	L	T	P
Credits: 3		3	-	-

Prerequisites: Programming for Problem Solving

Course Objectives:

- Learn Fundamentals of R.
- Covers how to use different functions in R, how to read data into R, accessing R packages, writing R functions, debugging, and organizing data using R functions.
- Cover the Basics of statistical data analysis with examples.
- The whole syllabus will give an idea to collect, compile and visualize data using statistical functions.

Learning Outcomes:

- Understand the basics of Fundamentals of R.
- Understands the loading, retrieval techniques of data.
- Understand how data is analysed and visualized using statistic functions.

Module-I

[09 periods]

Introduction to R: What is R? – Why R? – Advantages of R over Other Programming Languages - R Studio: R command Prompt, R script file, comments–Handling Packages in R: Installing a R Package, Few commands to get started: installed.packages(), packageDescription(), help(), find.package(), library() - Input and Output – Entering Data from keyboard – Printing fewer digits or more digits – Special Values functions : NA, Inf and–inf.

Module-II

[08 periods]

R Data Types: Vectors, Lists, Matrices, Arrays, Factors, Data Frame

Variables: Variable assignment, Data types of Variable, Finding Variable ls(), Deleting Variables - **Operators:** Arithmetic Operators, Relational Operators, Logical Operator, Assignment Operators, Miscellaneous Operators –

Decision Making: if statement, if – else statement, if– else if statement, switch statement

R Loops: repeat loop, while loop, for loop - Loop control statement: break statement, next statement.

Module-III

[10 periods]

R-Function : function definition, Built in functions: mean(), paste(), sum(), min(), max(), seq(), user-defined function, calling a function, calling a function without an argument, calling a function with argument values - R-Strings – Manipulating Text in Data: substr(), strsplit(), paste(), grep(), toupper(), tolower() - R Vectors – Sequence vector, rep function, vector access, vector names, vector math, vector recycling, vector element sorting

R List -Creating a List, List Tags and Values, Add/Delete Element to or from a List, Size of List, Merging Lists, Converting List to Vector

R Matrices – Accessing Elements of a Matrix, Matrix Computations: Addition, subtraction, Multiplication and Division

R Arrays: Naming Columns and Rows, Accessing Array Elements, Manipulating Array Elements, Calculation Across Array Elements

R Factors –creating factors, generating factor levels gl().

Module-IV

[10 periods]

Data Frames –Create Data Frame, Data Frame Access, Understanding Data in Data Frames: dim(), nrow(), ncol(), str(), Summary(), names(), head(), tail(), edit() functions - Extract Data from Data Frame, Expand Data Frame: Add Column, Add Row - Joining

Loading and handling Data in R: Getting and Setting the Working Directory – getwd(), setwd(), dir() - R-CSV Files - Input as a CSV file, Reading a CSV File, Analyzing the CSVFile: summary(), min(), max(), range(), mean(), median(), apply() - Writing into a CSV File
– R -Excel File – Reading the Excel file.

[9 periods]

Descriptive Statistics: Data Range, Frequencies, Mode, Mean and Median: Mean Applying Trim Option, Applying NA Option, Median - Mode - Standard Deviation – Correlation - Spotting Problems in Data with Visualization: visually Checking Distributions for a single Variable - R –Pie Charts: Pie Chart title and Colors – Slice Percentages and Chart Legend, 3D Pie Chart – R Histograms – Density Plot - R – Bar Charts: Bar Chart Labels, Title and Colors.

Text Books

1. Sandip Rakshit, R Programming for Beginners, McGraw Hill Education (India), 2017, ISBN : 978-93-5260-455-5.
2. Seema Acharya, Data Analytics using R, McGrawHill Education (India), 2018, ISBN:978-93-5260-524-8.

References:

1. Jure Leskovek, Anand Rajaraman and Jeffrey Ullman, Mining of Massive Datasets, v2.1, CambridgeUniversity Press.
2. Foster Provost and Tom Fawcett, Data Science for Business, What You Need to Know about Data Mining andData-Analytic Thinking, O'Reilly.
3. Cathy O'Neil and Rachel Schutt, Doing Data Science, Straight Talk from the Frontline, O'Reilly.
4. Samir Madhavan, Mastering Python for Data Science, Packt Publishing, 2015.

E-Resources:

1. <http://datasciencemasters.org/>.
2. <http://learnds.com/>
3. <https://www.datascienceweekly.org/>

Course Outcomes:

CO	Statement	Blooms Taxonomy Level
CO1	Understand and apply basic concepts of R for data science.	Understand
CO2	Learn and apply the fundamental concepts of data science.	Understand
CO3	Design suitable linear regression models to extract useful information.	Analyze
CO4	Develop and analyze regression models for the given data.	Apply
CO5	Handle time series data using ARIMA models.	Design

[illegible]

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech. V Semester		
Code: A0530	Distributed Systems [Professional Elective – III]	L	T	P
Credits: 3		3	-	-

Prerequisite: Data Structure and Algorithm, Operating System, Computer Network

Course Objectives:

A distributed system is a system whose components are located on different networked computers, which communicate and coordinate their actions by passing messages to one another. The components interact with one another in order to achieve a common goal. Three significant characteristics of distributed systems are: concurrency of components, lack of a global clock, and independent failure of components. From this course, students may learn foundations of distributed systems, idea of peer to peer services and file system, and security issues in distributed system.

Module-I: Introduction

[09 Periods]

Fundamentals of Distributed System: Definition of a Distributed System, Goals of a DistributedSystem, Types of Distributed Systems, Basics of Operating System and Networking.

Basics of Architectures, Processes, and Communication: **Architectures**-Types of System Architectures, Self Management in Distributed Systems; **Processes**-Basics of Threads, Virtualization, Roles of Client and Server, Code Migration; **Communication**-Types of Communications, Remote Procedure Calls, Message-Oriented Communication, Stream-Oriented Communication, Multicasting

Module-II: Naming, Synchronization

[09 Periods]

Naming: Names, Identifiers, and Addresses, Flat Naming, Structured Naming, Attribute Based Naming

Synchronization: Clock Synchronization, Logical Clocks, Mutual Exclusion, Global Positioning OfNodes, Election Algorithms.

Module-III: Consistency, Replication and Fault Tolerance

[10

Periods] Introduction to Replication, Data Centric Consistency Models, Client-Centric Consistency Models, Replica Management, Consistency Protocols, Basics of Fault Tolerance, Process Resilience, Reliable Client Server Communication, Reliable Group Communication, Distributed Commit, Recovery

Module-IV: Security

[10 Periods]

Introduction to Security- Security Threats, Policies, and Mechanisms, Design Issues, Basics of Cryptography, Secure Channels- Authentication, Message Integrity and Confidentiality, Secure Group Communication; Access Control- General Issues in Access Control, Firewalls, Secure Mobile Code, Denial of Service; Security Management-Key Management, Secure Group Management, Authorization Management.

Module-V: Categories of Distributed System

[09 Periods]

Architecture, Processes, Communication, Naming, Synchronization, Consistency and Replication, Fault Tolerance, Security: Distributed Object-based System; Distributed File System; Distributed Web-based

System; Distributed Coordination based System

Text Books:

1. George Coulouris, Jean Dollimore and Tim Kindberg, “Distributed Systems Concepts and Design”,3rd Edition, Pearson Education, 2002.
2. Andrew S. Tanenbaum, Maartenvan Steen, Distibuted Systems, “Principles and Pardigms”, PearsonEducation, 2002.

References:

1. Sape Mullender, "Distributed Systems", 2nd Edition, Addison Wesley, 1993.
2. Albert Fleishman, Distributes Systems, "Software Design and Implementation", springer, Verlag, 1994.
3. M. L. Liu, "Distributed Computing Principles and Applications", Pearson Education, 2004.

E- References

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

Course Outcomes:

CO	Statement	Blooms Taxonomy Level
CO1	Structuring distributed applications: using client-server and remote procedure calls	Understand
CO2	Learns inter process communication and distributed objects	Analyze
CO3	Design Cryptographic Algorithms and security issues for distributed systems	Analyze
CO4	Assess distributed file systems	Apply
CO5	Ordering of events: using logical and physical clocks	Understand

[illegible]

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech. V Semester		
Code: A1209	Android Application Development [Professional Elective – III]	L	T	P
Credits: 3		3	-	-

Prerequisite: Java

Course Objectives:

This course aims the students to learn the essentials of mobile apps development, aids in developing simple android applications, identify the essentials of android design, file settings, study about user interface design and develop android APIs.

Module I: Mobile and Information Architecture

[10

Periods] **Introduction to Mobile:** A brief history of Mobile, The Mobile Eco system, Mobile uses Types of Mobile Applications.

Mobile Information Architecture: Mobile Design, Mobile 2.0, Mobile Web development, Small Computing Device Requirements.

Module-II

[10 Periods]

Introduction to Android: History of Mobile Software Development, The Open Handset Alliance-Android platform differences.

Android Installation: The Android Platform, Android SDK, Eclipse Installation, Android Installation, Building a Sample Android application.

Module-III

[10 Periods]

Android Application Design Essentials: Anatomy of an Android applications, Android terminologies, Application Context, Activities, Services, Intents, Receiving and Broadcasting Intents.

Android File Settings: Android Manifest File and its common settings, Using Intent Filter, Permissions, Managing Application resources in a hierarchy, working with different types of resources. **Module-IV**

[09

Periods]

Android User Interface Design: Essentials User Interface Screen elements, Designing User Interfaces with Layouts.

Animation Techniques: Drawing and Working with Animation- Drawing on the screen-Working with Text-Working with Bitmaps-Working with shapes-Working with animation.

Module-V

[09 Periods]

Android APIs-I: Using Common Android APIs Using Android Data and Storage APIs, Managing data using SQLite, Sharing Data between Applications with Content Providers.

Android APIs-II : Using Android Networking APIs, Using Android Web APIs, Using Android Telephony APIs, Deploying Android Application to the World.

Text Books:

1. James Keogh, “**J2ME: The Complete Reference**”, Tata Mc Graw Hill.
2. Lauren Darcey and Shane Conder, “**Android Wireless Application Development**”, Pearson Education, 2nd ed. (2011).

References:

1. Reto Meier, “**Professional Android 2 Application Development**”, Wiley India PvtLtd.
2. Mark L Murphy, “**Beginning Android**”, Wiley India PvtLtd.
3. Barry Burd, “**Android Application Development All in one**” Edition: I, Wiley IndiaPvtLtd.

E-Resources

1. <http://onlinevideolecture.com/ebooks/?subject=Android-Development>
2. <https://developer.android.com/training/basics/firstapp/index.html>
3. IEEE Transactions on Mobile Computing
4. International Journal of Interactive Mobile Technologies
5. <http://nptel.ac.in/courses/106106147/>

Course Outcomes:

CO	Statement	Blooms Taxonomy Level
CO1	Understand the fundamentals of different mobile operating systems	Analyze
CO2	List out suitable software tools and APIs for the development User Interface of Android application	Understand
CO3	Apply intents, broadcast receivers and file setting in android application	Analyze
CO4	Develop, customize and enhance mobile applications with various widgets	Apply
CO5	Develop apps for mobile devices using SQLiteDatabase	Apply

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

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech. V Semester		
Code: A6217	Cyber Security [Professional Elective - III]	L	T	P
Credits: 3		3	-	-

Prerequisites:

NIL Course

Objectives:

This course makes the students to understand the basic concepts security policies, interpret security objectives, various catalog approaches, analyze cyber user, conflict, management, infrastructure issues, investigate various case studies on cyber security policies.

Module-I: Policies and Security Evolution

[10 Periods]

Introduction - Cyber Security, Cyber Security policy, Domain of Cyber Security Policy, Laws and Regulations

Cyber Security Evolution - Enterprise Policy, Technology Operations, Technology Configuration, Strategy Versus, Policy, Cyber Security Evolution, Productivity, Internet, E-Commerce, Counter Measures, Challenges.

Module-II: Cyber Security Objectives and Guidance

[10 Periods]

Security Objectives - Cyber Security Metrics, Security Management Goals, Counting Vulnerabilities, Security Frameworks, E-Commerce Systems, Industrial Control Systems, Personal Mobile Devices, Security Policy Objectives, Guidance for Decision Makers, Tone at the Top, Policy as a Project.

Catalog Approach - Cyber Security Management, Arriving at Goals, Cyber Security Documentation, the Catalog Approach, Catalog Format, Cyber Security Policy Taxonomy

Module-III: Policy Catalog and Issues

[10 Periods]

Cyber Security Policy Catalog- Cyber Governance Issues, Net Neutrality, Internet Names and Numbers, Copyright and Trademarks, Email and Messaging, Cyber User Issues, Malvertising, Impersonation.

Cyber User and Conflict Issues - Appropriate Use, Cyber Crime, Geo location, Privacy, Cyber Conflict Issues, Intellectual property Theft, Cyber Espionage, Cyber Sabotage, Cyber Welfare.

Module-IV: Cyber Management and Infrastructures Issues

[09 Periods]

Cyber Management Issues - Fiduciary Responsibility – Risk Management – Professional Certification

– Supply Chain – Security

Cyber Infrastructure Issues - Principles–Research and Development–Cyber Infrastructure Issue–Banking and finance–Health care–Industrial Control systems.

Module-V: Case Study

[09 Periods]

Government's Approach to Cyber Security Policy-Cyber security strategy-Brief History-Public policy development in the U.S Federal Government.

Espionage -The rise of cybercrime- Espionage and Nation-state Actions-Policy response to growing Espionage Threats-Congressional Action.

Text Books

1. Jennifer L. Bayuk, J. Healey, P. Rohmeyer, Marcus Sachs , Jeffrey Schmidt, Joseph Weiss "Cyber Security Policy Guidebook" John Wiley & Sons 2012.
2. Rick Howard "Cyber Security Essentials" Auerbach Publications 2011.

References

1. Richard A. Clarke, Robert Knake “**Cyberwar: The Next Threat to National Security & Whatto Do About It**” Ecco 2010
2. Dan Shoemaker “**Cyber security The Essential Body Of Knowledge**”, 1st edition, CengageLearning 2011.

E-Resources

1. http://www.esoln.net/edownload/Download/Cyber_Security_Policy_Guidebook.pdf
2. <http://index-of.es/Hack/CyberSecurity.pdf>
3. <https://www.acm.org/education/TowardCurricularGuidelinesCybersec.pdf>
4. <https://www.cs.cmu.edu/~hovy/papers/14dgo-cybersecurity-taxonomy.pdf>
5. http://ndl.iitkgp.ac.in/document/yVCWqd6u7wgye1qwH9xY77N9KJP4BJuXxkVQSJo9fL0Of1gtbY8enNTX_Gat1aW0f-JrSQu1YTNmVwRFJ_mJ7Q
6. <http://ndl.iitkgp.ac.in/document/yVCWqd6u7wgye1qwH9xY737OFS2a5kP6Ph6KB9KG9RiRGN-S5LJoIuO6-Z-TBERz0mAxCMQX4GTFW2WfVuCVAg>

Course Outcomes:

CO	Statement	Blooms Taxonomy Level
CO1	Explore various security policies and evolution of security.	Understand
CO2	Investigate more on various catalog approaches and cyber security objectives.	Analyze
CO3	Analyze cyber user and conflict issues.	Analyze
CO4	Review cyber management and infrastructure issues.	Analyze
CO5	Examine various case studies on cyber security policies	Understand

[illegible]

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech. V Semester		
Code: A1210	Information Retrieval Systems [Professional Elective - III]	L	T	P
Credits: 3		3	-	-

Prerequisites: Databases

Course Objectives:

1. To apply IR principles to locate relevant information large collections of data
2. To design different document clustering algorithms
3. To implement retrieval systems for web search tasks.
4. To Design Information Retrieval System for web search tasks.

