COURSE STRUCTURE AND DETAILED SYLLABUS

For

B.Tech-Four Year Degree Programme
(MR22 REGULATIONS)

Effective from the Academic Year 2022-23 onwards

Department of Information Technology

Malla Reddy Engineering College

(UGC Autonomous Institution, Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad). Accredited 3rd time by NAAC with 'A++' Grade, Maisammaguda(H), Medchal-Malkajgiri,Secunderabad, Telangana–500100.
www.mrec.ac.in

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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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Department of Information Technology

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

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 (PSOs)

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 toassesssocietal, 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 orleader 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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Department of Information Technology
Course Structure
(MR22 Regulations-Effective from the Academic Year 2022–23 onwards)

S. No	Course Category	Course Code	Name of the Course	L	T	P	Credits
			I YEAR I SEMESTER				
				Contact Hours/Week			
1.	HSMC	C0H01	English	3	-	-	3
2.	BSC	C0B01	Linear Algebra and Numerical Methods	3	1	-	4
3.	ESC	C0501	Programming for Problem Solving	3	-	-	3
4.	ESC	C0201	Basic Electrical and Electronics Engineering	3	-	-	3
5.	ESC	C0502	Programming for Problem Solving Lab	-	-	2	1
6.	HSMC	C0H02	English Language and Communication Skills Lab	-	-	2	1
7.	ESC	C1201	Engineering and IT Workshop	-	1	2	2
8.	ESC	C0202	Basic Electrical and Electronics Engineering Lab	-	-	2	1
			Total	12	2	8	18
			Total Contact Hours		22		

S. No	Course Category	Course Code	Name of the Course	L	T	P	Credits
			I YEAR II SEMESTER				
1.	BSC	C0B17	Engineering Chemistry	3	1	-	4
2.	ESC	C0305	Engineering Drawing	2	-	2	3
3.	BSC	C0B09	Semiconductor Physics	3	1	-	4
4.	BSC	C0B02	Probability and Statistics	3	-	-	3
5.	ESC	C0504	Python Programming	3	1	-	4
6.	BSC	C0B11	Applied Physics Lab	-	-	2	1
7.	BSC	C0B18	Engineering Chemistry Lab	-	-	2	1
8.	ESC	C0506	Python Programming Lab	-	1	2	2
			Total	14	4	8	22
			Total Contact Hours		26		

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Course Structure
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S.No	Course Category	Course Code	Name of the Course	Contact Hours /Week			Credits
				L	T	P	
1	PCC	C0507	Discrete Mathematics	3	-	-	3
2	PCC	C0509	Computer Organization and Architecture	3	-	-	3
3	PCC	C0510	Data Structures	3	-	-	3
4	PCC	C0511	Object Oriented Programming through Java	3	-	-	3
5	PCC	C1202	Introduction to IOT	3	-	-	3
6	PCC	C0512	Data Structures Lab	-	-	3	1.5
7	PCC	C0513	Object Oriented Programming through Java Lab	-	-	3	1.5
8	PCC	C0514	Data Visualization Programming/Power BI	-	1	2	2
9	MC	C00M1	Gender Sensitization	-	-	2	-
			Total	**15**	**1**	**10**	**20**
			Total Contact Hours / Credits	**26**			

II Year I Semester

S.No	Course Category	Course Code	Name of the Course	Contact Hours / Week			Credits
				L	T	P	
1	BSC	C0B07	Applied Statistics and Optimization Techniques	4	-	-	4
2	PCC	C0515	Database Management Systems	3	-	-	3
3	PCC	C0516	Operating Systems	3	-	-	3
4	PCC	C0517	Design & Analysis of Algorithms	3	-	-	3
5	PCC	C1203	Web Technologies	3	-	-	3
6	PCC	C0519	Database Management Systems Lab	-	-	2	1
7	PCC	C1204	Design & Analysis of Algorithms Lab	-	-	2	1
8	PCC	C12P1	Real Time Research Project / Field Based Research Project	-	-	2	1
9	PCC	C0522	Node JS/React JS/ Django	-	-	2	1
10	MC	C00M2	Environmental Science	2	-	-	-
			Total	**18**	**-**	**8**	**20**
			Total Contact Hours / Credits	**26**			

II Year II Semester

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Department of Information Technology
Course Structure
(MR22 Regulations-Effective from the Academic Year 2022–23 onwards)

S.No	Course Category	Course Code	Name of the Course	L	T	P	Credits
			III Year I Semester				
1	HSMC	C0H08	Business Economics & Financial Analysis	3			3
2	PCC	C6627	Artificial Intelligence	3	-	-	3
3	PCC	C1205	Software Engineering	3	-	-	3
4	PCC	C6201	Computer Networks	3	-	-	3
			Professional Elective-I				
5	**PEC-I**	C1206	Biometrics	3	-	-	3
		C0526	Principles of Programming Languages				
		C0527	Image Processing				
		C0524	Advance Computer Architecture				
		C0523	Quantum Computing				
6	PCC	C1207	Software Engineering & Computer Networks Lab	-	-	2	2
7	PCC	C6628	Artificial Intelligence Lab	-	-	2	2
8	PCC	C0530	UI Design-Flutter Lab	-	-	2	1
9	MC	C00M3	Quantitative Aptitude And Verbal Reasoning-I	2	-	-	-
10	MC	C00M5	Constitution of India	2	-	-	-
			Total	19	-	6	20
			Total Contact Hours		29		

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Course Structure
(MR22 Regulations-Effective from the Academic Year 2022–23 onwards)

S.No	Course Category	Course Code	Name of the Course	Contact Hours/Week L	T	P	Credits
			III Year II Semester				
1	PCC	C1208	Automata Theory and Compiler Design	3	-	-	3
2	PCC	C6625	Machine Learning	3	-	-	3
			Professional Elective-II				
3	**PEC-II**	C0525	Computer Graphics	3	-	-	3
		C6711	Data Analytics				
		C1207	Information Retrieval				
		C0529	Distributed Databases				
		C1208	Pattern Recognition				
			Professional Elective-III				
4	**PEC-III**	C0533	Full Stack Development	3	-	-	3
		C1211	Data Mining				
		C0534	Scripting Languages				
		C0535	Mobile Application Development				
		C6917	Internet of Things				
5	**OEC-I**		**Open Elective-I**	3	-	-	3
6	HSMC	C0H03	Advanced English Communication Skills Lab	-	-	2	1
7	PCC	C6626	Machine Learning Lab	-	-	2	1
8	PCC	--	**Professional Elective-III Lab**	-	-	4	1
9	PROJ	C00P1	Industrial Oriented Mini Project / Internship/ Skill Development Course (Big Data-Spark)	2	-	-	2
10	PCC	C00M4	Quantitative Aptitude & Verbal Reasoning-II	2	-	-	-
11	PCC	C00M6	Intellectual Property Rights	2			-
			Total	21	0	8	20
			Total Contact Hours	29			

Department of Information Technology
Course Structure
(MR22 Regulations-Effective from the Academic Year 2022–23 onwards)

S.No	Course Category	Course Code	Name of the Course	Contact Hours/Week			Credits
				L	T	P	
IV Year I Semester							
1	HSMC	COH09	Organizational Behavior	3	-	-	3
2	PCC	C1212	Information Security	3	-	-	3
3	PCC	C0544	Cloud Computing	3			3
Professional Elective-IV							
4	**PEC-IV**	C7320	Semantic Web	3	-	-	3
		C1213	High Performance Computing				
		C0536	Software Testing Methodologies				
		C0544	Advanced Operating Systems				
		C0547	Ad-hoc & Sensor Networks				
5	OEC-II	--	**Open Elective-II**	3	-	-	3
6	PCC	C1214	Information Security Lab	-	-	2	1
7	PCC	C0560	Cloud Computing Lab	-	-	2	1
8	PROJ	C00P2	Project Stage-I	-	-	6	3
			Total	**15**	**0**	**10**	**20**
			Total Contact Hours	**25**			

S.No	Course Category	Course Code	Name of the Course	Contact Hours /Week			Credits
				L	T	P	
IV Year II Semester							
1	**PEC-V**	C1215	Intrusion Detection Systems	3	-	-	3
		C1216	Real Time Systems				
		C6610	Deep Learning				
		C0558	Human Computer Interaction				
		C0550	Software Process &Project Management				
Professional Elective-VI							
2	**PEC-VI**	C6608	Natural Language Processing	3	-	-	3
		C0557	Distributed Systems				
		C1217	Augmented Reality & Virtual Reality				
		C1218	Web Security				
		C0548	Blockchain Technology				
3	OEC-III	--	**Open Elective-III**	3	-	-	3
4	PROJ	C0P03	Project Stage-II including Seminar	-	-	22	9+2
			Total	**9**	**0**	**22**	**20**

2022-23 Onwards (MR22)	Malla Reddy Engineering College (Autonomous)	B.Tech. I Semester		
Code:C0H01	**English**	L	T	P
Credits: 3	(Common for CE, EEE, ME, ECE, CSE, CSE (CS), CSE (AIML), CSE (DS), CSE (IOT), AI, IT and Mi.E)	3	-	-

Course Objectives:

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

Module – I

Speech : "Go Kiss the World" by Subroto Bagchi

Poem : "Leisure" by W. H. Davies

Vocabulary : Formation of Words, Roots, Prefixes, Suffixes

Grammar : Articles and Prepositions

Reading : Skimming and Scanning

Writing : Introduction to Writing Skills, Characteristics of Effective Writing

Module – II

Short story : "Gift of Magi" by O' Henry

Poem : "No Man is an Island" by John Donne

Vocabulary : One Word Substitutions; Synonyms and Antonyms

Grammar : Degrees of Comparison, Active and Passive Voice

Reading : Intensive Reading and Extensive Reading

Writing : Paragraph Writing- Cohesive devices; Jumbled Sentences; Punctuation

Module – III

Essay : "Lucidity, Simplicity, Euphony" by W. Somerset Maugham

Poem : "We wear the Mask" by Paul Laurence Dunbar

Grammar : Tense and Aspect

Vocabulary : Homonyms, Homophones, Homographs

Reading : Reading for Topic and Theme

Writing : Letter Writing

Module – IV

Short story : "The Night Train at Deoli" by Ruskin Bond

Poem : "Gift of India" by Sarojini Naidu

Grammar : Question Tags; Concord

Vocabulary : Idiomatic Expressions; Phrasal Verbs

Reading : Reading for Interpretation

Writing : Essay Writing, Describing, Defining and Classifying

Module – V

Essay : "Toasted English" by R. K. Narayan

Poem : "If' by Rudyard Kipling

Grammar : Direct and Indirect Speech, Misplaced Modifiers

Vocabulary : Redundancies and Clichés

Reading : Reading for Specific Purposes, Reading Comprehension practice
Writing : Paraphrasing & Summarizing,

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

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

Course Outcomes:

After completion of the course, students will be able to:

CO's	Statement	Blooms Taxonomy Level
CO1	Use written and spoken English considerably well for academic purposes.	Understand
CO2	Communicate in Enrich accurately and fluently	Understand
CO3	Employ extensive and intensive reading skills	Understand
CO4	Gain confidence in writing for academic and real life situations	Understand
CO5	Use standard grammar, punctuation, and spelling in technical documents	Understand

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

2022-23 Onwards (MR22)	**Malla Reddy Engineering College** (Autonomous)		B.Tech. I Semester	
Code:C0B01	**Linear Algebra and Numerical Methods** (Common For CSE, IT, CSE (AI&ML, DS, CS, IOT), B.Tech (AI&ML)	**L**	**T**	**P**
Credits: 4		**3**	**1**	**-**

Prerequisites: NIL

Course Objectives:

1. To learn types of matrices, Concept of rank of a matrix and applying the concept of rank to know the consistency of linear equations and to find all possible solutions, if exist.
2. To learn concept of Eigen values and Eigen vectors of a matrix, diagonalization of a matrix, Cayley Hamilton theorem and reduce a quadratic form into a canonical form through a linear transformation.
3. To learn various methods to find roots of an equation.
4. To learn Concept of finite differences and to estimate the value for the given data using interpolation.
5. To learn Solving ordinary differential equations and evaluation of integrals using numerical techniques.

MODULE I: Matrix Algebra   [12 PERIODS]

Vector Space, basis, linear dependence and independence (Only Definitions)
Matrices: Types of Matrices, Symmetric; Hermitian; Skew-symmetric; Skew- Hermitian; orthogonal matrices; Unitary Matrices; Rank of a matrix by Echelon form and Normal form, Inverse of Non-singular matrices by Gauss-Jordan method; solving system of Homogeneous and Non-Homogeneous linear equations, LU – Decomposition Method.

MODULE II: Eigen Values and Eigen Vectors   [12 Periods]

Eigen values , Eigen vectors and their properties; Diagonalization of a matrix; Cayley-Hamilton Theorem (without proof); Finding inverse and power of a matrix by Cayley-Hamilton Theorem.

Quadratic forms: Nature, rank, index and signature of the Quadratic Form, Linear Transformation and Orthogonal Transformation, Reduction of Quadratic form to canonical forms by Orthogonal Transformation Method. Singular Value Decomposition.

MODULE III: Algebraic &Transcendental equations   [12 Periods]

(A) Solution of Algebraic and Transcendental Equations: Introduction-Errors, types of errors. Bisection Method, Method of False Position, Newton-Raphson Method.
 (B) The Iteration Method ,Ramanujan's method to find smallest root of Equation. Jacobi's Iteration method for solving system of linear equations. Gauss seidel Iteration method for solving system of linear equations.

MODULE IV: Interpolation   [12 Periods]

Introduction- Errors in Polynomial Interpolation – Finite differences- Forward Differences- Backward differences-Central differences - Symbolic relations and separation of symbols. Differences of a polynomial-Newton's formulae for interpolation; Central difference

interpolation Formulae – Gauss Central Difference Formulae ; Interpolation with unevenly spaced points-Lagrange's Interpolation formula.

MODULE-V: Numerical solution of Ordinary Differential Equations and Numerical Integration   [12 Periods]

Numerical Integration: Trapezoidal Rule, Simpson's 1/3rd Rule, Simpson's 3/8 Rule.

Numerical solution of Ordinary Differential Equations : Introduction-Solution of Ordinary Differential Equation by Taylor's series method - Picard's Method of successive Approximations - Euler's Method-Modified Euler's Method – Runge-Kutta Methods.

TEXT BOOKS

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
3. D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005.
4. M . K Jain, S R K Iyengar, R.K Jain, Numerical Methods for Scientific and Engineering Computation, New age International publishers.
5. S.S.Sastry, Introductory Methods of Numerical Analysis,5th Edition, PHI Learning Private Limited
6. Richard Bellman, Introduction to matrix Analysis, Siam, second Edition.

REFERENCES

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint,2002.
2. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications,Reprint, 2008.
3. V. Krishnamurthy, V.P. Mainra and J.L. Arora, An introduction to Linear Algebra, AffiliatedEast–West press, Reprint 2005.
4. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint,2010.