Module-I: Introduction to Information Retrieval Systems [9 Periods]

Introduction: Definition of Information Retrieval System, Objectives of Information Retrieval Systems, Functional Overview, Relationship to Database Management Systems, Digital Libraries and DataWarehouses

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

Module-II: Cataloging and Indexing [9 Periods]

Cataloging and Indexing: History and Objectives of Indexing, Indexing Process, Automatic Indexing, Information Extraction

Data Structure: Introduction to Data Structure, Stemming Algorithms, Inverted File Structure, N-Gram Data Structures, PAT Data Structure, Signature File Structure, Hypertext and XML Data Structures, Hidden Markov Models

Module-III: Automatic Indexing [9 Periods]

Automatic Indexing: Classes of Automatic Indexing, Statistical Indexing, Natural Language, Concept Indexing, Hypertext Linkages

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

Module-IV: User Search Techniques [10 Periods]

User Search Techniques: Search Statements and Binding, Similarity Measures and Ranking, Relevance Feedback, Selective Dissemination of Information Search, Weighted Searches of Boolean Systems, Searching the INTERNET and Hypertext

Information Visualization: Introduction to Information Visualization, Cognition and Perception, Information Visualization Technologies

Module-V: Text Search Algorithms [9 Periods]

Text Search Algorithms: Introduction to Text Search Techniques, Software Text Search Algorithms, Hardware Text Search Systems

Multimedia Information Retrieval: Spoken Language Audio Retrieval, Non-Speech Audio Retrieval, Graph Retrieval, Imagery Retrieval, Video Retrieval

Text Book:

1. Information Storage and Retrieval Systems–Theory and Implementation, 2nd Edition, Gerald J. Kowalski, Mark T. Maybury, Springer

References:

1. Frakes, W.B., Ricardo Baeza-Yates: Information Retrieval Data Structures and Algorithms, PrenticeHall, 1992.
2. Information Storage & Retrieval By Robert Korfhage – John Wiley & Sons.
3. Modern Information Retrieval By Yates and Neto Pearson Education.

Course Outcomes:

1. Ability to apply IR principles to locate relevant information large collections of data
2. Ability to design different document clustering algorithms
3. Implement retrieval systems for web search tasks.
4. Design an Information Retrieval System for web search tasks.

COs	Statement	Blooms Taxonomy Level
CO1	Ability to apply IR principles to locate relevant information large collections of data	Understand
CO2	Ability to design different document clustering algorithms	Analyze
CO3	Implement retrieval systems for web search tasks.	Analyze
CO4	Design an Information Retrieval System for web search tasks.	Analyze

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

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech. V Semester		
Code: A1211	Soft Computing [Professional Elective - III]	L	T	P
Credits: 3		3	-	-

Prerequisites:

- A strong mathematical background.
- Proficiency with algorithms.
- Programming skills in C, C++, or Java, MATLAB, etc.
- Critical thinking and problem-solving skills.

Course Objectives:

This course will cover fundamental concepts used in soft computing. The concepts of Fuzzy logic (FL) will be covered first, followed by Artificial Neural Networks (ANNs) and optimization techniques using Genetic Algorithm (GA). Applications of Soft Computing techniques to solve a number of real-life problems will be covered to have hands on practices.

Module-I: Introduction to Soft Computing

[8 Periods]

Concept of computing systems, "Soft" computing versus "Hard" computing, Characteristics of Soft computing, Some applications of soft computing techniques.

Module-II: Fuzzy logic

[9 Periods]

Introduction to Fuzzy logic, Fuzzy sets and membership functions, Operations on Fuzzy sets, Fuzzy relations, rules, propositions, implications and inferences, Defuzzification techniques, Fuzzy logic controller design. Some applications of Fuzzy logic.

Module-III: Genetic Algorithms

[10 Periods]

Concept of "Genetics" and "Evolution" and its application to probabilistic search techniques, Basic GA framework and different GA architectures, GA operators: Encoding, Crossover, Selection, Mutation, etc. Solving single-objective optimization problems using GAs.

Module-IV: Multi-objective Optimization Problem Solving

[9 Periods]

Concept of multi-objective optimization problems (MOOPs) and issues of solving them, Multi-Objective Evolutionary Algorithm (MOEA), Non-Pareto approaches to solve MOOPs, Pareto-based approaches to solve MOOPs, Some applications with MOEAs.

Module-V: Artificial Neural Networks

[9 Periods]

Biological neurons and its working, Simulation of biological neurons to problem solving, Different ANNs architectures, training techniques for ANNs, Applications of ANNs to solve some real-life problems.

Resources & References

The following text and reference books may be referred to for this course.

1. Fuzzy Logic: A Practical approach, F. Martin, McNeill, and Ellen Thro, AP Professional, 2000.
2. Fuzzy Logic with Engineering Applications (3rd Edn.), Timothy J. Ross, Wiley, 2010.
3. Foundations of Neural Networks, Fuzzy Systems, and Knowledge Engineering, Nikola K. Kasabov, MIT Press, 1998.
4. Fuzzy Logic for Embedded Systems Applications, Ahmed M. Ibrahim, Elsevier Press, 2004.
5. An Introduction to Genetic Algorithms, Melanie Mitchell, MIT Press, 2000.
6. Genetic Algorithms in Search, Optimization and Machine Learning, David E. Goldberg,

Pearson Education, 2002.

7. Practical Genetic Algorithms, Randy L. Haupt and sue Ellen Haupt, John Wiley & Sons, 2002.
8. Neural Networks, Fuzzy Logis and Genetic Algorithms: Synthesis, and Applications, S. Rajasekaran, and G. A. Vijayalakshmi Pai, Prentice Hall of India, 2007.
9. Soft Computing, D. K. Pratihara, Narosa, 2008.
10. Neuro-Fuzzy and soft Computing, J.-S. R. Jang, C.-T. Sun, and E. Mizutani, PHI Learning, 2009.
11. Neural Networks and Learning Machines, (3rd Edn.), Simon Haykin, PHI Learning, 2011.

Course Outcomes:

After completion of the course, students able to learn

1. Fuzzy logic and its applications.
2. Artificial neural networks and its applications.
3. Solving single-objective optimization problem's using GAs.
4. Solving multi-objective optimization problems using Evolutionary algorithms (MOEAs).
5. Applications of Soft computing to solve problems in varieties of application domains.

CO	Statement	Blooms Taxonomy Level
CO1	Fuzzy logic and its applications	Understand
CO2	Artificial neural networks and its applications.	Analyze
CO3	Solving single-objective optimization problem's using GAs.	Analyze
CO4	Solving multi-objective optimization problems using Evolutionary algorithms (MOEAs).	Analyze
CO5	Applications of Soft computing to solve problems in varieties of application domains.	Understand

[illegible]

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech. V Semester		
Code: A0535	Software Engineering & Modelling Lab	L	T	P
Credits: 1.5	Common for CSE, CSE (Cyber Security), CSE (AI and ML), CSE (DS), CSE (IOT), AIML and IT)	-		3

Course Objectives:

1. To understand the software engineering methodologies involved in the phases for project development.
2. To gain knowledge about open source tools used for implementing software engineering methods.
3. To exercise developing product startups implementing software engineering methods

Open-source Tools: StarUML /UMLGraph / Topcased.

Prepare the following documents and develop the software project startup, prototype model, using software engineering methodology for at least two real time scenarios or for the sample experiments.

- Problem Analysis and Project Planning -Thorough study of the problem –Identify Project scope, Objectives and Infrastructure.
- Software Requirement Analysis – Describe the individual Phases/modules of the project and Identify deliverables. Identify functional and non-functional requirements.
 - a. Data Modeling – Use work products – data dictionary.
 - b. Software Designing – Develop use case diagrams and activity diagrams, build and test class diagrams, sequence diagrams and add interface to class diagrams.
 - c. Prototype model – Develop the prototype of the product.

The SRS and prototype model should be submitted for end semester examination.

List of Sample Experiments:

Course management system (CMS)

A course management system (CMS) is a collection of software tools providing an online environment for course interactions. A CMS typically includes a variety of online tools and environments, such as:

- a. An area for faculty posting of class materials such as course syllabus and handouts
- b. An area for student posting of papers and other assignments
- c. A grade book where faculty can record grades and each student can view his or her grades
- d. An integrated email tool allowing participants to send announcement email messages to the entire class or to a subset of the entire class
- e. A chat tool allowing synchronous communication among class participants
- f. A threaded discussion board allowing asynchronous communication among participants

In addition, a CMS is typically integrated with other databases in the university so that students enrolled in a particular course are automatically registered in the CMS as participants in that course.

The Course Management System (CMS) is a web application for department personnel, Academic Senate, and Registrar staff to view, enter, and manage course information formerly submitted via paper. Departments can use CMS to create new course proposals, submit changes for existing courses, and track the progress of proposals as they move through the stages of online approval.

Easy Leave

This project is aimed at developing a web based Leave Management Tool, which is of importance to either an organization or a college.

The Easy Leave is an Intranet based application that can be accessed throughout the organization or a specified group/Dept. This system can be used to automate the workflow of leave applications and their approvals. The periodic crediting of leave is also automated. There are features like notifications, cancellation of leave, automatic approval of leave, report generators etc in this Tool.

Functional components of the project:

There are registered people in the system. Some are approvers. An approver can also be a requestor. In an organization, the hierarchy could be Engineers/Managers/Business Managers/Managing Director etc. In a college, it could be Lecturer/Professor/Head of the Department/Dean/Principal etc.

Following is a list of functionalities of the system: A person should be able to

- a. login to the system through the first page of the application
- b. change the password after logging into the system
- c. see his/her eligibility details (like how many days of leave he/she is eligible for etc)
- d. query the leave balance
- e. see his/her leave history since the time he/she joined the company/college
- f. apply for leave, specifying the from and to dates, reason for taking leave, address for communication while on leave and his/her superior's email id
- g. see his/her current leave applications and the leave applications that are submitted to him/her for approval or cancellation
- h. approve/reject the leave applications that are submitted to him/her
- i. withdraw his/her leave application (which has not been approved yet)
- j. Cancel his/her leave (which has been already approved). This will need to be approved by his/her Superior
- k. get help about the leave system on how to use the different features of the system
- l. As soon as a leave application /cancellation request /withdrawal /approval /rejection /password-change is made by the person, an automatic email should be sent to the person and his superior giving details about the action
- m. The number of days of leave (as per the assumed leave policy) should be automatically credited to everybody and a notification regarding the same be sent to them automatically
- n. An automatic leave-approval facility for leave applications which are older than 2 weeks should be there. Notification about the automatic leave approval should be sent to the person as well as his superior

E-Bidding

Auctions are among the latest economic institutions in place. They have been used since antiquity to sell a wide variety of goods, and their basic form has remained unchanged. In this dissertation, we explore the efficiency of common auctions when values are interdependent the value to a particular bidder may depend on information available only to others-and asymmetric. In this setting, it is well known that sealed-bid auctions do not achieve efficient allocations in general since they do not allow the information held by different bidders to be shared.

Typically, in an auction, say of the kind used to sell art, the auctioneer sets a relatively low initial price. This price is then increased until only one bidder is willing to buy the object, and the exact manner in which this is done varies. In my model a bidder who drops out at some price can “reenter” at a higher price. With the invention of Ecommerce technologies over the Internet the opportunity to bid from the comfort of one’s own home has seen a change like never seen before. Within the span of a few short years, what may have began as an experimental idea has grown to an immensely popular hobby, and in some cases, a means of livelihood, the Auction Patrol gathers tremendous response every day, all day. With the point and click of the mouse, one may bid on an item they may need or just want, and in moments they find that either they are the top bidder or someone else wants it more, and you’re outbid! The excitement of an auction all from the comfort of home is a completely different experience.

Society cannot seem to escape the criminal element in the physical world, and so it is the same with Auction Patrols. This is one area where in a question can be raised as to How safe Auction Patrols.

Proposed system

- To generate the quick reports
- To make accuracy and efficient calculations
- To provide proper information briefly
- To provide data security
- To provide huge maintenance of records Flexibility of transactions can be completed in time

Electronic Cash counter

This project is mainly developed for the Account Division of a Banking sector to provide better interface of the entire banking transactions. This system is aimed to give a better out look to the user interfaces and to implement all the banking transactions like:

- Supply of Account Information
- New Account Creations
- Deposits
- Withdraws
- Cheque book issues
- Stop payments
- Transfer of accounts
- Report Generations.

Proposed System:

The development of the new system contains the following activities, which try to automate the entire process keeping in view of the database integration approach. User friendliness is provided in the application with various controls. The system makes the overall project management much easier and flexible. Readily upload the latest updates, allows user to download the alerts by clicking the URL. There is no risk of data mismanagement at any level while the project development is under process. It provides high level of security with different level of authentication

Course Objectives: The student should take up the case studies of ATM system, Online Reservation System and Model it in different views i.e. Use case view, logical view, component view, Deployment view.

Week 1

Design a Use case Diagram for ATM system, Online Reservation System

Week 2

Design a Sequence Diagram for ATM system, Online Reservation System. Design a Collaboration Diagram for ATM system, Online Reservation System.

Week 3

Design a Activity Diagram for ATM system, Online Reservation System.

Design a State Chart Diagram for ATM system, Online Reservation System.

Week 4

Design a Class Diagram for ATM system, Online Reservation System.

Week 5

Design a Component Diagram for ATM system, Online Reservation System.

Week 6

Design a Deployment Diagram for ATM system, Online Reservation System.

Course Outcomes:

CO	Statement	Blooms Taxonomy Level
CO1	Analyze the requirements through Use-Case View	Understand
CO2	Identify all structural and behavioral concepts of the entire system	Analyze
CO3	Develop a model using UML concepts by different types of diagrams like Use case Diagram, ClassDiagram, Sequence Diagram etc	Analyze

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

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B. Tech. V Semester		
Code: A1214	Android Application Development Lab	L	T	P
Credits: 1		--	1	2

Prerequisites:

NIL Course

Objectives:

The main objective of this course makes the students to know the components and structure of mobile application development frameworks for Android OS-based mobiles, deploy various mobile application development frameworks, analyze important design concepts and issues of development of mobile applications, understand the capabilities and limitations of mobile devices.

List Of Experiments:

1. Develop an application that uses GUI components, Font and Colors.
2. Develop an application that uses Layout Managers and event listeners.
3. Develop a native calculator application.
4. Write an application that draws basic graphical primitives on the screen.
5. Develop an application that makes use of database.
6. Develop an application that makes use of RSS Feed.
7. Implement an application that implements Multi-threading.
8. Develop a native application that uses GPS location information.
9. Implement an application that writes data to the SD card.
10. Implement an application that creates an alert upon receiving a message.
11. Write a mobile application that creates alarm clock.
12. Develop an application using all components of android and database.

Text Books

1. James Keogh, **“J2ME: The Complete Reference”**, Tata McGrawHill.
2. Lauren Darcey and Shane Conder, **“Android Wireless Application Development”**, Pearson Education, 2nd ed. (2011).

References

1. Reto Meier, **“Professional Android 2 Application Development”**, Wiley India Pvt Ltd.
2. Mark L Murphy, **“Beginning Android”**, Wiley India Pvt Ltd.
3. Barry Burd, **“Android Application Development All in one”** Edition: I, Wiley India PvtLtd

Course Outcomes:

CO	Statement	Blooms Taxonomy Level
CO1	Design and Implement various mobile applications using emulators	Design
CO2	Develop native android applications using android SDK	Develop
CO3	Deploy applications to hand-held devices	Deploy

[illegible]

2020-21 Onwards MR20	Malla Reddy Engineering College (Autonomous)	B.Tech. V Semester		
Code: A6202	Computer Networks Lab	L	T	P
Credits: 1.5	(Common for CSE, CSE (Cyber Security), CSE (AI and ML), CSE (DS), CSE (IOT), AI and IT)	-		3

Prerequisites: NIL

Course Objectives:

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

Software Requirements: Turbo C / JDK

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

- th

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

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

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

- Implement data link layer farming methods.
- Analyze error detection and error correction codes.
- Implement and analyze routing and congestion issues in network design.
- Implement Encoding and Decoding techniques used in presentation layer.
- To be able to work with different network tools.

CO	Statement	Blooms Taxonomy Level
CO1	Implement the various Protocols	Understand
CO2	Analyze Various Congestion Control Mechanisms	Apply
CO3	Implement encryption mechanisms using Symmetric Key and Assymmetric Key algorithms	Understand
CO4	Implement Encoding and Decoding techniques used in presentation layer.	Apply
CO5	To be able to work with different network tools.	Apply

[illegible]

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech. VI Semester		
Code: A0H08	Engineering Economics and Accountancy Common for CSE, CSE (Cyber Security), CSE (AI and ML), CSE (DS), CSE (IOT), AIML and IT)	L	T	P
Credits: 3		3	-	-

Prerequisites:

Objectives:

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

Module-I: Business Environment and Managerial Economics [10

Periods] Business Environment - Characteristic features of Business, Features and evaluation of Sole

Proprietorship, Partnership, Joint Stock Company, Public Enterprises and their types, Latest trends in Business Environment (Entrepreneurship).

Managerial Economics - Definition, Nature and Scope of Managerial Economics– Demand Analysis: Demand Determinants, Law of Demand and its exceptions. Elasticity of Demand, Types, Significance of Elasticity of Demand, Demand Forecasting, Factors governing demand forecasting, methods of demand forecasting.