E – RESOURCES

1. https://www.youtube.com/watch?v=sSjB7ccnM_I   (Matrices – System of linear Equations)
2. https://www.youtube.com/watch?v=h5urBuE4Xhg (Eigen values and Eigen vectors)
3. https://www.youtube.com/watch?v=9y_HcckJ96o (Quadratic forms)
4. https://www.youtube.com/watch?v=3j0c_FhOt5U (Bisection Method)
5. https://www.youtube.com/watch?v=6vs-pymcsqk (Regula Falsi Method and Newton Raphson Method)
6. https://www.youtube.com/watch?v=1pJYZX-tgi0 (Interpolation)
7. https://www.youtube.com/watch?v=Atv3IsQsak8&pbjreload=101   (Numerical Solution of ODE)
8. https://www.youtube.com/watch?v=iviiGB5vxLA (Numerical Integration)

NPTEL

1. https://www.youtube.com/watch?v=NEpvTe3pFIk&list=PLLy_2iUCG87BLKl8eISe4fHKdE2_j2B_T&index=5 (Matrices – System of linear Equations)
2. https://www.youtube.com/watch?v=wrSJ5re0TAw (Eigen values and Eigen vectors)

3. https://www.youtube.com/watch?v=yuE86XeGhEA (Quadratic forms)
4. https://www.youtube.com/watch?v=WbmLBRbp0zA (Bisection Method)
5. https://www.youtube.com/watch?v=0K6olBTdcSs (Regula Falsi and Newton Raphson Method)
6. https://www.youtube.com/watch?v=KSFnfUYcxoI (Interpolation)
7. https://www.youtube.com/watch?v=QugqSa3Gl-w&t=2254s (Numerical Solution of ODE)
8. https://www.youtube.com/watch?v=NihKCpjx2_0&list=PLbMVogVj5nJRILpJJO7KrZa8Ttj4_ZAgl (Numerical Solution of ODE)
9. https://www.youtube.com/watch?v=hizXlwJO1Ck (Numerical Integration)

Course Outcomes:

After completion of the course, students will be able to:

CO's	Statement	Blooms Taxonomy Level
CO1	Find rank of a matrix and analyze solutions of system of linear equations.	Analyze
CO2	Find Eigen values and Eigen vectors of a matrix, diagonalization a matrix, verification of Cayley Hamilton theorem and reduce a quadratic form into a canonical form through a linear transformation	Apply
CO3	Find the root of a given equation by various methods	Understand
CO4	Estimate the value for the given data using interpolation	Apply
CO5	Find the numerical solutions for a given ODE's and evaluations of integrals using numerical techniques	Analyze

CO- PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak												
COS	Programme Outcomes (POs)											
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	2	2	3	3				2			1
CO2	2	2	2	3	2				2			1
CO3	2	2	2	3	2				2			1
CO4	3	2	2	3	3				2			2
CO5	2	2	2	3	3				2			2

2022-23 Onwards (MR22)	Malla Reddy Engineering College (Autonomous)	B.Tech. I Semester		
Code: C0501	Programming for Problem Solving	L	T	P
Credits: 3	(Common for CE, EEE, ME, ECE, CSE, CSE (Cyber Security), CSE (AI and ML), CSE (DS), CSE (IOT), AI, IT and Mi.E)	3	-	-

Prerequisites: NIL

Course Objectives:

Understand the basic terminology, write, compile and debug programs in computer programming

Implement different control statements for solving problems.

Understand the concept of structured program and arrays.

Implement the idea of strings and pointers.

Analyse the usage of structures and different file operations.

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

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

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

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

Conditional Statements: Simple if statement, if-else statement, if-elseif- ladder, nested if-else, Dangling else problem, switch statements.

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

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

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

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

MODULE IV: Strings and Pointers   [09 Periods]

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

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

MODULE V: Structures and File Handling   [10 Periods]

Structures – Declaration, definition and initialization of structures, accessing structure elements, nested structures, arrays of structures, structures and functions, pointers to structures, self-referential structures, unions, difference between structures and union, typedef, bit fields, enumerated types, C programming examples.

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

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

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

E–RESOURCES
1. http://oxford university press.ac.in/eBooks/ Programming in C.
2. https://www.journals.elsevier.com/science-of-computer-programming
3. http://www.ejournalofsciences.org
4. http://onlinecourses.nptel.ac.in/iiitk_cs-101
5. http://onlinevideolecture.com/ebooks/?subject=C-Programming

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

CO's	Statement	Blooms Taxonomy Level
CO1	Write algorithms and to draw flowcharts for solving problems and translate the algorithms/flowcharts to programs (in C language)..	Analyze
CO2	Apply different types of control structures to code and test a given logic in C programming language	Apply
CO3	Decompose a problem into functions and to develop modular reusable code and Use arrays to formulate algorithms and programs for Searching and sorting problems	Understand
CO4	Develop programs that make use of concepts such as strings, pointers	Apply
CO5	Analyze structures, file operations and command line arguments	Analyze

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

2022-23 Onwards (MR22)	Malla Reddy Engineering College (Autonomous)	B.Tech. I Semester		
Code:C0201	**Basic Electrical and Electronics Engineering** (Common for all branches)	**L**	**T**	**P**
Credits: 3		3	-	-

Prerequisites: Nil

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

MODULE I: DC Circuits   **9 Periods**

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

MODULE II: AC Circuits   **9 Periods**

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

MODULE III: Introduction to Electrical Machines   **10 Periods**

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

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

MODULE IV: P-N Junction Diode   **10 Periods**

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

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

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

MODULE V: Bipolar Junction Transistor (BJT):   **10 Periods**

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

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

Text Books

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

References

1. V.K. Mehta and Rohit Mehta, "Principles of Electrical Engineering and Electronics", S.Chand & Co., 2009.

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

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

Course Outcomes:

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

CO	Statement	Blooms Taxonomy Level
CO1	Apply KCL, KVL and network theorems to analyse DC circuit	Apply
CO2	Analyze the single-phase AC Circuits, the representation of alternating quantities and determining the power and power factor in these circuits.	Analyze
CO3	Comprehend the construction and Operation of DC and AC machines	Understand
CO4	Understand the operation of PN Junction diode and its application in rectifier circuits	Understand
CO5	Compare the different configurations of BJT and draw the V-I characteristics of BJT, JFET and MOSFET	Understand

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

2022-23 Onwards (MR22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. I Semester		
Code: C0502	**Programming for Problem Solving Lab** (Common for CE, EEE, ME, ECE, CSE, CSE (Cyber Security), CSE (AI and ML), CSE (DS), CSE (IOT), AI, IT and Mi.E)	**L**	**T**	**P**
Credits: 1		**-**	**-**	**2**

Prerequisites: NIL

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

Software Requirements: C

List of Programs:
1. a. Practice various Internal and External DOS Commands.
   b. Write sample examples of C programs to implement basic operations.
2. a. Write a C program to find smallest and largest of given three numbers.
   b. Write a C program to find the roots of a quadratic equation.
   c. Write a C program to check whether given character is alphabet, digit or special symbol
3. a. Write a C program to find the sum of individual digits of a positive integer.
   b. Write a C program to generate the first 'n' terms of the sequence.
   [A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence.]
4. a. Write a C program to find whether the given number is palindrome, perfect, Armstrong or strong.
   b. Write a C program to generate all the prime numbers between n1 and n2, where n1 and n2 are values supplied by the user.
5. Write C programs that use both recursive and non-recursive functions
   a. To find the factorial of a given integer.
   b. To find the GCD (greatest common divisor) of two given integers.
6. a. Write a C program to find both the largest and smallest number in a list of integers.
   b. Write a C program that uses non-recursive function to search for a Key value in a given list of integers using linear search.
   c. Write a C program that uses recursive and non -function to search for a Key value in a given sorted list of integers using Binary search.