Module-II: Theory of Production and Cost Analysis [10

Periods] Theory of Production - Production Function – ISOquants and ISOcosts, MRTS, Least Cost Combination of Inputs, Cobb-Douglas Production function, Laws of Returns, Internal and External Economies of Scale.

Cost Analysis - Cost concepts, Opportunity cost, fixed vs. Variable costs, explicit costs Vs. Implicit costs, Out of pocket costs vs. Imputed costs. Break-even Analysis (BEA)- Determination of Break- Even Point (simple problems) - Managerial Significance and limitations of BEA.

Module-III: Market structures and Pricing Policies [09 Periods]

A: Introduction to Markets & Market structures - Types of competition, Features of Perfect competition, Monopoly and Monopolistic Competition. Price-Output Determination in case of Perfect Competition and Monopoly.

B: Pricing Policies & Methods - Cost plus Pricing, Marginal Cost Pricing, Sealed Bid Pricing, Going Rate Pricing, PLC based pricing methods.

Module-IV: Capital and Capital Budgeting [09 Periods]

Capital - Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements, Methods and sources of raising finance.

Capital Budgeting - Nature and scope of capital budgeting, features of capital budgeting proposals, Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR) and Net Present Value Method (simple problems)

Module-V: Financial Accounting and Ratios [10 Periods]

Financial Accounting - Introduction, Accounting principles, Accounting Cycle, Journal, Ledger, Trial

Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments).

Financial Analysis Through Ratios - Computation, Analysis and Interpretation of Liquidity Ratios (Current Ratio and quick ratio), Activity Ratios (Inventory turnover ratio and Debtor Turnover ratio), Capital structure Ratios (Debt- Equity ratio, Interest Coverage ratio), and Profitability ratios

(Gross Profit Ratio, Net Profit ratio, Operating Ratio, P/E Ratio and EPS).

Text Books

1. Aryasri, “**Managerial Economics and Financial Analysis**”, TMH, 2nd edition, 2005.
2. Varshney & Maheswari, “**Managerial Economics**”, 5th edition Sultan Chand, 2003

References

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

E-Resources

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

Course Outcomes:

CO	Statement	Blooms Taxonomy Level
1	Capable of analyzing fundamentals of economics concepts which helps in effective business administration.	Understand
2	Cost-out put relations understand.	Analyze
3	Crate awareness on market structures and pricing policies of various business	Understand
4	Identify the types of Business organization of the company and the implementation requirements of each one.	Understand
5	Financial position of the company can be analyzing with the help of financial statements.	Understand

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

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech. VI Semester		
Code: A1212	Machine Learning	L	T	P
Credits: 3		3	-	-

Pre-requisites: Linear Algebra and Probability Theory

Course Objectives:

The objectives of this course are:

1. Understand the need and elements of Machine Learning
2. Study various machine learning techniques
3. Design solutions for real world problems using machine learning techniques.

Module I: [10 Periods]

Introduction to Machine Learning: Introduction, Classic and Adaptive machines, learning types, deep learning, bio-inspired adaptive systems, Machine Learning and big data; Elements of Machine Learning: Data formats, Learnability, Statistical learning concepts, Class balancing, Elements of Information theory.

Module II: [09 Periods]

Feature Selection and Feature Engineering: Data sets, creating training and test sets, managing categorical data, missing features, data scaling and normalization, Withering, Feature selection and filtering, PCA, Visualization of high-dimensional datasets; Regression Algorithms: Linear models for regression, Regression types; Linear Classification Algorithms: Linear classification, logistic regression, grid search, classification metrics, ROC curve.

Module III: [10 Periods]

Naïve Bayes and Discriminant Analysis: Bayes theorem, Naïve Bayes classifiers, Discriminant analysis; Support Vector Machines: Linear SVM, Kernel-based classification; Decision Trees and Ensemble Learning: Binary Decision trees, Introduction to Ensemble Learning-Random Forests, AdaBoost, Gradient Tree Boosting, Voting classifier

Module IV: Rules and Analytical Learning [09 Periods]

Clustering Fundamentals: Basics, k-NN, Gaussian mixture, K-means, Evaluation methods, DBSCAN, Spectral Clustering, Hierarchical Clustering;

Introduction to Neural Networks: Introduction to deep learning, MLPs with Keras, deep learning model layers, introduction to Tensorflow.

Module V: Learning Techniques [10 Periods]

Machine Learning Architectures: Data collection, Normalization and regularization, Dimensionality reduction, Data augmentation, Modeling/Grid Search/Cross-validation, Visualization, GPU support, Introduction to distributed architectures, Scikit-learn tools for ML architectures, pipelines, Feature unions

Text Books:

1. Giuseppe Bonaccorso, "Machine Learning Algorithms", 2nd Edition, Packt, 2018,
2. Tom M. Mitchell, "**Machine Learning**", MGH, 1st Edition, 2013.
3. Stephen Marsland, "**Machine Learning: An Algorithmic Perspective**", Chapman and Hall / CRC, 2nd Edition, 2014.

References

1. Abhishek Vijavargia “Machine Learning using Python”, BPB Publications, 1st Edition, 2018
2. ReemaThareja “Python Programming”, Oxford Press, 2017
3. Yuxi Liu, “Python Machine Learning by Example”, 2nd Edition, PACT, 2017

E-Resources

1. <https://www.guru99.com/machine-learning-tutorial.htm>
2. https://www.tutorialspoint.com/machine_learning_with_python/index.htm
3. <https://www.geeksforgeeks.org/machine-learning/>
4. <http://nptel.ac.in/courses/106106139/>
5. <http://nptel.ac.in/courses/106105152/>

Course Outcomes:

CO	Statement	Blooms Taxonomy Level
1	Define the basic concepts related to Machine Learning	Analyze
2	Recognize the underlying mathematical relationships within and across Machine Learning algorithms and their paradigms	Understand
3	Determine the various applications of Machine Learning.	Apply
4	Design and develop solutions to real world problems using Machine Learning Algorithms	Apply
5	Evaluate and interpret the results of the various machine learning technique	Understand

[illegible]

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech. VI Semester		
Code: A0536	Compiler Design	L	T	P
Credits: 4	Common for CSE, CSE (Cyber Security), CSE (AIML), CSE (DS), CSE (IOT), AIML and IT)	4	-	-

Prerequisites: Formal Languages and Automata Theory.

Course Objectives:

- To study the various phases in the design of a compiler
- To understand the design of top-down and bottom-up parsers
- To understand syntax directed translation schemes
- To introduce LEX and YACC tools
- To learn to develop algorithms to generate code for a target machine

Module I:

[09 Periods]

Language Processors, the structure of a compiler, the science of building a compiler, programming language basics.

Lexical Analysis: The Role of the Lexical Analyzer, Input Buffering, Recognition of Tokens, The Lexical-Analyzer Generator Lex, Finite Automata, From Regular Expressions to Automata, Design of a Lexical-Analyzer Generator, Optimization of DFA-Based Pattern Matchers.

Module II: Syntax Analysis:

[10 Periods]

Syntax Analysis: Introduction, Context-Free Grammars, Writing a Grammar, Top-Down Parsing, Recursive and Non recursive top-down parsers, Bottom-Up Parsing,

Introduction to LR Parsing: Simple LR, More Powerful LR Parsers, Using Ambiguous Grammars, Parser Generators.

Module III:

[10 Periods]

Syntax-Directed Definitions, Evaluation Orders for SDD's, Applications of Syntax-Directed Translation, Syntax-Directed Translation Schemes, and Implementing L-Attributed SDD's.

Intermediate Code Generation: Variants of Syntax Trees, Three-Address Code, Types and Declarations, Type Checking, Control Flow, Back patching, Switch-Statements, Intermediate Code for Procedures.

Module IV:

[10 Periods]

Run-Time Environments: Storage organization, Stack Allocation of Space, Access to Nonlocal Data on the Stack, Heap Management, Introduction to Garbage Collection, Introduction to Trace-Based Collection.

Machine Independent Optimizations: The Principal Sources of Optimization, Introduction to Data- Flow Analysis, Foundations of Data-Flow Analysis, Constant Propagation, Partial-Redundancy Elimination, Loops in Flow Graphs.

Module V:

[09 Periods]

Code Generation: Issues in the Design of a Code Generator, The Target Language, Addresses in the Target Code, Basic Blocks and Flow Graphs, Optimization of Basic Blocks, A Simple Code Generator.

Machine Dependent Optimizations: Peephole Optimization, Register Allocation and Assignment, Dynamic Programming Code-Generation.

Text Books:

- 1) Compilers: Principles, Techniques and Tools, Second Edition, Alfred V. Aho, Monica S. Lam, Ravi Sethi, Jeffrey D. Ullman, Pearson.
- 2) Compiler Construction-Principles and Practice, Kenneth C. Loudon, Cengage Learning.

References:

- 1) Modern compiler implementation in C, Andrew W. Appel, Revised edition, Cambridge University Press.
- 2) The Theory and Practice of Compiler writing, J. P. Tremblay and P. G. Sorenson, TMH
- 3) Writing compilers and interpreters, R. Mak, 3rd edition, Wiley student edition.

E-Resources:

- 1) <https://nptel.ac.in/courses/106/104/106104123/>

Course Outcomes:

CO	Statement	Blooms Taxonomy Level
1	Distinguish the various phases of compilation.	Analyze
2	Explain the different types of parsing techniques.	Understand
3	List the intermediate forms of source programs and organize symbol table.	Analyze
4	Make use of code optimization techniques to reduce the code.	Apply
5	Build the Object code generation algorithms.	Apply

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

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B. Tech. VI Semester		
Code: A1213	Data Analysis and Visualization [Professional Elective –IV]	L	T	P
Credits: 3		3	-	-

Pre-requisites

Course

Objectives:

To Introduce the Numpy library in Python to support storage and operations on large multi-dimensional arrays and matrices

1. To Introduce large collection of mathematical functions to operate on multidimensional sequential data structures
2. To Demonstrate the functionality of the Pandas library in Python for open-source data analysis and Manipulation
3. To Demonstrate Data Aggregation, Grouping and Time Series analysis with Pandas
4. To Introduce the Matplotlib library in Python for resting static, animated and interactive visualizations

Module-I:

[10 Periods]

Introduction to NumPy: Data types in Python-Fixed type arrays, creating arrays, array indexing, array slicing, reshaping arrays, array concatenation and splitting, Universal Functions, Aggregations, Broadcasting rules, Comparisons, Boolean Arrays, Masks, Fancy Indexing, Fast Sorting using np.sort and np.argsort, partial sorting-partitioning with K-nearest neighbors, Creating Structured Arrays, Compound types and Record Arrays.

Module-II:

[9 Periods]

Introduction to Pandas: Series Object, Data Frame Object, Data Indexing and Selecting for Series and Data Frames, Universal Functions for Index Preservation, Index Alignment and Operations between Series and Data Frames, handling missing data, Operating on Null values, Hierarchical Indexing.

Module-III:

[9 Periods]

Combining Datasets: Concat, Append, Merge and Joins, Aggregation and Grouping, Pivot Tables, Vectorized String Operations, Working with Time Series, High-Performance functions-query () and eval()

Module-IV:

[8 Periods]

Inferential Statistics-Normal distribution, Poisson distribution, Bernoulli distribution, z-score, p-score, One-tailed and two-tailed, Type 1 and Type-2 errors, Confidence interval, Correlation, Z-test vs T-test, F-distribution, Chi-square distribution, the chi-square test of independence, ANOVA, data mining, Heart attack dataset analysis

Module-V:

[9 Periods]

Visualization with Matplotlib: Simple Line plots, Scatter plots, Visualizing errors, Density and Contour plots, Histograms, Binnings, Multiple subplots, Three-dimensional plotting with Matplotlib, Geographic data with Basemap, Visualization with Seaborn.

Text Books:

1. Jake VanderPlas, “Python Data Science Handbook”, O’Reilly Media, 2016.
2. Samir Madhavan, “Mastering Python for Data Science”, Packt Publishing, 2015.

E-Resources:

1. <https://www.coursera.org/learn/python-data-analysis?specialization=data-science-python>
2. <https://www.coursera.org/learn/python-plotting>

Course Outcomes:

CO	Statement	Blooms Taxonomy Level
1	Efficiently store and manipulate dense data in arrays with Numpy	Analyze
2	Apply high level mathematical functions to aggregate, broadcast, index and sort multidimensional arrays.	Understand
3	Create Series and Data Frame objects to operate on datasets.	Analyze
4	Perform Data cleaning, transformation, merging, aggregation on datasets.	Apply
5	Apply 2-D and 3-D plotting techniques on datasets	Apply

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

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B. Tech. VI Semester		
Code: A1216	Image Processing and Pattern Recognition [Professional Elective - IV]	L	T	P
Credits: 3		3	-	-

Pre-requisites: AI

Course Description

This course emphasizes general principles of image processing, rather than specific applications. Lectures will cover topics such as point operations, color processing, image thresholding/segmentation, morphological image processing, image filtering and DE convolution, noise reduction and restoration, scale-space techniques, feature extraction and recognition, image registration, and image matching. This course includes foundations of pattern recognition algorithms and machines, including statistical and structural methods. Data structures for pattern representation, feature discovery and selection, classification vs. description, parametric and non-parametric classification.

Course Objectives

The objective of this course is to

- imparts knowledge in the area of image and image processing
- understand fundamentals of digital image processing
- provide knowledge of the applications of the theories taught in Digital Image Processing
- learn the fundamentals of Pattern recognition and to choose an appropriate feature
- classification algorithm for a pattern recognition problems and apply them properly using modern computing tools such as MATLAB, C/C++ etc.

Module-I: Introduction to Image Processing

[9

Periods] Image formation, image geometry perspective and other transformation, stereo imaging elements of visual perception. Digital Image-sampling and quantization serial & parallel Image processing.

Module-II: Image Restoration

[9 Periods]

Image Restoration-Constrained and unconstrained restoration Wiener filter, motion blur remover, geometric and radiometric correction Image data compression-Huffman and other codes transform compression, predictive compression two tone Image compression, block coding, run length coding, and contour coding.

Module-III: Segmentation Techniques

[10

Periods] Segmentation Techniques-thresholding approaches, region growing, relaxation, line and edge detection approaches, edge linking, supervised and unsupervised classification techniques, remotely sensed image analysis and applications, Shape Analysis – Gestalt principles, shape number, moment Fourier and other shape descriptors, Skeleton detection, Hough transform, topological and texture analysis, shape matching.

Module-IV: Pattern Recognition

[9 Periods]

Basics of pattern recognition, Design principles of pattern recognition system, Learning and adaptation, Pattern recognition approaches, Mathematical foundations – Linear algebra, Probability Theory, Expectation, mean and covariance, Normal distribution, multivariate normal densities, Chi squared test. **Module-V: Statistical Pattern Recognition**

[9

Periods]

Bayesian Decision Theory, Classifiers, Normal density and discriminant functions, Parameter estimation methods: Maximum-Likelihood estimation, Bayesian Parameter estimation, Dimension reduction methods – Principal Component Analysis (PCA), Fisher Linear discriminant analysis, Expectation- maximization (EM), Hidden Markov Models (HMM), Gaussian mixture models.