7. a. Write a C program that implements the Bubble sort method to sort a given array of integers in ascending order.
   b. Write a C program that implements the Selection sort method to sort a given list of names in ascending order.
8. Write a C program to perform the following:
   a. Addition of Two Matrices
   b. Multiplication of Two Matrices.
9. Write a C program that uses functions to perform the following operations:
   a. To insert a sub-string into given main string from a given position.
   b. To delete n characters from a given position in a given string.
   c. To find substring in a given string
10. a. Write a C program to determine if the given string is a palindrome or not
    b. Write a C program to count the lines, words and characters in a given text.
11.
    a. Write a C program to swap two numbers, which implement call by value and call by reference.
    b. Write a C program to display the below student details using structures

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

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

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

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

Course Outcomes:

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

CO	Statement	Blooms Taxonomy Level
CO1	Make use various programming constructs and to develop C programs	Understand
CO2	Implement different Operations on arrays, strings, functions, pointers in C programming language	Apply
CO3	Analyze structures, unions and file in C language to develop Programs	Analyze

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

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

2022-23 Onwards (MR22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)			B.Tech. I / I Semester	
Code: C0H02	English Language and Communication Skills Lab (Common for CE, EEE, ME, ECE, CSE, CSE(CS), CSE (AI and ML), CSE (DS), CSE (IOT), AI, IT and Min.E)	**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 Objectives:

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

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

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

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

Speaking Skills:
Objectives:
1. To make students aware of the role of speaking in English and its contribution to their success.
2. To enable students to express themselves fluently and appropriately in social and professional contexts.

• Oral practice
• Describing objects/situations/people
• Just A Minute (JAM) Sessions.

Syllabus: English Language and Communication Skills Lab has two parts:
a. Computer Assisted Language Learning (CALL) Lab
b. Interactive Communication Skills (ICS) Lab

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

Module - I:

CALL Lab: Introduction to Phonetics – Speech Sounds – Vowels and Consonants
ICS Lab: Ice-Breaking activity and JAM session; Listening: listening for sounds in context, for ideas; Speaking: ideation and translation of ideas into sentences.

Module - II:
CALL Lab: Structure of Syllables - Past Tense Marker and Plural Marker – Weak Forms and Strong Forms - Consonant Clusters.
ICS Lab: Situational Dialogues – Role-Play- Expressions in Various Situations – Self-introduction and Introducing others – Greetings – Apologies – Requests – Social and Professional Etiquette - Telephone Etiquette; Listening: listening for specific purposes, for details; Speaking: speaking in the above situations with clarity, connectivity, maintaining voice characters.

Module - III:
CALL Lab: Word accent and Listening Comprehension-reading aloud meaningfully.
ICS Lab: Descriptions- Narrations- Giving Directions and guidelines; Listening: listening for intelligible English; Speaking: formal and informal conversations, register.

Module - IV:
CALL Lab: Intonation and Common errors in Pronunciation- reading aloud (evaluating through recording).
ICS Lab: Extempore- Public Speaking, Oral Presentation Skills; Listening: note taking and listening for speaker's tone/attitude; Speaking: organizing, connecting ideas and sentences, short forms in spoken English, errors in spoken English

Module - V:
CALL Lab: Reduction of Mother Tongue Interference and Conversation Practice
ICS Lab: Information Transfer, Debate
Minimum requirement of infrastructural facilities for EL Lab:
1. Computer Assisted Language Learning (CALL) Lab:
The Computer aided Language Lab for 40 students with 40 systems, one master console, LAN facility and English language software for self- study by learners.
System Requirement (Hardware component):
Computer network with Lan with minimum 60 multimedia systems with the following specifications:
a) P – IV Processor   b) Speed – 2.8 GHZ   c) RAM – 512 MB Minimum
d) Hard Disk – 80 GB   e) Headphones of High quality
2. Interactive Communication Skills (ICS) Lab: The Interactive Communication Skills Lab: A Spacious room with movable chairs and audio-visual aids with a Public Address System, a T. V., a digital stereo –audio & video system and camcorder etc.
Books Suggested for English Language Lab Library (to be located within the lab in addition to the CDs of the textbook which are loaded on the systems):
Prescribed Lab Manual:
Rani, Sudha. *English Language Communication Skills Laboratory*. 5th edition, Pearson Publication, 2014.

Reference Books:
1. Roach, Peter. English Phonetics and Phonology. 4ᵗʰ edition, Cambridge University Press, 2009.
2. Hughes, John and Mallett, Andrew. *Successful Presentations DVD and Student's Book Pack*. Oxford University Press, 2013.

3. Hancock, Mark. *English Pronunciation in Use* (Intermediate). 2nd edition, Cambridge University Press, 2009.
4. Karia, Akash. *Public Speaking Mastery: Speak Like a Winner*. Kindle edition, 2013.
5. Lucas, Stephen. *The Art of Public Speaking.* 11th edition, Tata McGraw Hill, 2011.

Websites:
1. http://www.mindtools.com/CommSkll/ActiveListening.htm
2. http://www.slideshare.net/alisonkis/dialogue-and-roleplay-activity
3. http://www.hse.ru/pubs/lib/data/access/ram/ticket/2/14309868938d576a532b71360b73542683807 27a22/An%20article%20for%20Monika%20(2010).pdf

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

CO	Statement	Blooms Taxonomy Level
CO1	Understand the nuances of language through audio- visual experience and group activities.	Understand
CO2	Hone 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 inhibitions	Understand
CO5	Speak with clarity and confidence; thereby enhance employability skills of the students	Understand

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

2022-23 Onwards (MR22)	Malla Reddy Engineering College (Autonomous)	B.Tech. I Semester		
Code: C1201	Engineering and IT Workshop (Common for CSE and IT)	L	T	P
Credits:2		-	1	2

Pre requisites: NIL

Course Objectives:

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

Engineering Workshop:

Problem 1: Trades for Exercises

At least two exercises from each trade

1. House-wiring
2. Soldering

Problem 2: Trades for Demonstration & Exposure

1. Carpentry
2. Wood working lathe

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

Problem 3:

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

Problem 4:

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

Problem 5:

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

Problem 6:

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

Productivity tools: LaTeX and Word Word Orientation: An overview of LaTeX and Microsoft (MS) office / equivalent (FOSS) tool word should be learned: Importance of LaTeX and MS office / equivalent (FOSS) tool Word as word Processors, Details of the three tasks and features that should be covered in each, using LaTeX and word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter.

Problem 7: Using LaTeX and Word to create project certificate. Features to be covered: - Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in both LaTeX and Word.

Problem 8: Creating project abstract Features to be covered: -Formatting Styles, inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

Problem 9: Creating a Newsletter: Features to be covered: - Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs in word.

Problem 10: Spreadsheet Orientation: Accessing, overview of toolbars, saving spreadsheet files, Using help and resources. Creating a Scheduler: -Gridlines, Format Cells, Summation, auto fill, Formatting Text

Problem 11: Calculating GPA -. Features to be covered: -Cell Referencing, Formulae in spreadsheet –average, std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function, Sorting, Conditional formatting.

Problem 12: Creating Power Point: Student should work on basic power point utilities and tools in Latex and MS Office/equivalent (FOSS) which help them create basic power point presentation. PPT Orientation, Slide Layouts, Inserting Text, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows, Hyperlinks, Inserting Images, Tables and Charts

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

Course Outcomes:

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

CO	Statement	Blooms Taxanomy Level
CO1	Knowledge of carpentry process and methods used in the design and fabrication, installation, maintenance and repair of structures and fixtures (e.g., furniture, cabinets) to accomplish work assignments along with the understanding of house wiring components.	Analyze
CO2	Apply knowledge for computer assembling and software installation and ability how to solve the trouble shooting problems and connecting the PC on to effective use of internet.	Apply
CO3	To introduce the usage of Productivity tools in crafting professional word documents, excel spreadsheets and power point presentations using open office tools and LaTeX	Understand

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

2022-23 Onwards (MR22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. I Semester		
Code: C0202	**Basic Electrical And Electronics Engineering Lab** (Common for all branches)	**L**	**T**	**P**
Credits: 1		-	-	2

Course Objectives:

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

List of Experiments:

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

Course Outcomes:

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

1. Experimentally verify the basic circuit theorems, KCL and KVL
2. Measure power, power factor and phase angle in RC circuits experimentally.
3. Acquire hands on experience of conducting various tests on dc shunt motor, single phase transformers and three phase induction motors and obtaining their performance indices using standard analytical as well as graphical methods
4. Draw the characteristics of different semiconductor devices like PN junction Diode, Zener Diode, BJT and JFET by conducting suitable experiments.
5. Experimentally verify the working of half and full wave rectifier by using PN Junction diodes.

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

2022-23 Onwards (MR22)	**Malla Reddy Engineering College** (Autonomous)	**B.Tech** **II Semester**		
Code:C0B17	**Engineering Chemistry** (Common for ALL)	**L**	**T**	**P**
Credits: 4		3	1	-

Course objectives:

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

Module I: Water and its treatment [10 Periods]

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

Module II: Molecular structure and Theories of Bonding: [10 Periods]

Introduction to Molecular orbital Theory. Linear Combination of Atomic Orbital's (LCAO), significance of bonding and anti-bonding molecular orbital, Conditions for the formation of molecular orbital's. Molecular orbital energy level diagrams of diatomic molecules -, N_2,$O_2$and F_2. Introduction to coordination compounds-ligand-coordination number (CN) - spectrochemical series. Salient features of crystal field theory, Crystal field splitting of transition metal complexes in octahedral ($[CoF_6]^{3-}$ and $[Co(CN)_6]^{3-}$) and tetrahedral ($[NiCl_4]^{2-}$ and $[Ni (CO)_4]$) fields - magnetic properties of complexes. Band structure of solids and effect of doping on conductance.

Module III: Electrochemistry and Corrosion [17 Periods]

A. Electrochemistry:

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

B. Corrosion: [7 Periods]

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

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

Introduction to Isomers - classification of isomers - structural (chain, positional & functional) and stereoisomerism-geometrical (cis-trans & E-Z system) - characteristics of geometrical isomerism, optical isomerism (chirality - optical activity, specific rotation, enantiomers and diastereomers) of tartaric acid and lactic acid. Conformational isomerism ofn-Butane. Introduction to bond cleavage (homo & hetero cleavage) - reaction intermediates and their stability. Types of organic reactions - Mechanism of substitution (SN^1& SN^2) and (E_1&E_2) reactions with suitable example. Ring opening (Beckmann rearrangement), oxidation and reduction (Cannizaro reaction), cyclization (Components of Diels-Alder reaction-Mechanism of Diels-Alder reaction with suitable example) reactions.

Synthesis of Paracetamol, Aspirin and their applications.

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

UNIT-V   FUELS AND COMBUSTION [08 PERIODS]

Fuels: Classification- solid fuels: coal – analysis of coal – proximate and ultimate analysis and their significance. Liquid fuels – petroleum and its refining, cracking – types – moving bed catalytic cracking. Knocking – octane and cetane rating, synthetic petrol - Fischer-Tropsch's process; Gaseous fuels – composition and uses of natural gas, LPG and CNG.

Combustion: Definition, Calorific value of fuel – HCV, LCV; Calculation of air quantity required for combustion of a fuel. Determination of calorific value by Junkers gas calorimeter-Numerical problems on combustion.

Text Books:
1. P.C.Jain and Monica Jain, "**A Text Book of Engineering Chemistry**", DhanpatRai Publications, New Delhi, 16th Edition 2014.
2. S.S. Dara and S.S. Umare, "**A Text Book of Engineering Chemistry**", S Chand Publications, New Delhi, 12th Edition 2010.

Reference Books:
1. B.Rama Devi, Ch.VenkataRamana Reddy and PrasanthaRath,"**Text Book of Engineering chemistry**",Cengage Learning India Pvt.Ltd,2016.
2. M.G. Fontana and N. D. Greene, "**Corrosion Engineering**", McGraw Hill Publications, New York, 3rd Edition, 1996.

Course Outcomes:

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

COs	Course Outcome	Bloom's Taxonomy Level
CO1	Understand water treatment, specifically hardness of water and purification of water by various methods.	Understand(**L2**)
CO2	Analyze microscopic chemistry in terms of atomic and molecular orbital's splitting and band theory related to conductivity	Analyze(**L4**)
CO3	Apply knowledge of electrochemical cell concept with respect to fuel cells, batteries, theories of corrosion. Applications of corrosion control methods.	Apply(**L3**)
CO4	Acquire basic knowledge on the concepts of stereochemistry, chemical reaction mechanisms that are used in the synthesis of drug molecules, interpretation of NMR in organic molecules and their uses in medical field.	Analyze (**L4**)
CO5	Acquire the knowledge of various fuels and identify a better fuel source of less pollution.	Analyze (**L4**)

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

2022-23 Onwards (MR22)	Malla Reddy Engineering College (Autonomous)	B.Tech. II Semester		
Code: C0305	**ENGINEERING DRAWING** (Common for CSE, IT, CSE (Cyber Security), CSE (AI and ML), CSE (Data Science), CSE (IoT) and AI)	L	T	P
Credits: 3		2	-	2

PREREQUISITES: NIL

Course Objectives:

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

MODULE I:

Introduction to Engineering Drawing, Principles of Engineering Graphics and their significance, Lettering.

Geometrical Constructions: Regular polygons only. Conic Sections: Ellipse, Parabola, Hyperbola– General method only Cycloidal Curves and Involute, tangents & normal for the curves.Scales: Plane Scale, Diagonal scale, Vernier Scale.

MODULE II:

Orthographic Projections: Principles of Orthographic Projections – Conventions – First and Third Angle projections.

Projection of Points: Projection of points including all four quadrants.

Projection of Lines: Projection of Lines - parallel, perpendicular, inclined to reference planes and Traces.

MODULE III:

Projection of Planes: Axis inclined to both the reference plane.

Projection of Solids: Projections of regular solids like cube, prism, pyramid, cylinder and cone by rotatingobject method. Axis inclined to both the reference plane.

MODULE IV:

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

Development of Surfaces: Development of lateral surfaces of Right Regular Solids – Prism, Cylinder, Pyramid and Cone.

MODULE V:

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

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

TEXT BOOKS

1. K.L.Narayana, S. Bheemanjaneyulu "Engineering Drawing with Auto CAD-2016" New Age InternationalPublishers, 1st Edition, 2018.

2. N.D. Bhat, "Engineering Drawing", Charotar Publishing House, 53rd Edition, 2014.

REFERENCES

1. K.L.Narayana, P.Kannaiah, "Engineering Drawing", SciTech Publishers. 2nd Edition, 2017

2. K.Venugopal,"Engineering Drawing",NewAge International Publishers, 3rd Edition, 2014.

3. K. V. Natarajan, "A text book of Engineering Graphics", Dhanalakshmi Publishers,

2015.

4. M.S. Kumar, "Engineering Graphics", D.D. Publications, 2011.

5. Trymbaka Murthy, "Computer Aided Engineering Drawing", I.K. international Publishing House, 3rdEdition, 2011.

E - RESOURCES

1. http://nptel.ac.in/courses/112103019/

2. https://www.slideshare.net/search/slideshow?searchfrom=header&q=engineering+drawing

3. https://www.wiziq.com/tutorials/engineering-drawing

4. http://freevideolectures.com/Course/3420/Engineering-Drawing

5. http://www.worldcat.org/title/journal-of-engineering-graphics/oclc/1781711

6. http://road.issn.org/issn/2344-4681-journal-of-industrial-design-and-engineering-graphics nit jalandhar (EG MECI102)

2022-23 Onwards (MR22)	**Malla Reddy Engineering College** (Autonomous)	**B.Tech.** **II Semester**		
Code: C0B09	**Semiconductor Physics**	L	T	P
Credits: 4		3	1	-

Prerequisites: Fundamentals of Physics

Course Objectives:

1. To outline the dual nature of matter
2. To elaborate the significance of the Kronig-Penney model in classifying the materials
3. To illustrate the working of p-n junction diode, photodiode, LED and solar cell
4. To compare the working of Ruby laser, He-Ne laser and semiconductor laser, besides illustrating the working principle of optical fibre and elaborate its applications.
5. To explain various logic gates.