1. Digital Image Processing – Gonzalez and Wood, Addison Wesley, 1993.
2. Fundamental of Image Processing – Anil K.Jain, Prentice Hall of India.
3. Pattern Classification – R.O. Duda, P.E. Hart and D.G. Stork, Second Edition John Wiley, 2006

1. Digital Picture Processing – Rosenfeld and Kak, vol.I & vol.II, Academic,1982
2. Computer Vision – Ballard and Brown, Prentice Hall, 1982
3. An Introduction to Digital Image Processing – Wayne Niblack, Prentice Hall, 1986
4. Pattern Recognition and Machine Learning – C. M. Bishop, Springer, 2009.
5. Pattern Recognition – S. Theodoridis and K. Koutroumbas, 4th Edition, Academic Press,2009

1. <http://www.nptel.iitm.ac.in/courses/IIT-Kanpure.Communication>
2. [DIP Image Databases](#)
3. <http://www.imagescience.org/>

CO	Statement	Blooms Taxonomy Level
CO1	Exploration of the limitations of the computational methods on digital images	Understand
CO2	Expected to implement the spatial and frequency domain image transforms on enhancement	Analyze
CO3	Explain the different image restoration of images	Understand
CO4	Elaborate understanding on image enhancement techniques	Apply
CO5	Analyze and define the need for compression and evaluate the basic compression algorithms	Analyze

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B. Tech. VI Semester		
Code: A1217	UI/UX Designing	L	T	P
Credits: 3	[Professional Elective - IV]	3	-	-

Pre-requisites: Basic knowledge of software and knowledge of programming languages

Course Objectives:

This UI UX course focuses on the core skills involved in UI/UX designing, including the understanding of different stages of design thinking, working with tools such as Adobe XD / Sketch, identification of appropriate research methods, UI methodologies, and more

Module-I: User-Centered Design Process and User Research [10

Periods] Scripting Languages: HTML, CSS, Fundamentals of graphics design, principles of visual design

User-Centered Design Process: Overview of UI & UX Design, Overview of the UX Design Process, Difference between User Interface (UI) vs User Experience (UX)

User Research: Introduction to User Research, Importance of User Research in UX Design, User research method: Surveys, Contextual Inquiry, Identifying Appropriate Research Methods, Defining user research goals, objectives and questions, Recruiting users

Module-II: Designing Interactions [9 Periods]

An affinity analysis, modeling, decision tree diagrams and activity diagrams, Defining problem and vision statement, Persona creation – Primary and Secondary persona, Requirement definition, Creative ideation–brainstorming and ideation techniques, Scenarios and functionality extraction, Information architecture, Task flows, Wireframe design

Module-III: Fundamentals of UI, Heuristics and Interaction Design [9 Periods]

Design Principles for UX and UI Design, UI Elements-Patterns, Material Design (Google) and Human Interface Design (Apple) guidelines, Interaction Principles & Interaction Behavior, Master the Brand Platforms & Style Guides, Understand problems and design solutions for e-commerce, social media, message, data, and dashboard design

Elementary Sketching & Wire framing

Principles of Sketching, Core Responsive Design, Wire framing vs Wire flows, Click through Wire framing Prototyping, Wire flow Creation, Work with different tools – Sketch, Figma, Adobe XD

Module-IV: Low-High Fidelity Design [9 Periods]

Inclusive Design and Designing for Accessibility, Building High-Fidelity Mockups, Designing Efficiently with Tools, Interaction Patterns, Designing animations and interactions, Understand Style guides, elements, prototyping, Building a Design System – Style guides, color palette, fonts, grid, iconography, UI elements,

Photography, Imagery, and Illustration

Use of grids in UI design, Design animations and interaction patterns for key UI elements,

Module-V: Usability Evaluation and Product Design [9

Periods] Usability Evaluation

Type of usability evaluation – Qualitative & Quantitative evaluation, Guerilla testing , A/B Testing, Un moderated remote usability testing, Card sorting, Session recording, think aloud. Think aloud– Introduction and advantages, Designing evaluation protocol, Conducting usability evaluation study, Conduct Usability Test explicit, Synthesize your Test Findings, UX practices in corporate World **Interaction with Development Team**

COs	Programme Outcomes(POs)												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1			1									1	1	
CO2	1	2	2		2	3				1	2		1	1	2
CO3	2	3	2	3			1		2			1	1	1	
CO4	3	2	2								3			2	2
CO5	4	5	1		2								1		1

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B. Tech. VI Semester		
Code: A1218	Object Oriented Analysis and Design [Professional Elective - IV]	L	T	P
Credits: 3		3	-	-

Prerequisite: NIL

Course Objectives:

The student will be able to understand the Unified Modeling Language Principles and learns fundamental process pattern for object-oriented analysis and design.

Module I: Introduction to UML

[09 Periods]

Importance of modeling, principles of modeling, object-oriented modeling, conceptual model of the UML, Architecture, and Software Development Life Cycle.

Module II: Behavioral and structural Modeling

[09 Periods]

Basic Behavioral Modeling-I: Use cases, Use case Diagrams, Activity Diagrams.

Basic Structural Modeling: Classes, Relationships, common Mechanisms, and diagrams.

Module III: Behavioral Model II

[12 Periods]

Advanced Structural Modeling-Advanced classes, advanced relationships, Interfaces, Types and Roles, Packages.

Class & Object Diagrams-Terms, concepts, modeling techniques for Class & Object Diagrams.

Basic Behavioral Modeling-II: Interactions, Interaction diagrams

Module IV: Advanced Behavioral Modeling

[09 Periods]

Advanced Behavioral Modeling: Events and signals, state machines, processes and Threads, time and space, state chart diagrams.

Module V: Architecture Modeling

[09 Periods]

Component, Deployment, Component diagrams and Deployment diagrams.

Case Study: The Unified Library application.

Text Books

1. Grady Booch, James Rumbaugh, Ivar Jacobson: The Unified Modeling Language User Guide, Pearson Education.
2. Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado: UML 2 Toolkit, WILEY-Dreamtech India Pvt.Ltd.

Reference Books

- 1.Meilir Page-Jones: Fundamentals of Object-Oriented Design in UML, Pearson Education.
- 2.Atul Kahate: Object Oriented Analysis & Design, The McGraw-Hill.
- 3.Mark Priestley: Practical Object-Oriented Design with UML, Tata Mc Graw Hill.
4. Applying UML and Patterns: An introduction to Object-Oriented Analysis and Design and Unified Process, Craig Larman, Pearson Education.

Course Outcome:

CO	Statement	Blooms Taxonomy Level
CO1	Analyze the requirements through Use-Case View	Understand
CO2	Identify all structural and behavioral concepts of the entire system	Understand
CO3	Develop a model using UML concepts by different types of diagrams like Use case diagram, Class Diagram, Sequence Diagram etc	Apply
CO4	Design event process and state chart diagrams for the models	Understand
CO5	Build an application with object oriented analysis and design concepts	Analyze

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

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B. Tech. VI Semester		
Code: A1219	Advanced Computer Architecture [Professional Elective - IV]	L	T	P
Credits: 3		3	-	-

Pre-requisites: Computer Organization

Course Objectives:

This course helps to explore on the advanced concepts and state-of-the-art developments in computer architecture: memory systems, pipelining, simultaneous multithreading, run- time optimization, array processing, parallel processing, multiprocessing, abstract analytic models, power-aware computing, embedded computing, relationship between computer design and application requirements, cost/performance tradeoffs, and many example computers of interesting and un usual features.

Module-I: [09 Periods]

Fundamentals of Computer Design- Technology trends- cost price and their trends- measuring and reporting performance - quantitative principles of computer design

Module-II: [09 Periods]

Instruction Set Principles and Examples- Classifying instruction set architecture - memory addressing- type and size of operands- operations in the instruction set- instructions for control flow- encoding an instruction set.

Module-III: [10 Periods]

Instruction Level Parallelism (ILP) and its Dynamic Exploitation–Concepts and challenges- overcoming data hazards- reducing branch costs with dynamic hardware prediction–high performance instruction delivery- hardware based speculation ILP software approach- compiler techniques- static branch protection - VLIW approach -

H.W support for more ILP at compile time.

Module-IV: [10 Periods]

Memory Hierarchy Design- Cache performance- reducing cache misses’ penalty and miss rate – virtual memory. Multiprocessors and thread level parallelism- symmetric shared memory architectures- distributed shared memory- Synchronization- multi threading

Module-V: [10 Periods]

Storage Systems - Types – Buses - RAID- errors and failures - designing an I/O system in five easy pieces. Inter connection networks and clusters - interconnection network media – practical issues in interconnecting networks – clusters- designing a cluster

Text Books:

1. Computer Architecture A quantitative approach 3rd edition John L. Hennessy & David A. Patterson Morgan Kaufmann (An Imprint of Elsevier)

Reference Books:

1. “Computer Architecture and parallel Processing” Kai Hwang and A.Briggs International Edition McGraw-Hill.
2. Advanced Computer Architectures, Dezso Sima, Terence Fountain, Peter Kacsuk, Pearson.

Course Outcomes:

CO	Statement	Blooms Taxonomy Level
CO1	Understand and apply concept and principle of cache memory and virtual memory to high -performance computer architecture	Understand
CO2	Understand pipelining and its speed advantage & design pipelined logic	Apply
CO3	Proficient in fault-tolerant design techniques and examine various methods of error detection and correction such as TMR and Hamming Codes	Understand
CO4	Identify tradeoffs between complex instruction set computers (CISC) and reduced instruction set computers (RISC).	Analyze
CO5	Analyze and perform tradeoffs between the cost, performance, and reliability of alternative computer architectures	Analyze

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

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B. Tech. VI Semester		
Code: A1220	DevOps [Professional Elective -V]	L	T	P
Credits: 3		3	-	-

Course Objectives:

The main objectives of this course are to

1. Describe the agile relationship between development and IT operations.
2. Understand the skill sets and high-functioning teams involved in DevOps and related methods to reach a continuous delivery capability
3. Implement automated system update and DevOps lifecycle

Module-I: Introduction

[8 Periods]

Introduction, Agile development model, DevOps, and ITIL. DevOps process and Continuous Delivery, Release management, Scrum, Kanban, delivery pipeline, bottlenecks, examples

Module-II: Software Development and Architecture

[10 Periods]

Software Development Models and DevOps: DevOps Lifecycle for Business Agility, DevOps, and Continuous Testing.

DevOps influence on Architecture: Introducing software architecture, the monolithic scenario, Architecture rules of thumb, the separation of concerns, Handling database migrations, Microservices, and the data tier, DevOps, architecture, and resilience.

Module-III: Project Management

[9 Periods]

Introduction, the need for source code control, The history of source code management, Roles and code, source code management system and migrations, Shared authentication, HostedGit servers, Different Git server implementations, Docker intermission, Gerrit, The pull request model, GitLab.

Module-IV: Testing Tools and Automation

[10 Periods]

Testing Tools and Automation: Various types of testing, Automation of testing Pros and cons, Selenium-Introduction, Selenium features, JavaScript testing, Testing backend integration points, Test-driven development, REPL-driven development

Deployment of the System: Deployment systems, Virtualization stacks, code execution at the client, Puppet master and agents, Ansible, Deployment tools: Chef, SaltStack and Docker

Module-V: Code Monitoring

[9 Periods]

Code monitoring tools: Nagios, Munin, Ganglia, Log handling. Introduction to issue trackers, Need of Issue Tracker: Workflows and issues, Problems with issue tracker proliferation, Trackers tools: Bugzilla, GitLab tracker, and Jira

Text Books

1. 1.Joakim Verona. Practical Devops, Second Edition. Ingram short title; 2nd edition (2018). ISBN-10: 1788392574
2. Deepak Gaikwad, Viral Thakkar. DevOps Tools from Practitioner's Viewpoint. Wiley publications. ISBN: 9788126579952

Reference Books

1. Len Bass, Ingo Weber, Liming Zhu. DevOps: A Software Architect's Perspective. Addison Wesley; ISBN10: 9780134049847

Course Outcomes:

CO	Statement	Blooms Taxonomy Level
CO1	Identify components of DevOps environment	Understand
CO2	Describe Software development models and architectures of DevOps	Apply
CO3	Apply different project management, integration, testing and code deployment tool	Understand
CO4	Investigate different DevOps Software development models	Analyze
CO5	Collaborate and adopt DevOps in real-time projects	Analyze

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

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B. Tech. VI Semester		
Code: A0558	Software Quality Assurance and Testing [Professional Elective-V]	L	T	P
Credits: 3		3	-	-

Prerequisites:

Course Objectives:

The main objectives of this course are to

- To understand software testing and quality assurance as a fundamental component of software life cycle
- To define the scope of SW T & QA projects
- To efficiently perform T & QA activities using modern software tools
- To estimate cost of a T & QA project and manage budgets
- To prepare test plans and schedules for a T&QA project
- To develop T & QA project staffing requirements
- To effectively manage a T & QA project

Module-I

[10 Periods]

Software Quality Assurance and Standards:

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

Module-II-Software Testing Strategy and Environment

[09 Periods]

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

Module-III: Software Testing Tools

[10 Periods]

Selecting and Installing Software Testing tools–(Chapter 4) of T1. Automation and Testing Tools–(Chapter 15) of T2 Load Runner, Win runner and Rational Testing Tools, Silk test, Java Testing Tools, JMetra, JUNIT and Cactus. (Refer Internet and R9, R10)

Module-IV: Testing Process

[10 Periods]

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

Module-V: Seven Step Testing Process – II

[10 Periods]

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

Text Books:

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

Reference Books:

1. Foundations of Software Testing, Dorothy Graham, et al., Cengage learning, 2007, rp 2010.
2. Software Testing – Effective Methods, Tools and Techniques, Renu Rajani, Pradeep Oak, Tata McGraw-Hill, rp2011.
3. Software Automation Testing Tools for Beginners, Rahul Shende, Shroff Publishers and Distributors, 2012.
4. Software Testing Tools, K.V.K.K. Prasad, Dream Tech Press, 2008.
5. Software Testing Concepts and Tools, Nageswara Rao Pusuluri, Dream Tech press, 200

E-Resources:

1. https://www.tutorialspoint.com/software_testing_dictionary/test_tools.htm

Course Outcomes:

CO	Statement	Blooms Taxonomy Level
CO1	Understand Software Quality Assurance Framework and Standards	Understand
CO2	Outline various Metrics, Methodologies for Measuring SQA.	Understand
CO3	Classify the Software Testing Strategy and Associate it with the Test Environment.	Analyze
CO4	Select a Specific Testing Technique and Tool for Software Development.	Analyze
CO5	Apply the Test Process on various Software Domains.	Apply

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

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B. Tech. VI Semester		
Code:A1221	Mobile Communication [Professional Elective -V]	L	T	P
Credits: 3		3	-	-

Prerequisites: NIL.

Course objectives:

The student should be made to:

1. Understand the basic concepts of mobile computing
2. Understand Wireless LAN, Bluetooth and WiFi Technologies
3. Be familiar with the network protocol stack
4. Learn the basics of mobile telecommunication system
5. Be exposed to Ad-Hoc networks

Module I: Introduction

[09 Periods]

Introduction to Mobile Computing, Applications of Mobile Computing- Generations of Mobile Communication Technologies

MAC Protocols: SDMA, TDMA, FDMA, CDMA

Module-II: Mobile Telecommunication System

[09 Periods]

GSM, Architecture, Protocols, Connection Establishment, Frequency Allocation, Routing, Mobility Management, Security, GPRS, UMTS Architecture

Module-II: III: Wireless Networks

[09 Periods]

Wireless LANs and PANs, IEEE 802.11 Standard, Architecture, Services: Bluetooth, Wi-Fi, WiMAX

Module-IV: Mobile Network Layer

[09 Periods]

Mobile IP, DHCP, AdHoc, Proactive and Reactive Routing Protocols, Multicast Routing, Vehicular Ad Hoc networks (VANET), MANET Vs VANET, Security

Module-V: Mobile Transport and Application Layer

[10 Periods]

Mobile TCP, WAP Architecture, WDP, WTLS, WTP, WSP, WAE, WTA Architecture, WML

Text Books:

1. Jochen Schiller, "Mobile Communications", PHI, Second Edition, 2003.
2. Prasant Kumar Pattanaik, Rajib Mall, "Fundamentals of Mobile Computing", PHI Learning Pvt.Ltd, New Delhi – 2012.

References:

1. Dharma Prakash Agarwal, Qing and An Zeng, "Introduction to Wireless and Mobile systems", Thomson Asia Pvt Ltd, 2005.
2. Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas Stober, —Principles of Mobile Computing, Springer, 2003.
3. William.C.Y.Lee,—Mobile Cellular Telecommunications-Analog and Digital Systems, Second Edition, Tata Mc Graw Hill Edition, 2006.
4. C.K.Toth, —AdHoc Mobile Wireless Networks, First Edition, Pearson Education, 2002.
5. Android Developers: <http://developer.android.com/index.html>
6. Apple Developer: <https://developer.apple.com/>

7. Windows Phone Dev Center: <http://developer.windowsphone.com>
8. BlackBerry Developer: <http://developer.blackberry.com>
9. www.padeepz.net

Course Outcomes:

CO	Statement	Blooms Taxonomy Level
CO1	Explain the basics of mobile telecommunication system	Understand
CO2	Illustrate the generations of telecommunication systems in wireless network	Understand
CO3	Understand the architecture of Wireless LAN technologies	Analyze
CO4	Determine the functionality of network layer and Identify a routing protocol for a given Ad hoc networks	Analyze
CO5	Explain the functionality of Transport and Application layer	Apply

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

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B. Tech. VI Semester		
Code: A1222	Social Media Analytics [Professional Elective -V]	L	T	P
Credits: 3		3	-	-

Pre-Requisites: Cybercrime and Information Warfare, Computer Networks.