Module–I: Quantum Mechanics [8 Periods]

Introduction, Plank's theory of black body radiation, deduction of Wien's displacement law and Ralygien's law; Louis de Broglie's concept of matter waves; Davisson and Germer experiment; G.P. Thomson Experiment; Heisenberg's uncertainty principle and its application (electron cannot exist inside the nucleus); Schrodinger's time-independent wave equation, Physical significance and properties of wave function; Particle in a one-dimensional infinite potential well.

Module – II: Band theory of solids [8 Periods]

Introduction, Postulates and drawbacks of Classical and Quantum free electron theory, Fermi Dirac distribution function; Density of energy states; Bloch theorem; Qualitative treatment of Kronig - Penney model; E Vs k relationship; Origin of energy bands; Classification of materials into Conductors, Semiconductors and insulators; Concept of Effective mass.

Module –III: Semiconductor Physics [13 Periods]

A: Introduction, Intrinsic and Extrinsic Semiconductors; Expression for carrier concentration in intrinsic and extrinsic semiconductors; Variation of Fermi energy level in Intrinsic and extrinsic semiconductors with respect to temperature and doping concentration.

B: Direct and indirect bandgap semiconductors; Carrier generation and Recombination; Drift and Diffusion mechanisms; Equation of Continuity; P-N Junction diode, Energy band diagram, V-I haracteristics; Construction and Working of Photodiode, LED & Solar cell and their applications.

Module – IV [12 Periods]

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

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

Module – V: Introduction to Digital Electronics [9 Periods]

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

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

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
3. Revised Edition, 2014.
4. P Horowitz and W. Hill, "The Art of Electronics" Cambridge University Press, 3rd edition, 2015.
5. D K Bhattacharya, Poonam Tandon, "**Engineering Physics**", Oxford University Press, 1st Edition, 2015.
6. 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

NPTEL VIDEOS:
1. http://nptel.ac.in/courses/113104012/
2. https://www.youtube.com/watch?v=9seDKvbaoHU&list=PLzJaFd3A7DZse2tQ2qUFChSiCj7jBidO0&index=29
3. https://www.youtube.com/watch?v=4a0FbQdH3dY

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

COs	Course Outcome	Bloom's 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	Apply
CO3	Analyze the working of semiconductor devices like PN junction diode, Photodiode, LED and Solar cell	Analyze
CO4	Compare and contrast Ruby, He-Ne, Semiconductor Lasers and discover the working principle of optical fibers besides and elucidating their applications.	Understand
CO5	Describe the Boolean algebra and examine various logic gates	Understand

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

2022-23 Onwards (MR22)	**Malla Reddy Engineering College** (Autonomous)	**B.Tech.** **II Semester**		
Code:C0B02	**Probability and Statistics** (Common For CSE, IT, CSE(AI&ML,DS,CS,IOT), B.Tech (AI&ML)	**L**	**T**	**P**
Credits: 3		**3**	**-**	**-**

Prerequisites: NIL

Course Objectives:
1. Define event, outcome, trial, simple event, sample space and calculate the probability that an event will occur.
2. To learn the random variables and its distributions.
3. Statistical analyses are very often concerned with the difference between means.
4. Investigate the variability in sample statistics from sample to sample
5. Identify the direction and strength of a linear correlation between two factors.

MODULE I: Probability: [10 Periods]
Introduction to Probability **;**Events, sample space, mutually exclusive events. Exhaustive events. Addition theorem for 2& n events and their related problems, conditional probability ,multiplication theorem, Dependent and Independent events, Boole's inequality, Baye's Theorem.

MODULE II: Random variables: [14 Periods]
Random variables, Discrete and continuous Random variables, Probability mass function, Probability density function, probability distribution functions, Expectation, Discrete Probability distributions. Bernoulli, Binomial, Poisson, Geometric distributions of their mean and variance, moment generating function–related problems. Continuous probability distributions: Normal distribution, Uniform distribution, exponential distribution their mean and variance, moment generating function, Central Limit theorem(Without proof).

MODULE III: Sampling Distributions: [14 Periods]
(A) Definitions of population-sampling-statistic, parameter. Types of sampling, expected values of Sample mean and variance, sampling distribution, Standard error, Sampling distribution of means and sampling distribution of variance. Parameter estimations – likelihood estimate, point estimation and interval estimation

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

Large sample tests:
   (i) Test of significance for single mean
   (i) Test of significance for difference of means
   (ii) Test of significance for single proportion
   (iii) Test of significance for difference of proportions
   (iv) Test of significance for standard deviations

MODULE IV: Small sample tests: [12 Periods]
Student t-distribution, its properties and its assumptions, Test of significance difference between sample mean and population mean; difference between means of two small samples, Snedecor's, F- distribution and its properties. Test of equality of two population variances, Chi-square distribution, its properties, Chi-square test of goodness of fit, Independence of attributes.

MODULE V: Correlation, Regression: [10 Periods]
Scatterplot, Correlation, Coefficient of correlation, the rank correlation. Regression, Regression Coefficient, The lines of regression: simple regression. Multiple regression for three variables.

Text Books

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

References

1. P. G. Hole, S. C. Port and C. J. Stone, Introduction to Probability Theory, Universal Book Stall, 2003(Reprint).
2. S. Ross, A First Course in Probability, 6th Ed., Pearson Education India, 2002.
3. W. Feller, An Introduction to Probability Theory and its Applications, Vol.1, 3rd Ed., Wiley, 1968.

E – Resources

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. **Concerned Journals/ Magazines links:**
1. http://www.pnas.org/content/93/9/3772.full.pdf (Hypothesis testing and earthquake prediction)
2. http://nsuworks.nova.edu/cgi/viewcontent.cgi?article=2373&context=tqr(Sampling Theory)
3. https://sci-hub.cc/10.1111/j.1540-6261.1996.tb05219.x (probability Distributions)

c) NPTEL Videos:

   1. http://nptel.ac.in/courses/117105085/ (Introduction to theory of probability)
   2. http://nptel.ac.in/courses/117105085/9 (Mean and variance of random variables)
   3. http://nptel.ac.in/courses/111105041/33 (Testing of hypothesis)

Course Outcomes:

After Completion of the course the students will be

COs	Course Outcome	Bloom's Taxonomy Level
CO1	Understand and appreciate the role of P&S in data analytics and big data analysis.	**Analyze**
CO2	Find the Probability in certain realistic situation	Understand
CO3	Identify distribution in certain realistic situation. It is mainly useful for circuit as well as non-circuit branches of engineering. Also able to differentiate among many random variables Involved in the probability models. It is quite useful for all branches of engineering.	Understand
CO4	Calculate mean and proportions (large and small sample) and to make Important decisions from few samples which are taken out of unmanageably huge populations.	Apply
CO5	understand how to forecast the future observations.	Understand

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

2022-23 Onwards (MR22)	Malla Reddy Engineering College (Autonomous)	B.Tech. II Semester		
Code: C0504	**Python Programming** (Common for CSE, IT, CSE (Cyber Security), CSE (AI and ML), CSE (Data Science), CSE (IoT) and AI)	**L**	**T**	**P**
Credits: 4		**3**	**1**	**-**

Course Objectives: This course will enable students to

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

MODULE - I [10 Periods]

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

MODULE - II [9 Periods]

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

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

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

MODULE - III [10 Periods]

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

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

MODULE – IV [10 Periods]

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

MODULE - V [9 Periods]

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

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

TEXT BOOKS

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

REFERENCE BOOKS

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

E–RESOURCES

1. "Learn Python - Free Interactive Python Tutorial", https://www.learnpython.org/
2. "Free Python Tutorial - Python For Beginner," https://www.udemy.com/share/101EfoB UcccV1SQHw
3. "Basics of Python for Data Science", https://olympus.greatlearning.in/courses/11265
4. "Beginners Guide / Programmers - Python Wiki", https://wiki.python.org/moin/Beginners Guide/Programmers
5. "Introduction to Python", https://www.datacamp.com/courses/intro-to-python-for-data-science

Course Outcomes:

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

COs	Course Outcome	Bloom's Taxonomy Level
CO1	Learn syntax and semantics along with the basic data structures of Python	**Analyze**
CO2	Apply different operation on Files by using modules and implement exceptions in Python	Apply
CO3	Identify the use regular expressions and multithreaded programming in Python	Understand
CO4	Implement Object Oriented Programming concepts to build programs in Python	Apply
CO5	Identify different GUI Components to Design web applications in Python	**Analyze**

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

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

2022-23 Onwards (MR22)	Malla Reddy Engineering College (Autonomous)	B.Tech. II Semester		
Code: C0B11	**Applied Physics Lab** (Common for AI&ML, CSE (AI & ML), CSE (SC), CSE (IoT), CSE (Data Science) ,CSE and IT)	**L**	**T**	**P**
Credits: 1		-	-	2

Course Objectives:

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

List of Experiments

1   Planck's constant
    To determine Planck's constant using Photo electric effect.
2   Energy band –gap of a semiconductor
    To determine the energy band gap of a semiconductor.
3   V-I and P-I characteristics of light emitting diode
    Plot V-I and P-I characteristics of light emitting diode.
4   Laser diode
    To study the Characteristics of Laser diode.
5   Solar Cell
    To study the V-I Characteristics of solar cell.
6   LCR Circuit
    To determination of resonant frequency, bandwidth and quality factor of RLC circuit.
7   Numerical Aperture of an Optical fiber
    To determine the Numerical aperture of the given fiber.
8   Bending Loss of a Fiber
    To determine the bending loss of the given fiber.
9   Light Dependent Resistance (LDR)
    To determine the characteristics of a LDR.
10 Stewart and Gee's experiment
    Determination of Magnetic field along the axis of current carrying circular coil.
11 B-H Curve
To study the magnetization of ferromagnetic material in presence of magnetic field.
12 Sonometer
To verify the frequency of AC Supply.
13. Construction of fundamental logic gates using discrete components and verification of truth   tables
14. Verification of truth tables of fundamental logic gates using ICs
15. Construction of fundamental logic gates using universal logic gates.

Course Outcomes:

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

COs	Course Outcome	Bloom's Taxonomy Level
CO1	Develop skills to impart practical knowledge in real time solution	**Analyze**
CO2	Understand principle, concept, working, application and comparison of results with theoretical calculations	Understand
CO3	Design new instruments with practical knowledge	Apply
CO4	Understand measurement technology	Understand
CO5	Use new instruments and real time applications in engineering studies	**Analyze**

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

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

2022-23 Onwards (MR22)	Malla Reddy Engineering College (Autonomous)	B.Tech. II Semester		
Code: C0B18	Engineering Chemistry Lab (Common for ALL)	L	T	P
Credits: 1		-	-	2

Course objectives:

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

List of Experiments:

1. Calibration of Volumetric apparatus.
2. Estimation of Total Hardness of water by EDTA Method.
3. Estimation of an acid by P^Hmetry.
4. Estimation of alkalinity of water.
5. Estimation of strength of an acid by Conductometry.
6. Estimation of strength of an acid by Potentiometry.
7. Estimation of Mn^{+2}ion in $KMnO_4$ by Colorimetry.
8. Determination of viscosity of given liquids by Ostwald's viscometer.
9. Determination of surface tension of given sample using stalagmometer.
10. Estimation of iron (II) by dichrometry.
11. Determination of rate constant of hydrolysis of methyl acetate.
12. Preparation of Aspirin.

Course outcomes:

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

COs	Course Outcome	Bloom's Taxonomy Level
CO1	Acquire knowledge about the chemistry lab, kind of experiments that can be performed and the precautions to perform four types of titrations & understand the principle involved in the applications of the method.	Understand
CO2	Understand about mineral analytic technique for estimation of ions/metal ions in minerals	Understand
CO3	Apply instrumental techniques such as colorimetry, conductometry & potentiometry	Apply
CO4	Learn to determine physical properties like free chlorides in water, viscosity & surface tension.	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	1											
CO2	2	1	2												
CO3	2	2		1											
CO4	2	2	1												
CO5	2	1	2												

2022-23 Onwards (MR22)	Malla Reddy Engineering College (Autonomous)		B.Tech. II Semester		
Code: C0506	Python Programming Lab (Common for CSE, IT, CSE (Cyber Security), CSE (AI and ML), CSE (Data Science) and CSE (IoT))		L	T	P
Credits: 2			-	1	2

Prerequisites: NIL
Course Objectives:
This course enables the students to develop various applications using python.

Software Requirements: Python

List of Programs:
1 a) Write a program to purposefully raise Indentation Error and correct it.
   b) Write a program to compute distance between two points taking input from the user (Pythagorean Theorem).
   c) Write a program add.py that takes 2 numbers as command line arguments and prints its sum.
2 a) Write a Program for checking whether the given number is a even number or not.
   b) Using for loop, write a program that prints out the decimal equivalents of 1/2, 1/3, 1/4, . . . , 1/10.
   c) Write a program using for loop that loops over a sequence. What is sequence?
   d) Write a program using a while loop that asks the user for a number, and prints a countdown from that number to zero.
3 a) Find the sum of all the primes below two million.
   b) Each new term in the Fibonacci sequence is generated by adding the previous two terms. By starting with 1 and 2, the first 10 terms will be: 1, 2, 3, 5, 8, 13, 21, 34, 55, 89
   c) By considering the terms in the Fibonacci sequence whose values do not exceed four million, find the sum of the even-valued terms.
   d) Write a program to count the numbers of characters in the given string and store them in a dictionary data structure
   e) Write a program to use split and join methods in the given string and trace a birthday with a dictionary data structure.
4 a) Write a program to combine two lists into a dictionary.
   b) Write a program to count frequency of characters in a given file. Can you use character frequency to tell whether the given file is a Python program file, C program file or a text file?
5 a) Write a program to print each line of a file in reverse order.
   b) Write a program to compute the number of characters, words and lines in a file.
6 a) Write a function ball _collide that takes two balls as parameters and computes if they are colliding. Your function should return a Boolean representing whether or not the balls are colliding.
       Hint: Represent a ball on a plane as a tuple of (x, y, r), r being the radius. If (distance between two balls centers) <= (sum of their radii) then (they are colliding)
   b) Find mean, median, mode for the given set of numbers in a list.
7 a) Write a function nearly_ equal to test whether two strings are nearly equal. Two strings a and b are nearly equal when a can be generated by a single mutation on b.
   b) Write a function dups to find all duplicates in the list.

    c) Write a function unique to find all the unique elements of a list.

8 a) Write a function cumulative_product to compute cumulative product of a list of numbers.

    b) Write a function reverse to reverse a list. Without using the reverse function.

9 Create a Regular Expression and implement the following

    a) Recognize the following strings: "bat," "bit," "but," "hat," "hit," or "hut."

    b) Match any pair of words separated by a single space, i.e., first and last names.

    c) Match any word and single letter separated by a comma and single space, as in last name, first initial.