Course Objectives:

Module-I: [9 Periods]

Introduction to Social Media Analytics (SMA): Social media landscape, Need for SMA; SMA in Small organizations; SMA in large organizations; Application of SMA in different areas

Network Fundamentals and Models: The social networks perspective - nodes, ties and influencers, Social network and web data and methods. Graphs and Matrices- Basic measures for individuals and networks. Information visualization

Module-II: [9 Periods]

Making Connections: Link analysis. Random graphs and network evolution. Social contexts: Affiliation and identity.

Web Analytics Tools and Techniques: Click stream analysis, A/B testing, online surveys, Use of Google Analytics; Web crawling and indexing; Natural Language Processing Techniques for Micro-text Analysis.

Module- III: [10 Periods]

Facebook Analytics: Introduction, parameters, demographics. Analyzing page audience. Reach and Engagement analysis. Post- performance on FB, Use of Facebook Business Manager; Social campaigns. Measuring and Analyzing social campaigns, defining goals and evaluating outcomes, Network Analysis. (LinkedIn, Instagram, YouTube Twitter etc.

Module- IV: Computer Forensics [9 Periods]

Processing and Visualizing Data, Influence Maximization, Link Prediction, Collective Classification. Applications in Advertising and Game Analytics (Use of tools like Unity3D / PyCharm), Introduction to Python Programming, Collecting and analyzing social media data; visualization and exploration.

Module- V: Mobile Forensics and Legal Aspects of Digital Forensics [9 Periods]

Mobile Forensics: mobile forensics techniques, mobile forensics tools.

Legal Aspects of Digital Forensics: IT Act 2000, amendment of IT Act 2008. Recent trends in mobile forensic technique and methods to search and seizure electronic evidence.

Text Books and Reference Books:

1. Mathew Ganis, Avinash, Koishkar, Social Media Analytics, IBM Press, 2015 / 1st
2. Jim Sterne, Social Media Metrics, Wiley, Latest
3. Oliver Blanchard, Social Media ROI, Que, Publishing, Latest
4. Marshall Sponder, Gorah F. Khan, Digital Analytics for Marketing, Routledge, 2017 / 1st
5. Marshall Sponder, Social Media Analytics, McGraw Hill, Latest

6. Tracy L. Tuten, Michael R. Solomon, Social Media Marketing, Sage, 2018 / 3rd
7. Gohar F. Khan, Creating Value With Social Media Analytics Create Space Independent Publishing 2018 / 1st
8. Alex Gonsalves, Social Media Analytics Strategy, AP Press, 2017 / 1st

E-Sources:

1. <https://searchbusinessanalytics.techtarget.com/definition/social-media-analytics>
2. <https://analytics.facebook.com>
3. <https://gameanalytics.com/blog/best-tools-for-mobile-game-developers.html>
4. https://www.jetbrains.com/pycharm/features/scientific_tools.html

Course Outcomes:

CO	Statement	Blooms Taxonomy Level
CO1	Evaluate effectiveness of different social media campaigns using various analytical tools.	Understand
CO2	Apply appropriate analytic tools to a range of social media data sources.	Understand
CO3	Examine how different industries across the globe are using social media analytics.	Analyze
CO4	Analyze unstructured data primarily textual comments - for sentiments expressed in them.	Analyze
CO5	Evaluate the effectiveness of a campaign using social media analytics and Google Analytics.	Apply

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

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B. Tech. VI Semester		
Code: A0550	Big Data Analytics	L	T	P
Credits: 3	[Professional Elective -V]	3	-	-

Prerequisites: Databases, programming Fundamentals.

Course Objectives:

Understand the Big Data Platform and its Use cases

- Provide an overview of Apache Hadoop
- Provide HDFS Concepts and Interfacing with HDFS
- Understand Map Reduce Jobs
- Provide hands on Hadoop Eco System
- Apply analytics on Structured, Unstructured Data.
- Exposure to Data Analytics with R.

Module-I: Introduction To Big Data and Hadoop

[09 Periods]

Types of Digital Data, Introduction to Big Data, Big Data Analytics, History of Hadoop, Apache Hadoop, Analyzing Data with Unix tools, Analyzing Data with Hadoop, Hadoop Streaming, Hadoop Echo System, IBM Big Data Strategy, Introduction to Infosphere Big Insights and Big Sheets

Module-II: HDFS (Hadoop Distributed File System)

[09 Periods]

The Design of HDFS, HDFS Concepts, Command Line Interface, Hadoop file system interfaces, Data flow, Data Ingest with Flume and Scoop and Hadoop archives, Hadoop I/O: Compression, Serialization, Avro and File-Based Data structures.

Module-III: Map Reduce

[09 Periods]

Anatomy of a Map Reduce Job Run, Failures, Job Scheduling, Shuffle and Sort, Task Execution, Map Reduce Types and Formats, Map Reduce Features.

Module-IV: Hadoop Eco System

[09 Periods]

Pig: Introduction to PIG, Execution Modes of Pig, Comparison of Pig with Databases, Grunt, Pig Latin, User Defined Functions, Data Processing operators.

Hive: Hive Shell, Hive Services, Hive Meta store, Comparison with Traditional Databases, HiveQL, Tables, Querying Data and User Defined Functions.

HBase: HBasics, Concepts, Clients, Example, Hbase Versus RDBMS.

Big SQL: Introduction.

Module-V: Data Analytics with R

[12 Periods]

Machine Learning: Introduction, Supervised Learning, Unsupervised Learning, Collaborative Filtering.

Big Data Analytics with BigR.

Text Books

1. Tom White “Hadoop: The Definitive Guide” Third Edit on, O’reily Media, 2012.
2. Seema Acharya, Subhasini Chellappan, "Big Data Analytics" Wiley 2015.

REFERENCES

1. Michael Berthold, David J. Hand, "Intelligent Data Analysis", Springer, 2007.
2. Jay Liebowitz, “Big Data and Business Analytics” Auerbach Publications, CRC press (2013)
3. Tom Plunkett, Mark Hornick, “Using R to Unlock the Value of Big Data: Big Data Analytics with Oracle R Enterprise and Oracle R Connector for Hadoop”, McGraw-Hill/Osborne Media (2013), Oracle press.

- Anand Rajaraman and Jeffrey David Ullman, "Mining of Massive Datasets", Cambridge University Press, 2012.
- Bill Franks, "Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics", John Wiley & sons, 2012.
- Glen J. Myat, "Making Sense of Data", John Wiley & Sons, 2007
- Pete Warden, "Big Data Glossary", O'Reilly, 2011.
- Michael Mineli, Michele Chambers, Ambiga Dhiraj, "Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses", Wiley Publications, 2013.
- Arvind Sathi, "BigDataAnalytics: Disruptive Technologies for Changing the Game", MC Press, 2012

E-Resources

- http://newton.uam.mx/xgeorge/uea/Lab_Prog_O_O/materiales_auxiliares/Big_Java_4th_Ed.pdf
- <http://www.isical.ac.in/~acmsc/WBDA2015/slides/hg/Oreilly.Hadoop.The.Definitive.Guide.3rd.Edition.Jan.2012.pdf>
- <https://static.googleusercontent.com/media/research.google.com/en//archive/mapreduce-osdi04.pdf>
- <http://www.comp.nus.edu.sg/~ooibc/mapreduce-survey.pdf>
- <http://freevideolectures.com/Course/3613/Big-Data-and-Hadoop/18>
- <http://freevideolectures.com/Course/3613/Big-Data-and-Hadoop/40>

Course Outcomes:

CO	Statement	Blooms Taxonomy Level
CO1	Apply knowledge and demonstrate to manage project in multi - disciplinary areas	Understand
CO2	Identify problems, formulate literature survey and analyze engineering problem	Apply
CO3	Design and conduct experiments to interpret data pertaining to engineering problems	Understand
CO4	Design system components that acquire the needs of public health and environmental considerations	Analyze
CO5	Apply knowledge for carrying out the project in team and perform documentation effectively	Understand

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

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B. Tech. VI Semester		
Code: A0H03	English Communication and Presentation Skills Lab (Common for CSE, CSE (Cyber Security), CSE (AI and ML), CSE (DS), CSE (IOT), AI and IT)	L	T	P
Credits: 1		-	-	2

Prerequisite: NIL

Course Objectives:

The learners need to be aware of the characteristics of technical communication in their workplaces; as a result, they are exposed to different channels of technical communication. Hence the acquired skills make the learners effective communicators using persuasive language. Besides the above said, one of the major objectives is to maintain objectivity in writing documents and to produce professional quality documents using different components of the language.

Introduction: Effective Communication binds any progressive organization. At the B Tech third year level, the Technical Communication and Presentation skills laboratory is introduced to help students succeed in attaining a challenging and a professional career. Each unit aims to reinforce learning and helps the learners perform well before and after they enter the world of work. The course is designed to be practical, stimulating and challenging providing opportunities to the learners to go beyond the classrooms and get empowered in Technical Communication skills. The course enables the students understand the employers' expectations that are varied from company to company while giving them insight into the acceptable norms of attitude, behavior and etiquette. The course also focuses on the presentation skills of the learners

Methodology: Facilitator's role: Since classroom learning augments thinking process, helping them to develop written, spoken and non-verbal communication, the facilitator / Faculty would briefly discuss the topics with the students and later on guide them while the students involved in activities, writing work and while making presentations. The facilitator is required to design a lot of practical/industry oriented project works for the students

*Students are required to participate, perform, write and submit the work in the form of written documents or Power Point Presentations to hone their spoken written and non-verbal communication skills. Students are to take up field work and submit the project work.

Module-I: Oral Presentation

Mechanics of Presentations – Methodology of Presentation, Importance of Non-verbal communication during presentations– Nuances of Presentation.

*This particular MODULE is for internal evaluation purpose(s).

Module-II: E-Correspondence and Email etiquette

Common web mail services, yahoo, gmail etc, fields to pay attention- To:, Cc:, Bcc:, Reply All, Subject, Salutation, Body, Signature, Font, Caps Lock , Highlight, The 'KISS' strategy (Keep It Simple and Short,)Points to remember while signing off, Introduction to Technical Vocabulary.

• This MODULE is purely for internal assessment/evaluation

Module-III: Group Discussion

Initiators- Contributor-Informer-Team Leader-Motivator-Creative Contributor , Importance of , Non-verbal communication -eye contact, voice characters, posture, gestures, do's and don'ts, Role play and Simulation- Learners assuming the roles of characters and participating in Group discussion, analysis, or prediction with strictly defined goals.

Module-IV: Interview Skills & Office Etiquette

Preparing for the interview, types of interviews, interview session, importance of non-verbal communication during the interview, do's and don'ts of interview, follow up and thanking letter. FAQ's. Formal Conversation, office attire- do's and don'ts, greetings and meetings, speaking to seniors and handshakes, offering and taking visiting cards.

Module V: Job Hunt Process

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

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

References

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

E-Resources

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

Course Outcomes:

CO	Statement	Blooms Taxonomy Level
CO1	Give Oral Presentations Confidently.	Understand
CO2	Draft appropriate Resume in accordance with the context.	Understand
CO3	Participate and present their view and ideas logically and confidently.	Analyze
CO4	Understand the importance of communication in various settings.	Analyze
CO5	Utilize the technology for career advancement	Understand

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

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B. Tech. VI Semester		
Code:A1215	Machine Learning Lab	L	T	P
Credits: 1		-	-	2

Course Objectives:

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

List of Programs:

1. Install python and useful packages and load the sample dataset to understand, and visualize
2. Implementation of Simple Linear Regression using Python
3. Implementation of Multivariate Linear Regression using Python
4. Implementation of Simple Logistic Regression and Multivariate Logistic Regression using Python
5. Implementation of Decision Trees using Python
6. Implementation of any 3 Classification Algorithms using Python
7. Implementation of Random Forests Algorithm using Python
8. Implementation of K-Means, KNN Algorithms using Python
9. Implementation of SVM On Any Applicable Datasets using Python
10. Implementation of Neural Networks using Python
11. Implementation of PCA using Python
12. Implementation of Anomaly Detection and Recommendation using Python

References

1. Machine Learning with Python/Scikit-Learn, - Application to the Estimation of Occupancy and Human Activities, pp. 1-103

Course Outcomes:

CO	Statement	Blooms Taxonomy Level
CO1	Apply Machine Learning approaches for a given Problem	Understand
CO2	Analyze and identify the need for machine learning techniques for a particular domain	Understand
CO3	Develop the real time applications and predict its outcomes using machine learning algorithms	Analyze

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

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B. Tech. VI Semester		
Code: A0543	Compiler Design Lab (Common for CSE, IT, CSE (CS), CSE (AI and ML), CSE(DS), CSE (IOT), AI and)	L	T	P
Credits: 2		-	1	2

Prerequisites: Basic Programming

Course Objectives:

1. To understand the various phases in the design of a compiler.
2. To understand the design of top-down and bottom-up parsers.
3. To understand syntax directed translation schemes.

Software Requirements: Turbo C / C++

List of Programs:

1. Write a LEX Program to scan reserved word & Identifiers of C Language. The lexical analyzer should ignore redundant spaces, tabs and newlines. It should also ignore comments.
2. Write a C program to recognize strings under 'a*', 'a*b+', 'abb'
3. Write a C program to test whether a given identifier is valid or not
4. Write a Program to implement Recursive Descent Parser for language.
5. Write a Program to Design a Predictive Parser for the Language Accepted by the given Grammar.
6. Write a Program for Implementation of Shift Reduce parsing
7. Write a program to calculate first function for the given grammar.
8. Write a program to implement Simple LR Parser for the given language
9. Write a program to Implement SLR (1) Parsing algorithm for the given language
10. Write a program to Design LALR bottom-up parser for the given language
11. Write a program to Design CLR bottom-up parser for the given language
12. Write a C program to generate three address codes.

Textbooks:

1. Andrew N. Appel, "Modern **Compiler Implementation in C**", Cambridge University Press.
2. A.V. Aho. J.D.Ullman, "**Principles of compiler design**", Pearson Education.
3. D.M Dhamdhere, "Systems **programming and operating systems**", 2nd edition, tata McGraw hill publishing comp pvtLtd.

References:

1. Dick Grune, Henry E. Bal, Criel T. H. Jacobs,” **Modern Compiler Design**”, Wiley dreamtech.
2. Cooper & Linda,” **Engineering a Compiler**”, Elsevier.
3. Louden,” **Compiler Construction**”, Thomson.

Course Outcomes:

CO	Statement	Blooms Taxonomy Level
CO1	Develop program for solving parser problems.	Apply
CO2	Create program for intermediate code generation.	Apply
CO3	Write code to generate abstract syntax tree and to convert BNF to YACC.	Apply

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

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech. VII Semester		
Code: A0H09	Management Fundamentals (Common for EEE, ECE and IT)	L	T	P
Credits: 3		3	-	-

Prerequisites: Nil

Course Objectives:

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

Module-I: Management and Principles of Management [09 Periods]

Introduction to Management: Concepts of Management and organization-nature, importance and Functions of Management, Taylor's Scientific Management Theory, Fayol's Principles of Management.

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

Module – II: Planning, Organization and types of Structures [10 Periods]

Planning: Need for planning- -Steps in the process of planning-Advantages and limitation of planning. Types of planning - Vision, Mission, Goals, Objectives, Policy, Strategy, Programmes, Elements of Corporate Planning Process, Management by Objectives (MBO).

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

Module – III: Staffing and Controlling [10 Periods]

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

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

Module – IV: Operations and Materials Management [09 Periods]

Operations Management: Principles and Types of Plant Layout-Methods of production (Job, batch and Mass Production), Work Study -Basic procedure involved in Method Study and Work Measurement.

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

Module-V: Project Management and Contemporary Practices [10 Periods]

Project Management (PERT/CPM): Network Analysis, Programme Evaluation and Review Technique (PERT), Critical Path Method (CPM), Identifying critical path, Probability of Completing the project within given time, Project Cost Analysis, Project Crashing. (Simple problems)

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

Text Books:

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

References:

1. Kotler Philip & Keller Kevin Lane, **"Marketing Management"**, PHI, 12th edition, 2005
2. Koontz & Weihrich, **"Essentials of Management"**, TMH, 6th edition, 2005.

3. Thomas N. Duening & John M. Ivancevich “**Management - Principles and Guidelines**”, Biztantra, 5th edition 2003.
4. Memoria & S.V. Gauker, “**Personnel Management**”, Himalaya, 25th edition, 2005
5. Samuel C. Certo, “**Modern Management**”, PHI, 9th edition, 2005.

E-Resources:

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

Course Outcomes:

CO	Statement	Blooms Taxonomy Level
CO1	Understand the various concepts, principles and theories of management.	Understand
CO2	Understand the basic concepts of planning and various structures of organizations.	Understand
CO3	Understand the process of staffing and controlling	Understand
CO4	Understand the process of operations management. Also learn the concepts of materials management and marketing management at an organization.	Understand
CO5	Understand the various contemporary management practices. Also the project management techniques.	Understand

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

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech. VII Semester		
Code: A0545	Data Mining (Common for CSE, IT , CSE(CS), CSE (AIML), CSE(DS), CSE (IOT), AIML)	L	T	P
Credits: 3		3	-	-

Prerequisites: NIL

Course Objectives:

This course provides the students to understand stages in building a Data Warehouse, identify the need and importance of preprocessing techniques, implement similarity and dissimilarity techniques, analyze and evaluate performance of algorithms for Association Rules, analyze Classification and Clustering algorithms.

Module-I: Introduction

[09 Periods]

Motivation for Data Mining–Data Mining–Definition and Functionalities–Classification of DM Systems -DM task primitives–Integration of a Data Mining system with a Database or a Data Warehouse–Issues in DM–KDD Process

Module-II: Data Pre-processing

[10 Periods]

Data summarization, data cleaning, data integration and transformation, data reduction, data discretization and concept hierarchy generation, feature extraction , feature transformation, feature selection, introduction to Dimensionality Reduction, CUR decomposition.

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

Module-III: Classification and Association

[09 Periods]

Basic Concepts, General Approach to solving a classification problem, Decision Tree Induction: Working of Decision Tree, building a decision tree. Methods for expressing an attribute test conditions, measures for selecting the best split, Algorithm for decision tree induction, Bayes’ Theorem, Naïve Bayesian Classification, Bayesian Belief Networks, Data Generalization and summarization-based characterization-Attribute relevance - class comparisons, Frequent Item Set generation, Rule generation, compact representation of frequent item sets, FP- Growth Algorithm.

Module-IV: Cluster Analysis:

[10 Periods]

Clustering: Problem Definition, Clustering Overview, Evaluation of Clustering Algorithms, Partitioning Clustering -K-Means Algorithm, K-Means Additional issues, PAM Algorithm; Hierarchical Clustering – Agglomerative Methods and divisive methods, Basic Agglomerative Hierarchical Clustering, Strengths and Weakness; Outlier Detection, Clustering high dimensional data, clustering Graph and Network data.

Module-V: Web Mining

[10 Periods]

Introduction to Web Mining, Web content mining, Web usage mining, Web Structure mining, Web log structure and issues regarding web logs, Spatial Data Mining, Temporal Mining, And Multimedia Mining, Applications of Distributed and parallel Data Mining.

Text Books

1. Pang-Ning Tan & Michael Steinbach, “**Introduction to Data Mining**”, Vipin Kumar, Pearson.
2. Jiawei Han, Michel Kamber,” **Data Mining concepts and Techniques**”, 3/e, Elsevier.
3. J. Han, M. Kamber, “Data Mining Concepts and Techniques”, Morgan Kaufmann

References

1. Hongbo Du, “**Data Mining Techniques and Applications: An Introduction**”, Cengage Learning.
2. Vikram Pudi and P. Radha Krishna, “**Data Mining**”, Oxford.
3. Mohammed J. Zaki, Wagner Meira, Jr,” **Data Mining and Analysis - Fundamental Concepts and Algorithms**”, Oxford
4. Alex Berson, Stephen Smith,” **Data Warehousing Data Mining & OLAP**”, TMH.

E-Resources

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

Course Outcomes:

CO	Statement	Blooms Taxonomy Level
CO1	Acquire knowledge in building a Data Warehouse	Understand
CO2	Understand the need and importance of preprocessing techniques	Understand
CO3	Implement Similarity and dissimilarity techniques	Implement
CO4	Analyze and evaluate performance of algorithms for Association Rules	Analyze
CO5	Deploy Classification and Clustering algorithms	Deploy

CO- PO Mapping

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

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

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech. VII Semester		
Code: A1223	Internet of Things	L	T	P
Credits: 3		3	-	-

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

Course Objectives:

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

Module-I

[9 Periods]

Introduction to Internet of Things, Characteristics of IoT, Physical design of IoT, Functional blocks of IoT, Sensing, Actuation, Basics of Networking, Communication Protocols, Sensor Networks.

Module-II

[10 Periods]

Machine-to-Machine Communications, Difference between IoT and M2M, Interoperability in IoT, Introduction to Arduino Programming, Integration of Sensors and Actuators with Arduino.

Module-III

[9 Periods]

Introduction to Python programming, Introduction to Raspberry Pi, Interfacing Raspberry Pi with basic peripherals, Implementation of IoT with Raspberry Pi, Case studies.

Module-IV

[10 Periods]

Implementation of IoT with Raspberry Pi, Introduction to Software defined Network (SDN), SDN for IoT, Data Handling and Analytics.

Module-V: IOT Use-cases: Smart city Project & Industrial Use cases

[10 Periods]

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

Text Books

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

References

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

E-Resources

1. <http://www.itu.int/en/ITU-T/gsi/iot/Pages/default.aspx>
2. <http://electronicdesign.com/embedded/understanding-protocolsbehind-internet-things>
3. http://eclipse.org/community/eclipse_newsletter/2014/february/article2.php

4. <http://iot.eclipse.org/protocols.html>
5. <http://www.slideshare.net/paolopat/internet-ofthingsprotocolswar>
6. <http://www.slideshare.net/RealTimeInnovations/io-34485340>
7. <https://thingsboard.io/docs/iot-video-tutorials/>
8. <https://thenewboston.com/videos.php?cat=98&video=20109>

Course Outcomes:

CO	Statement	Blooms Taxonomy Level
CO1	Understand the fundamental concepts of IoT and its applications	Understand
CO2	Analyse Machine to Machine and System Management in IOT with Protocols	Analyze
CO3	Design IOT Applications using Python Different packages	Apply
CO4	Build real world applications by applying Raspberry PI	Apply
CO5	Examine different web-based APIs while designing application Framework.	Analyze

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

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech. VII Semester		
Code:A1224	IT Infrastructure Management [Professional Elective – VI]	L	T	P
Credits: 3		3	-	-

Pre-requisites: NIL

Course Objectives:

The objectives for this course are:

1. to develop a comprehensive knowledge of the functionality of networking hardware;
2. to acquire the skills to solve business problems that require IT solutions; and
3. to develop the competency to investigate inter-organization and intra-organization communications problems and propose a viable technology solution.

Module-I

[10 Periods]

Introduction: Network and internet, computing resources, information technology, IT infrastructure management, infrastructure, IT Infrastructure management, challenges in IT infrastructure management, design issues of IT organizations and IT infrastructure, determining customers' requirements, IT systems management process, IT service management process, information system design process, patterns for IT systems management, IT infrastructure library.

Module-II

[9 Periods]

Service Delivery Process: Service level management, financial management, IT service continuity management, capacity management, availability management.

Service Support Process: Configuration management, incident management, problem management, Change management, release management.

Module-III

[8 Periods]

Storage Management: Introduction to storage, backup and storage, archive and retrieve, disaster recovery, space management, database and application protection, Bare Machine Recovery (BMR), data retention.

Module-IV

[9 Periods]

Security Management: Introduction, computer security, internet security, physical security, identity management, access control, intrusion detection.

Module-V

[8 Periods]

IT Ethics: Introduction, intellectual property, privacy and law, computer forensics, ethics and internet, cyber-crimes.

Text Books:

1. Phalguni Gupta, Surya Prakash, Umarani Jayaraman, IT Infrastructure and its Management, Tata McGraw Hill Education Private Limited, ISBN-13: 9780070699793, 2009.
2. 2.Simon Adams, ITIL V3 Foundation Handbook Updated Edition, Stationery Office Books (TSO) Publisher, 2009.

Reference Books:

1. Ivanka Menken, ITIL V3 Foundation Certification Exam Preparation Course in a Book for Passing the ITIL V3 Foundation Exam, Second Edition (The Art ofService), 2009.
2. Van Haren, Passing the ITIL Foundation, Van Haren Publishing, 2011.

Course Outcomes:

CO	Statement	Blooms Taxonomy Level
CO1	Distinguish the core elements of an IT infrastructure and specialized security devices	Understand
CO2	Manage different types of service delivery methods	Analyze
CO3	Gain a complete knowledge on storage management and access controls	Apply
CO4	Understand how to provide security for various levels in the organization	Apply
CO5	Learn ethics and rules of the organization how to utilize the infrastructure	Analyze

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

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech. VII Semester		
Code: A1225	AI for Robotics [Professional Elective - VI]	L	T	P
Credits: 3		3	-	-

Pre-requisites: Basics of AI

Course Objectives:

- To develop semantic-based and context-aware systems to acquire, organize process, share and use the knowledge embedded in multimedia content.
- Research will aim to maximize automation of the complete knowledge lifecycle and achieve semantic interoperability between Web resources and services.
- The field of Robotics is a multi-disciplinary as robots are amazingly complex system comprising mechanical, electrical, electronic H/W and S/W and issues germane to all these.

Module I - Problem solving and Scope of AI

[10 Periods]

Introduction to Artificial Intelligence: Applications- Games, theorem proving, natural language processing, vision and speech processing, robotics, expert systems. AI techniques- search knowledge, abstraction.

Problem Solving

State space search-Production systems, search space control: depth-first, breadth-first search. Heuristic search - Hill climbing, best-first search, branch and bound. Problem Reduction, Constraint Satisfaction End, Means-End Analysis. LA* Algorithm, L(AO*) Algorithm.

Module II - Knowledge Representation

[9 Periods]

Knowledge Representation issues, first order predicate calculus, Horn Clauses, Resolution, Semantic Nets, Frames, Partitioned Nets, Procedural Vs Declarative knowledge, Forward Vs Backward Reasoning.

Module III - Understanding Natural Languages

[10 Periods]

Introduction to NLP, Basics of Syntactic Processing, Basics of Semantic Analysis, Basics of Parsing techniques, context free and transformational grammars, transition nets, augmented transition nets, Shanks Conceptual Dependency, Scripts, Basics of grammar free analyzers, Basics of sentence generation, and Basics of translation.

Module IV- Expert Systems

[8 Periods]

Expert System: Need and justification for expert systems, knowledge acquisition, Case Studies: MYCIN, R1

Programming Language: Introduction to programming Language, LISP and PROLOG.

Handling Uncertainties: Non-monotonic reasoning, Probabilistic reasoning, use of certainty factors, Fuzzy logic.

Module V - Introduction to Robotics

[9 Periods]

Fundamentals of Robotics, Robot Kinematics: Position Analysis, Dynamic Analysis and Forces, Robot Programming languages & systems: Introduction, the three levels of robot programming, requirements of a robot programming language, problems peculiar to robot programming languages

Text & References:

1. Russell Stuart, Norvig Peter, “Artificial Intelligence Modern Approach”, Pearson Education series in AI, 3rd Edition, 2010.
2. Dan.W. Patterson, “Introduction to Artificial Intelligence and Expert Systems”, PHI Learning, 2009.
3. Donald.A. Waterman, “A guide to Expert Systems”, Pearson, 2002.

Course Outcomes:

CO	Statement	Blooms Taxonomy Level
CO1	The student will be able to: Describe human intelligence and AI Explain how intelligentsystem works.	Understand
CO2	Apply basics of Fuzzy logic and neural networks.	Analyze
CO3	Explain Expert System and implementation.	Apply
CO4	Apply Knowledge representation and semantic in Knowledge representation.	Apply
CO5	Develop some familiarity with current research problems and research methods in AI.	Analyze

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

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

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech. VII Semester		
Code: A0548	Software Testing Methodologies [Professional Elective-VII]	L	T	P
Credits: 3		3	-	-

Prerequisites: Software Engineering

Course Objectives:

This Course enables the students to understand the principles and need for various types of testing test adequacy assessment using: data flow, transaction flow and path testing, describe strategies for generating system test cases, apply the essential characteristics of path product and regular expressions, explain about the people and organizational issues in Testing.

MODULE I: Introduction to Software Testing and Defects [08 Periods]

Introduction- Purpose of testing-Dichotomies-Software Testing Principles- Bugs, consequences of bugs, Taxonomy of bugs -The Tester's Role in a Software Development Organization-Black box testing and white box testing.

Defects- Cost of defects- Defect Classes- Defect Examples, software testing life cycle.

MODULE II : Testing Techniques [10 Periods]

Flow graphs and Path Testing- Basics concepts of path testing-predicates-path predicates and achievable paths- path sensitizing- path instrumentation, application of path testing.

Transaction and Data Flow Testing- Transaction flows- transaction flow testing techniques, Basics of dataflow testing - strategies in data flow testing-application of dataflow testing.

MODULE III: Test Case Approaches and Testing Types [11 Periods]

A: Test Case Design Strategies

Using Black Box Approach to Test Case Design -Random Testing – Requirements based testing – Boundary Value Analysis – Equivalence Class Partitioning– Compatibility testing – User documentation testing – Domain testing.

B: Testing Types

Alpha, Beta Tests, Usability and Accessibility testing – Configuration testing - Compatibility testing – Testing the documentation.

MODULE IV: Path Testing and Applications [10 Periods]

Paths, Path products and Regular Expressions- Path products and path expression- reduction procedure- applications- regular expressions and flow anomaly detection.

Logic Based Testing, State Graphs and Transition Testing- Overview decision tables path expressions, k-v charts, state, State graphs, transition testing, good and bad state graphs, state testing, testability tips.

MODULE V: Software Testing Tools and Graph Matrices [09 Periods]

Graph Matrices and Applications- Motivational over view, matrix of graph, relations, power of matrix, node reduction algorithm. Software Testing Tools- Taxonomy of Testing tools. Methodology to evaluate automated testing tools, Load Runner, Win runner and Rational Testing Tools, Java Testing Tools, JMetra, JUNIT and Cactus.

Textbooks:

1. Van Nostrand Reinhold, “Software Testing Techniques”, Boris Beizer, 2nd Edition, New York, 1990.
2. Srinivasan Desikan and Gopalaswamy Ramesh, “Software Testing Principles and Practices”, Pearson Education, 2006.

References:

1. Sams Publishing, “Software Testing”, Ron Patton, Second Edition, Pearson education, 2007.
2. Renu Rajani, Pradeep Oak, “Software Testing – Effective Methods, Tools and Techniques”, Tata McGraw Hill, 2004.
3. Edward Kit, “Software Testing in the Real World – Improving the Process”, Pearson Education, 1995.
4. Aditya P. Mathur, “Foundations of Software Testing – Fundamental algorithms and techniques”, Dorling Kindersley (India) Pvt. Ltd., Pearson Education, 2008

E -Resources

1. <https://books.google.co.in/books?isbn=8177222600>
2. <https://books.google.co.in/books?isbn=817758121X>
3. http://www.uta.fi/sis/reports/index/R31_2014.pdf
4. <http://nptel.ac.in/courses/106101061/18#>

Course Outcomes:

CO	Statement	Blooms Taxonomy Level
CO1	Explain the concept of software testing objectives, Principles, Bugs, Tester Roles and Defects in Software Development life Cycle	Understand
CO2	Compare path sensitizing, path instrumentation related to path testing with its importance and transaction flow testing and data flow testing strategies.	Analyze
CO3	Classify Test Case Approaches and Testing Types	Analyze
CO4	Develop a defect free module using path products and path expressions using logic based testing to KV charts and its specifications	Apply
CO5	Determine state graphs and transition testing with its various testability tips	Understand

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

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

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech. VII Semester		
Code: A0546	Blockchain Technologies	L	T	P
Credits: 3	[Professional Elective - VI]	3	-	-

Prerequisites: NIL

Course Objectives:

This course provides a broad overview of the essential concepts of blockchain technology – by initially exploring the Bitcoin protocol followed by the Ethereum protocol – to lay the foundation necessary for developing applications and programming.

1. To understand the history, types and applications of Blockchain
2. To acquire knowledge about cryptography and consensus algorithms.
3. Deploy projects using Web3j and design blockchain based applications.

Module I: Introduction to Blockchain

[9 Periods]

Distributed DBMS–Limitations of Distributed DBMS, Introduction to Block chain–History, Definition, Distributed Ledger, Blockchain Categories–Public, Private, Consortium, Blockchain Network and Nodes, Peer-to-Peer Network, Mining Mechanism, Generic elements of Blockchain, Features of Blockchain, and Types of Blockchain.

Module II: Blockchain Architecture

[9 Periods]

Operation of Bitcoin Blockchain, Blockchain Architecture – Block, Hash, Distributer P2P, Structure of Blockchain- Consensus mechanism: Proof of Work (PoW), Proof of Stake (PoS), Byzantine Fault Tolerance (BFT), Proof of Authority (PoA) and Proof of Elapsed Time (PoET)

Module III: Blockchain-Based Futures System

[8 Periods]

Project presentation- Futures smart contract: Blockchain oracles- Web3j: Setting up the Web3J- Installing web3j- Wallet creation, Java client: The wrapper generator- Initializing web3j- Setting up Ethereum accounts- Deploying the contract

Module IV: Blockchain in Business and Creating ICO

[10 Periods]

Public versus private and permissioned versus permission less blockchains- Privacy and anonymity in Ethereum- Why are privacy and anonymity important? - The Ethereum Enterprise Alliance- Blockchain-as-a-Service- Initial Coin Offering (ICO): Project setup for ICO implementation- Token contracts- Token sale contracts-Contract security and testing the code

Module V: Distributed Storage IPFS and Swarm

[8 Periods]

Ethereum Virtual Machine- Swarm and IPFS: Installing IPFS, Hosting our frontend: Serving your frontend using IPFS, Serving your frontend using Swarm, IPFS file uploader project: Project setup the web page

Text Books:

1. Imran Bashir, “Mastering Blockchain: Distributed Ledger Technology, decentralization, and smart contracts explained”, 2nd Edition, Packt Publishing Ltd, March 2018.
2. Bellaj Badr, Richard Horrocks, Xun (Brian) Wu, “Blockchain By Example: A developer's guide to creating decentralized applications using Bitcoin, Ethereum, and Hyperledger”, Packt Publishing Limited, 2018.

Reference Books:

1. Andreas M. Antonopoulos, "Mastering Bitcoin: Unlocking Digital Cryptocurrencies", O'Reilly Media Inc, 2015
2. Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller and Steven Goldfeder, "Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction", Princeton University Press, 2016.

E-References:

1. <https://www.velmie.com/practical-blockchain-study>
2. <https://www.udemy.com/course/build-your-blockchain-az/>
3. <https://blockchainhub.net/blockchains-and-distributed-ledger-technologies-in-general/>
4. <https://blog.todotnet.com/2019/03/solving-real-world-problems-with-distributed-ledger-technology/>

Course Outcome:

CO	Statement	Blooms Taxonomy Level
CO1	Contentedly discuss and describe the history, types and applications of Blockchain	Understand
CO2	Gains familiarity with cryptography and Consensus algorithms.	Analyze
CO3	Create and deploy projects using Web3j.	Analyze
CO4	Implement an ICO on Ethereum	Apply
CO5	Design blockchain based application with Swarm and IPFS	Understand

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

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech. VII Semester		
Code: A6215	Digital Forensics [Professional Elective-VII]	L	T	P
Credits: 3		3	-	-

Prerequisite: Cybercrime and Information Warfare, Computer Networks

Course Objectives:

1. To study digital forensic concepts and the investigative process
2. To learn about the legal issues of digital forensic analysis and the role of investigator.
3. To study the data acquisition, identification and storage of digital Evidence.
4. To Learn the usage of digital forensics tools.
5. To learn E-mail investigation and Mobile device forensics.

Module I:

[09 Periods]

Computer Forensics Fundamentals: What is Computer Forensics? Use of Computer Forensics in Law Enforcement, Computer Forensics Assistance to Human Resources/Employment Proceedings, Computer Forensics Services, Benefits of Professional Forensics Methodology, Steps taken by Computer Forensics Specialists.

Types of Computer Forensics Technology: Types of Military Computer Forensic Technology, Types of Law Enforcement Computer Forensic Technology, Types of Business Computer Forensic Technology.

Module II:

[09 Periods]

Understanding Digital Forensics and Investigations: Procedure for Private Sector High-Tech investigations, Understanding Data Recovery Workstations and Software, Conducting an investigation.

Data Acquisition: Understanding Storage Formats for Digital Evidence, Determining the Best Acquisition Method, Using Acquisition Tools, Validating Data Acquisitions, Performing RAID Data Acquisitions, Remote Network Acquisition Tools, Other Forensics Acquisition Tools.

Module III:

[09 Periods]

Processing Crime and Incident Scenes: Identifying Digital Evidence, Collecting Evidence in Private-Sector Incident Scenes, Processing Law Enforcement Crime Scenes, Preparing for a Search, Securing a Digital Incident or Crime Scene, Seizing Digital Evidence at the Scene, Storing Digital Evidence, Obtaining a Digital Hash, Reviewing a Case..

Module IV: Computer Forensics

[09 Periods]

Current Digital Forensics Tools: Evaluating Computer Forensic Tool Needs, Digital Forensics Software Tools, Digital Forensics Hardware Tools, Validating and Testing Forensics Software.

Digital Forensics Analysis and Validation: Determining What Data to Collect and Analyse, Validating Forensic Data, Addressing Data-Hiding Techniques.

Module V: Mobile Forensics

[09 Periods]

E-Mail and Social Media Investigations: Exploring the Role of E-Mail in Investigation, Exploring the Roles of the Client and Server in E-Mail, Investigating E-Mail Crimes and Violations, Understanding E-Mail Servers, Using Specialized E-Mail Forensic Tools, Applying Digital Forensics Methods to

Social Media Communications.

Mobile Device Forensics and Internet of Anything: Understanding Mobile Device Forensics, Understanding Acquisition Procedures for Mobile Devices.

Text Books:

1. Vacca, J, Computer Forensics, Computer Crime Scene Investigation, Charles River Media, 2015.
2. Nelson, B, Phillips, A, Stuart, C., "Guide to Computer Forensics and Investigations", 5th edition., Cengage Learning, 2016.

Suggested Reading:

1. John Sammons," The basics of digital Forensics – The primer for getting started in digital forensics", Elsevier Syngress Imprint, 2012.
2. Richard Boddington," Practical Digital Forensics" [PACKT] Publication, Open-source community, 2016

References:

1. Real Digital Forensics by Keith J. Jones, Richard Bejtich, Curtis W. Rose, Addison- Wesley Pearson Education
2. Forensic Compiling, A Tractitioneris Guide by Tony Sammes and Brian Jenkinson, Springer International edition.

Course Outcomes:

CO	Statement	Blooms Taxonomy Level
CO1	Describe digital forensics and relate it to an investigative process.	Understand
CO2	Explain the legal issues of preparing and performing digital forensic analysis based on the investigator's position and duty.	Analyze
CO3	Interpret the cyber pieces of evidence, Digital forensic process model and their legal perspective.	Analyze
CO4	Demonstrate various forensic tools to investigate the cybercrime and to identify the digital pieces of evidence.	Apply
CO5	Analyse the digital evidence used to commit cyber offenses	Understand

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

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech. VII Semester		
Code: A0544	Data Mining Lab	L	T	P
Credits: 2		-	1	2

Prerequisite: NIL

Course Objectives:

This course provides the students to understand stages in building a Data Warehouse, identify the need and importance of preprocessing techniques, implement similarity and dissimilarity techniques, analyze and evaluate performance of algorithms for Association Rules, analyze Classification and Clustering algorithms.

Software Requirements: WEKA TOOL

List of Programs:

1. Demonstration of preprocessing on student.arff dataset.
2. Implementation of preprocessing on labor.arff dataset.
3. Demonstration of Association rule process on contactlenses.arff dataset using Apriori Algorithm.
4. Implement Association rule process on test.arff dataset using Apriori algorithm.
5. Apply classification rule process on student.arff dataset using J48 algorithm.
6. Perform classification rule process on employee.arff dataset using J48 algorithm.
7. Use classification rule process on employee.arff dataset using ID3algorithm.
8. Deploy classification rule process on employee.arff dataset using naïve bayes Algorithm.
9. Implement clustering rule process on iris.arff dataset using simple k-means.
10. Make use of clustering rule process on student.arff dataset using simple k-means.
11. Design a Decision Tree by pruning the nodes on your own.
 - i. Convert the decision trees into “if-then-else rules”.
 - ii. The decision tree must consist of 2-3 levels and convert it into a set of rules.
12. Generate Association rules for the following transactional database using Apriori algorithm.

TID	List of Items
T100	I1,I2,I5
T200	I2,I4
T300	I2,I3
T400	I1,I2,I4
T500	I1,I3
T600	I2,I3
T700	I1,I3
T800	I1,I2,I3,I5

1. Pang-Ning Tan & Michael Steinbach, “**Introduction to Data Mining**”, Vipin Kumar, Pearson.
2. Jiawei Han, Michel Kamber,” **Data Mining concepts and Techniques**”, 3rd Edn, Elsevier.

1. Hongbo Du, “**Data Mining Techniques and Applications: An Introduction**”, Cengage Learning.
2. Vikram Pudi and P. Radha Krishna, “**Data Mining**”, Oxford.
3. Mohammed J. Zaki, Wagner Meira, Jr,” **Data Mining and Analysis Fundamental Concepts and Algorithms**”, Oxford
4. Alex Berson, Stephen Smith,” **Data Warehousing Data Mining & OLAP**”, TMH.

CO	Statement	Blooms Taxonomy Level
CO1	Analyze the classification rules on variousdatabases	Analyze
CO2	Deploy association rules for any kind ofdatabases	Understand
CO3	Develop clustering rules forapplications	Develop

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

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech. VII Semester		
Code: A1226	Internet of Things Lab	L	T	P
Credits: 2		-	1	2

Course Objectives:

1. Fundamental concepts of IoT and its applications
2. M2M concepts with protocols.
3. Applications using Python Scripting Language.
4. Real world applications by applying Raspberry PI.

1. Using raspberry pi

- a. Calculate the distance using a distance sensor.
- b. Basic LED functionality.

2. Using Arduino

- a. Calculate the distance using a distance sensor.
- b. Basic LED functionality.
- c. Calculate temperature using a temperature sensor.

3. Using Node MCU

- a. Calculate the distance using a distance sensor.
- b. Basic LED functionality.
- c. Calculate temperature using a temperature sensor.

4. Installing OS on Raspberry Pi

- a) Installation using PiImager
- b) Installation using image file
 - Downloading an Image
 - Writing the image to an SD card
 - using Linux
 - using Windows
 - Booting up Follow the instructions given in the URL <https://www.raspberrypi.com/documentation/computers/getting-started.html>

5. Accessing GPIO pins using Python

- a) Installing GPIO Zero library.

First, update your repositories list:
`sudo apt update` Then install the package for Python 3:
`sudo apt install python3-gpiozero`
- b) Blinking an LED connected to one of the GPIO pin
- c) Adjusting the brightness of an LED Adjust the brightness of an LED (0 to 100, where 100 means maximum brightness) using the in-built PWM wavelength.

6. Collecting Sensor Data

- a) DHT Sensor interface
 - Connect the terminals of DHT GPIO pins of Raspberry Pi.

- Import the DHT library using import Adafruit_DHT
- Read sensor data and display it on screen.

7. Build end-to-end IoT Use case with Device – Gateway – Cloud – Application model

- Smart Street Lighting System
- Smart Home Management System
- Smart Water Management System

TEXT BOOKS:

1. Internet of Things - A Hands-on Approach, Arshdeep Bahga and Vijay Madisetti, Universities Press, 2015, ISBN: 9788173719547
2. Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014, ISBN: 9789350239759

REFERENCE BOOKS:

1. Bernd Scholz-Reiter, Florian Michahelles, "Architecting the Internet of Things", ISBN 978-3-642-19156-5 e-ISBN 978-3-642-19157-2, Springer, 2016
- N. Ida, Sensors, Actuators and Their Interfaces, Scitech Publishers, 2014.

Course Outcomes:

CO	Statement	Blooms Taxonomy Level
CO1	Describe the fundamental concepts of IoT and its applications	Analyze
CO2	Illustrate M2M concepts with protocols	Understand
CO3	Develop applications using Python Scripting Language	Develop
CO4	Build real world applications by applying RaspberryPI	Develop
CO5	Examine web based services	Analyze

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

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech. VII Semester		
Code: A00P1	Internship/Mini Project	L	T	P
Credits: 2		-	-	4

Prerequisite: Knowledge on professional courses, ability to investigate suitable literature, problem identification and solving.

Course Objectives:

- The student engages in interdisciplinary research in the field of engineering and technology, including both theoretical and practical expertise.
- Motivate the students towards the R&D with creative problem solving

Course Outcomes:

CO	Statement	Blooms Taxonomy Level
CO1	Apply knowledge and demonstrate to manage project in multi - disciplinary areas	Apply
CO2	Identify problems, formulate literature survey and analyze engineering problems	Analyze
CO3	Design and conduct experiments to interpret data pertaining to engineering problems	Apply
CO4	Design system components that acquire the needs of public health and environmental considerations	Apply
CO5	Apply knowledge for carrying out the project in team and perform documentation effectively	Apply

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

Note: Students are instructed to

1. Prepare an Action Plan with project work timelines.
2. Submit weekly project status reports duly signed by the supervisor.
3. Prepare a report in the specified format.
4. Present project seminars as per schedules
5. **Write a Survey paper** for Conference presentation/ Publication in Journals.

Table: Guidelines for the Award of Marks (Max.Marks:100)

Evaluation by	Max. Marks	Evaluation Criteria / Parameter
Supervisor	10	Regularity and Punctuality
	10	Work Progress
	10	Quality of the Research
	10	Report on Project
Project Coordinator	10	Technical Content
	10	Presentation
	10	Partial Implementation
Department Review Committee	20	Project Review
	10	Conference/Journal Publication

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech. VIII Semester		
Code: A00P2	Major Project	L	T	P
Credits: 12		-	-	24

Course Objectives:

1. Enable the student extend further the investigative study, either fully theoretical/practical or involving both theoretical and practical work.
2. The work shall be carried out under the guidance of a Supervisor from the department alone or jointly with a supervisor drawn from R&D laboratory/Industry.
3. Preparing an action plan for conducting the research by team members

Course Outcomes:

CO	Statement	Blooms Taxonomy Level
CO1	Identify, Formulate a problem and design and implement a viable solution	Analyze
CO2	Ability to learn and use modern tools to solve problems efficiently.	Create
CO3	Identify the requirements for the real world problems	Analyze
CO4	Demonstrate and build the project successfully by hardware requirements, coding, emulating and testing.	Evaluate
CO5	Demonstrate an ability to work in teams and manage the conduct of the research study	Analyze

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

Note: Students are instructed to

1. Conduct detailed Analysis//Simulation/Design/Problem Solving/Experiment as needed
2. Submit the project report in the specified format.
3. Attend the project seminars as per given schedule.
4. **Publish a paper** in Conference/Journal/Patent before external viva voce

Guidelines for awarding CIE marks: (Max. Marks: 60)

Evaluator	Max. Marks	Parameter
Department Review Committee	10	Review-I
	10	Review-II
	10	Pre-Submission Review
Supervisor	5	Regularity and Punctuality
	5	Progress of the Work
	5	Quality of the work
	5	Report Writing
	10	Analytical/Programming/Experimental Skills

Guidelines for awarding SEE marks: (Max. Marks: 140)

Evaluator	Max. Marks	Parameter
Internal and External Examiners	10	Idea / Innovations
	10	Applications
	10	Live Research Projects
	10	Scope for future enhancement
	10	Application to Society
	20	PPT Presentation
	40	Thesis Evaluation
	30	Viva-Voce

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech. VIII Semester		
Code: A00P3	Seminar	L	T	P
Credits: 1		-	-	2

Objectives:

The goal of a seminar is to introduce students to critical reading, understanding, summarizing, explaining and preparing report on state of the art topics in a broad area of his/her specialization. Seminar topics may be chosen by the students with advice from the faculty members and the student shall read further relevant articles in the domain.

Course Outcomes:

CO	Statement	Blooms Taxonomy Level
CO1	Study the literature of emerging technologies to organize, analyze and consolidate the information.	Analyze
CO2	Exhibit effective communication skills, stage courage, and confidence.	Create
CO3	Demonstrate intrapersonal skills.	Analyze
CO4	Explain new innovations/inventions in the relevant field.	Evaluate
CO5	Prepare Seminar Report in a prescribed format.	Analyze

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

Table: Guidelines for awarding marks (Max.Marks:100)

S.No	Parameter	Max. Marks
1	Relevance to Problem	10
2	Preparation of PPT	10
3	Presentation Skills in Reviews	20
4	Questions and Answers	10
5	Report preparation in a prescribed format	20
6	Final Seminar Presentation	30

OPEN ELECTIVES

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech III Semester		
Code: A1227	Information theory & Coding [Open Elective]	L	T	P
Credits: 3		3	-	-

Prerequisite

1. Digital Communications

Course Objectives:

1. To acquire the knowledge in measurement of information and errors.
2. Understand the importance of various codes for communication systems
3. To design encoder and decoder of various codes.
4. To know the applicability of source and channel codes

Module-I

Coding for Reliable Digital Transmission and storage

Mathematical model of Information, A Logarithmic Measure of Information, Average and Mutual Information and Entropy, Types of Errors, Error Control Strategies.

Source Codes: Shannon-fano coding, Huffman coding

Module- II

Linear Block Codes: Introduction to Linear Block Codes, Syndrome and Error Detection, Minimum Distance of a Block code, Error-Detecting and Error-correcting Capabilities of a Block code, Standard array and Syndrome Decoding, Probability of an undetected error for Linear Codes over a BSC, Hamming Codes. Applications of Block codes for Error control in data storage system

Module - III

Cyclic Codes: Description, Generator and Parity-check Matrices, Encoding, Syndrome Computation and Error Detection, Decoding, Cyclic Hamming Codes, shortened cyclic codes, Error-trapping decoding for cyclic codes, Majority logic decoding for cyclic codes.

Module- IV

Convolutional Codes: Encoding of Convolutional Codes- Structural and Distance Properties, state, tree, trellis diagrams, maximum likelihood decoding, Sequential decoding, Majority- logic decoding of Convolution codes. Application of Viterbi Decoding and Sequential Decoding, Applications of Convolutional codes in ARQ system.

Module - V

BCH Codes: Minimum distance and BCH bounds, Decoding procedure for BCH codes, Syndrome computation and iterative algorithms, Error locations polynomials for single and double error correction.

TEXT BOOKS

1. Error Control Coding- Fundamentals and Applications –Shu Lin, Daniel J.Costello,Jr, PrenticeHall, Inc 2014.
2. Error Correcting Coding Theory-Man Young Rhee, McGraw – Hill Publishing 1989

REFERENCE BOOKS

1. Digital Communications- John G. Proakis, 5th ed., , TMH 2008.
2. Introduction to Error Control Codes-Salvatore Gravano-oxford
3. Error Correction Coding – Mathematical Methods and Algorithms – Todd K.Moon, 2006, WileyIndia.
4. Information Theory, Coding and Cryptography – Ranjan Bose, 2nd Edition, 2009, TMH.

Course Outcomes:

CO	Statement	Blooms Taxonomy Level
CO1	Learn measurement of information and errors.	Analyze
CO2	Obtain knowledge in designing various source codes and channel codes	Create
CO3	Design encoders and decoders for block and cyclic codes	Analyze
CO4	Understand the significance of codes in various applications	Evaluate

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

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B. Tech. VII Semester		
Code: A1228	Software Project Management [Professional Elective-VI]	L	T	P
Credits: 3		3	-	-

Course Objective:

It gives an in-depth knowledge of software project management and project planning. It also covers the Step Wise framework in project planning.

Module-I: Introduction to Software Project Management [10 Periods]

Software engineering problem and software product, software product attributes, Definition of a Software Project (SP), SP Vs. other types of project's activities covered by SPM, categorizing SPs, Project management cycle, SPM framework, types of project plan.

Project Analysis

Introduction, strategic assessment, technical assessment, economic analysis: Present worth, future worth, annual worth, internal rate of return (IRR) method, benefit-cost ratio analysis, including uniform gradient cash flow and comparison of mutually exclusive alternatives.

Module-II: Activity Planning and Scheduling [9 Periods]

Objectives of activity planning, Work breakdown structure, Bar chart, Network planning model: Critical path method (CPM), Program evaluation and review technique (PERT), Precedence diagramming method (PDM), Shortening project duration, Identifying critical activities.

Risk Management

Introduction, nature and identification of risk, risk analysis, evaluation of risk to the schedule using Z-values

Module-III: Resource Allocation [9 Periods]

Identifying resource requirements, resource allocation, resource smoothening and resource balancing.

Monitoring and control

Introduction, collecting data, visualizing progress, cost monitoring, earned value analysis, project control

Module-IV: Managing Contracts and People [9 Periods]

Introduction, types of contracts, stages in contract, placement, typical terms of a contract, contract management, acceptance, managing people and organizing terms: Introduction, understanding behavior, organizational behavior: a back ground, selecting the right person for the job, instruction in the best methods, motivation, working in groups, becoming a team, decision making, leadership, organizational structures, conclusion, further exercises.

Module-V: Software Quality Assurance and Testing [10 Periods]

Testing principles and objectives, test plan, types and levels of testing, test strategies, program verification and validation, software quality, SEI-CMM, SQA activities, QA organization structure, SQA plan.

Software Configuration Management

Introduction, need, basic configuration, management function, baseline, configuration management responsibilities.

Recommended Books

1. Bob Hughes and Mike Cotterell, Software Project Management, Tata McGraw Hill, (2009)
2. Roger Pressman, A practitioner's Guide to Software Engineering, Tata McGraw Hill, (2014)
3. Head First PMP: A Brain Friendly Guide to Passing the Project Management Professional Exam (2013)

Course Outcomes:

CO	Statement	Blooms Taxonomy Level
CO1	Apply the basics of Software Project Management in order to manage and deliver qualified product	Analyze
CO2	Identify the Problem Effectively and Efficiently with proper documentation for the use indifferent software teams and organization.	Create
CO3	Comprehend and be able to carry on Technical as well as Cost Benefit Analysis and plan the activities within time schedules with CPM and PERT Analysis.	Analyze
CO4	Competent to design Communication Plans, Procurement of Resources and Human Resource Management.	Evaluate
CO5	Perform Software Quality Assurance, Testing and Configuration Management effectively	Analyze

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

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech VIII Semester		
Code:A1229	Distributed Databases [Open Elective]	L	T	P
Credits: 3		3	-	-

Prerequisites: A course on “Database Management 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. Query processing and optimization; distributed transaction management and reliability; parallel and object database management systems.

Module - I

[9 Periods]

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.

Module – II

[10 Periods]

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.

Module – III

[9 Periods]

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

Module – IV

[10 Periods]

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.

Module – V

[9 Periods]

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, Pearson Edn. Asia, 2001.
2. Stefano Ceri and Giuseppe Pelagatti: Distributed Databases, McGraw Hill.

Reference Books:

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

Course Outcomes:

CO	Statement	Blooms Taxonomy Level
CO1	Understand theoretical and practical aspects of distributed database systems.	Analyze
CO2	Study and identify various issues related to the development of distributed database system.	Create
CO3	Understand the design aspects of object-oriented database system and related development.	Analyze

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

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech III Semester		
Code:A1230	Concurrent Programming [Open Elective]	L	T	P
Credits: 3		3	-	-

Prerequisites

1. A course on “Operating Systems”
2. A course on “Java Programming”

Course Objectives: To explore the abstractions used in concurrent programming

MODULE – I

[9 Periods]

Introduction - Shared Objects and Synchronization, A Fable, Properties of Mutual Exclusion, The Moral, The Producer–Consumer Problem, The Harsh Realities of Parallelization.

Mutual Exclusion - Time, Critical Sections, 2-Thread Solutions, The Peterson Lock, The Filter Lock, Lamport’s Bakery Algorithm.

MODULE – II

[10 Periods]

Concurrent Objects - Concurrency and Correctness, Sequential Objects, Quiescent consistency, Sequential Consistency, Linearizability, Linearization Points, Formal Definitions Linearizability, Compositional Linearizability, The Nonblocking Property, Progress conditions, Dependent Progress Conditions, The Java Memory Model, Locks and synchronized Blocks, Volatile Fields, Final Fields.

MODULE – III

[8 Periods]

Synchronization Operations, Consensus Numbers, Consensus Protocols, The compareAndSet() Operation Introduction Universality, A Lock-Free Universal, Construction Wait- Free Universal Construction, Spin Locks , Test-And-Set Locks

MODULE – IV

[10 Periods]

Linked Lists: The Role of Locking, Introduction, List-Based Sets, Concurrent Reasoning, CoarseGrained Synchronization, Fine-Grained Synchronization, Optimistic Synchronization, Lazy Synchronization, Non-Blocking Synchronization

MODULE – V

[8 Periods]

Concurrent Queues and the ABA Problem, Concurrent Stacks and Elimination, Transactional Memories

TEXT BOOKS:

1. The Art of Multiprocessor Programming, by Maurice Herlihy and Nir Shavit, Morgan Kaufmann Publishers, 1st Edition, Indian Reprint 2012.

REFERENCE BOOKS:

1. Java Concurrency in Practice by Brian Goetz, Tim Peierls, Joshua Block, Joseph Bowbeer, David Holmes and Doug Lea, Addison Wesley, 1st Edition, 2006.
2. Concurrent Programming in Java™: Design Principles and Patterns, Second Edition by Doug Lea, Publisher: Addison Wesley, Pub Date: October 01, 1999.

Course Outcomes:

CO	Statement	Blooms Taxonomy Level
CO1	Ability to implement the mechanisms for communication and co-ordination among concurrent processes.	Analyze
CO2	Ability to understand and reason about concurrency and concurrent objects	Understand
CO3	Ability to implement the locking and non-blocking mechanisms	Apply
CO4	Ability to understand concurrent objects	Understand

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

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech III Semester		
Code:A1231	Network Programming [Open Elective]	L	T	P
Credits: 3		3	-	-

Course Objectives:

1. To understand inter process and inter-system communication
2. To understand socket programming in its entirety
3. To understand usage of TCP/UDP / Raw sockets
4. To understand how to build network applications

MODULE – I

[10 Periods]

Introduction to Network Programming: OSI model, Unix standards, TCP and UDP & TCP connection establishment and Format, Buffer sizes and limitation, standard internet services, Protocol usage by common internet application.

Sockets : Address structures, value – result arguments, Byte ordering and manipulation function and related functions Elementary TCP sockets – Socket, connect, bind, listen, accept, fork and exec function, concurrent servers. Close function and related function.

MODULE – II

[10 Periods]

TCP client server : Introduction, TCP Echo server functions, Normal startup, terminate and signal handling server process termination, Crashing and Rebooting of server host shutdown of server host. **Elementary UDP sockets:** Introduction UDP Echo server function, lost datagram, summary of UDP example, Lack of flow control with UDP, determining outgoing interface with UDP.

I/O Multiplexing: I/O Models, select function, Batch input, shutdown function, poll function, TCP Echoserver,

MODULE – III

[9 Periods]

Socket options: getsockopt and setsockopt functions. Socket states, Generic socket option IPV6 socket option ICMPV6 socket option IPV6 socket option and TCP socket options.

Advanced I/O Functions-Introduction, Socket Timeouts, recv and send Functions, readv and writev Functions, recvmsg and sendmsg Functions, Ancillary Data, How Much Data Is Queued?, Sockets and Standard I/O, T/TCP: TCP for Transactions.

MODULE – IV

[10 Periods]

Elementary name and Address conversions: DNS, gethost by Name function, Resolver option, Function and IPV6 support, uname function, other networking information.

Daemon Processes and inetd Superserver – Introduction, syslogd Daemon, syslog Function, daemon_init Function, inetd Daemon, daemon_inetd Function

Broadcasting- Introduction, Broadcast Addresses, Unicast versus Broadcast, dg_cli Function Using Broadcasting, Race Conditions

Multicasting- Introduction, Multicast Addresses, Multicasting versus Broadcasting on A

LAN, Multicasting on a WAN, Multicast Socket Options, mcast_join and Related Functions, dg_cli Function Using Multicasting, Receiving MBone Session Announcements, Sending and Receiving, SNTP: SimpleNetwork Time Protocol, SNTP (Continued)

MODULE – V

[9 Periods]

Raw Sockets-Introduction, Raw Socket Creation, Raw Socket Output, Raw Socket Input, Ping Program, Traceroute Program, An ICMP Message Daemon, Datalink Access- Introduction, BPF: BSD Packet Filter, DLPI: Data Link Provider Interface, Linux:

SOCK_PACKET, libpcap: Packet Capture Library, Examining the UDP Checksum Field. Remote Login: Terminal line disciplines, Pseudo-Terminals, Terminal modes, Control Terminals, rlogin Overview, RPC Transparency Issues.

TEXT BOOKS:

1. UNIX Network Programming, by W. Richard Stevens, Bill Fenner, Andrew M. Rudoff, Pearson Education
2. UNIX Network Programming, 1st Edition, - W. Richard Stevens. PHI.

REFERENCES:

1. UNIX Systems Programming using C++ T CHAN, PHI.
2. UNIX for Programmers and Users, 3rd Edition Graham GLASS, King abls, Pearson Education
3. Advanced UNIX Programming 2nd Edition M. J. ROCHKIND, Pearson Education

Course Outcomes:

CO	Statement	Blooms Taxonomy Level
CO1	To write socket API based programs	Understand
CO2	To design and implement client-server applications using TCP and UDP sockets	Apply
CO3	To analyze network programs	Analyze

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

2020-21 Onwards (MR20)	Malla Reddy Engineering College (Autonomous)	B.Tech III Semester		
Code:A1232	Scripting Languages [Open Elective]	L	T	P
Credits: 3		3	-	-

Prerequisites:

1. A course on “Computer Programming and Data Structures”
2. A course on “Object Oriented Programming Concepts”

Course Objectives:

1. This course introduces the script programming paradigm
2. Introduces scripting languages such as Perl, Ruby and TCL.
3. Learning TCL

Module – I

[9 Periods]

Introduction: Ruby, Rails, The structure and Execution of Ruby Programs, Package Management with RUBYGEMS, Ruby and web: Writing CGI scripts, cookies, Choice of Webservers, SOAP and webservices RubyTk – Simple Tk Application, widgets, Binding events, Canvas, scrolling

Module – II

[9 Periods]

Extending Ruby: Ruby Objects in C, the Jukebox extension, Memory allocation, Ruby Type System, Embedding Ruby to Other Languages, Embedding a Ruby Interpreter

MODULE – III

[10 Periods]

Introduction to PERL and Scripting Scripts and Programs, Origin of Scripting, Scripting Today, Characteristics of Scripting Languages, Uses for Scripting Languages, Web Scripting, and the universe of Scripting Languages. PERL- Names and Values, Variables, Scalar Expressions, Control Structures, arrays, list, hashes, strings, pattern and regular expressions, subroutines.

MODULE – IV

[10 Periods]

Advanced perl, finer points of looping, pack and unpack, filesystem, eval, data structures, packages, modules, objects, interfacing to the operating system, Creating Internet aware applications, Dirty Hands Internet Programming, security issues.

MODULE -V

[10 Periods]

TCL Structure, syntax, Variables and Data in TCL, Control Flow, Data Structures, input/output, procedures, strings, patterns, files, Advance TCL- eval, source, exec and uplevel commands, Name spaces, trapping errors, event driven programs, making applications internet aware, Nuts and Bolts Internet Programming, Security Issues, C Interface. Tk Tk- Visual Tool Kits, Fundamental Concepts of Tk, Tk by example, Events and Binding, Perl-Tk.

TEXT BOOKS:

1. The World of Scripting Languages, David Barron, Wiley Publications.
2. Ruby Programming language by David Flanagan and Yukihiro Matsumoto O'Reilly
3. "Programming Ruby" The Pragmatic Programmers guide by Dabve Thomas Second edition

REFERENCE BOOKS:

1. Open Source Web Development with LAMP using Linux Apache, MySQL, Perl and PHP, J.Lee and B. Ware (Addison Wesley) Pearson Education.
2. Perl by Example, E. Quigley, Pearson Education.
3. Programming Perl, Larry Wall, T. Christiansen and J. Orwant, O'Reilly, SPD.
4. Tcl and the Tk Tool kit, Ousterhout, Pearson Education.
5. Perl Power, J. P. Flynt, Cengage Learning.

Course Outcomes:

CO	Statement	Blooms Taxonomy Level
CO1	Comprehend the differences between typical scripting languages and typical system and application programming languages.	
CO2	Gain knowledge of the strengths and weakness of Perl, TCL and Ruby; and select an appropriate language for solving a given problem.	
CO3	Acquire programming skills in scripting language	

CO- PO Mapping															
COs	Programme Outcomes (POs)												PSOs		
	PO1	PO	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C01					1					2		2			
C02										1		2			
C03		1		1						2		2			
C04					1	1			1	2		2			
C05				1	1				1	2		2			