10 Write a python program to implement multithreading scenarios.

11 Write a python program to simulate the banking operations using Class.

12 Write a python program to demonstrate the Queue / Stack operations using Class.

TEXT BOOKS

1. Wesley J. Chun, Core Python Programming, Second Edition, Prentice Hall, 2007.

2. Kenneth A. Lambert, Fundamentals of Python: First Programs, Cengage Learning, 2011.

REFERENCE BOOKS

1. Allen B. Downey, "Think Python, How to think like a Computer Scientist", First Edition, O'reilly Publishing, 2018.

2. Vamsi Kurama, "Python Programming: A Modern Approach", Pearson India, 2017.

3. Mark Lutz, "Learning Python", Fifth Edition, O'rielly Publishers, 2013.

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

COs	Course Outcome	Bloom's Taxonomy Level
CO1	Apply core Python scripting elements such as variables and flow control structures	Apply
CO2	Implement data structures like lists, tuple, dictionary and sequence in Python	Analyze
CO3	Build Python programs by using OOPs concepts and apply different file operations	Apply

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

2022-23 Onwards (MR22)	**Malla Reddy Engineering College** (Autonomous)	**B.Tech. III Semester**		
Code: C0507	**Discrete Mathematics**	**L**	**T**	**P**
Credits: 3		**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.

TEXTBOOKS:

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

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

E-RESOURCES:
1. http://www.cse.iitd.ernet.in/~bagchi/courses/discrete-book/fullbook.pdf
2. http://www.medellin.unal.edu.co/~curmat/matdiscretas/doc/Epp.pdf
3. http://ndl.iitkgp.ac.in/document/yVCWqd6u7wgye1qwH9xY7xPG734QA9tMJN2ncqS12ZbN7pUSSlWCxSgPOZJEokyWJlxQLYsrFyeITA70W9C8Pg
4. http://nptel.ac.in/courses/106106094/

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

COs	Course Outcome	Bloom's Taxonomy Level
CO1	**Apply** the concepts of connectives and normal forms in real time applications	Apply
CO2	**Summarize** predicate logic, relations and their operations	Analyze
CO3	Describe functions, algebraic systems, groups and Boolean algebra.	Understand
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

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

2022-23 Onwards (MR22)	**Malla Reddy Engineering College** (Autonomous)	**B.Tech. III Semester**		
Code:C0509	**Computer Organization and Architecture**	**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, ZvonksVranesic, SafeaZaky, 5th Edition, McGraw Hill.

2. Computer Organization and Architecture, William Stallings 6th Edition, Pearson/PHI.
3. Structured Computer Organization, Andrew S. Tanenbaum, 4th Edition, PHI/Pearson.

E-Resources:
1. https://books.google.co.in/books?isbn=8131700704
2. http://ndl.iitkgp.ac.in/document/yVCWqd6u7wgye1qwH9xY7Eh9eBOsT1ELoYpKlg_xngrkluevXOJLs1TbxS8q2icgUs3hL4_KAi5So5FgXcVg
3. http://ndl.iitkgp.ac.in/document/yVCWqd6u7wgye1qwH9xY7xAYUzYSlXl4zudlsolr-e7wQNrNXLxbgGFxbkoyx1iN3YbHuFrzI2jc_70rWMEwQ
4. http://nptel.ac.in/courses/106106092/

Outcomes:

COs	Course Outcome	Bloom's Taxonomy Level
CO1	Understand the theory and architecture of central processing unit	Understand
CO2	Analyze some of the design issues in terms of speed, technology, cost, performance	Analyze
CO3	Design a simple CPU with applying the theory concepts.	Apply
CO4	Use appropriate tools to design verify and test the CPU architecture	Understand
CO5	Learn the concepts of parallel processing, pipelining and inter processor communication.	Analyze

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

2022-23 Onwards (MR22)	Malla Reddy Engineering College (Autonomous)	B.Tech. III Semester		
Code: C0510	Data Structures	L	T	P
Credits: 3		3	-	-

Prerequisites: A course on "Programming for Problem Solving "

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

Module-I: **[10 Periods]**
Introduction to Data Structures, abstract data types, Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list, Stacks-Operations, array and linked representations of stacks, stack applications, Queues-operations, array and linked representations.

Module-II: **[09 Periods]**
Dictionaries: linear list representation, skip list representation, operations - insertion, deletion and searching.

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

Module-III: **[10 Periods]**
Search Trees: Binary Search Trees, Definition, Implementation, Operations- Searching, Insertion and Deletion, AVL Trees, Definition, Height of an AVL Tree, Operations – Insertion, Deletion and Searching, Definition and example of Red–Black, Splay Trees.

Module-IV: **[10 Periods]**
Graphs: Graph Implementation Methods. Graph Traversal Methods.
Sorting: 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
3.
4. Pseudo code approach with C ", Thomson (India), 2nd Edition, 2004.

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

E-Resources:
1. http://gvpcse.azurewebsites.net/pdf/data.pdf
2. http://www.sncwgs.ac.in/wp-content/uploads/2015/11/Fundamental-Data-Structures.pdf
3. http://www.learnerstv.com/Free-Computer-Science-Video-lectures-ltv247-Page1.htm

4. http://ndl.iitkgp.ac.in/document/yVCWqd6u7wgye1qwH9xY7-3lcmoMApVUMmjlExpIb1zste4YXX1pSpX8a2mLgDzZ-E41CJ6PVmY4S0MqVbxsFQ
5. http://nptel.ac.in/courses/106102064/1

Course Outcomes:

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

COs	Course Outcome	Bloom's Taxonomy Level
CO1	**Implement** the linear data structures such as linked list, stacks and queues	Understand
CO2	**Understand** the Dictionaries and Hash table representation	Understand
CO3	**Analyze** the various non linear data structures with its operations	Analyze
CO4	**Develop** the programs by using Graph Traversal and heap sort	Understand
CO5	**Apply** data structure concepts for the implementation of pattern matching and tries	Apply

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

2022-23 Onwards (MR22)	**Malla Reddy Engineering College** (Autonomous)	B.Tech. III Semester		
Code: C0511	**Object Oriented Programming**	**L**	**T**	**P**
Credits: 3		3	-	-

Prerequisites: Computer Programming

Course Objectives:

* To understand the basic object-oriented programming concepts and apply them in problem solving.
* To illustrate inheritance concepts for reusing the program.
* To demonstrate multitasking by using multiple threads and event handling
* To develop data-centric applications using JDBC.
* To understand the basics of java console and GUI based programming

MODULE-I: [10 Periods]

Object Oriented Thinking and Java Basics- Need for OOP paradigm, summary of oop concepts, coping with complexity, abstraction mechanisms. A way of viewing world – Agents, responsibility, messages, methods, History of Java, Java buzzwords, data types, variables, scope and lifetime of variables, arrays, operators, expressions, control statements, type conversion and casting, simple java program, concepts of classes, objects, constructors, methods, access control, this keyword, garbage collection, overloading methods and constructors, method binding, inheritance, overriding and exceptions, parameter passing, recursion, nested and inner classes, exploring string class.

Module II: [10 Periods]

Inheritance and Packages– Hierarchical abstractions, Base class object, subclass, subtype, substitutability, forms of inheritance specialization, specification, construction, extension, limitation, combination, benefits of inheritance, costs of inheritance. Member access rules, super uses, using final with inheritance, polymorphism- method overriding, abstract classes, the Object class. Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages.

MODULE III: [09 Periods]

Interfaces - Defining an interface, differences between classes and interfaces, implementing interface, applying interfaces, variables in interface and extending interfaces. Exploring java.io.

Exception handling and Multithreading-- Concepts of exception handling, benefits of exception handling, Termination or resumptive models, exception hierarchy, usage of try, catch, throw, throws and finally, built in exceptions, creating own exception subclasses. String handling, Exploring java.util. Differences between multithreading and multitasking, thread life cycle, creating threads, thread priorities, synchronizing threads, inter thread communication, thread groups, daemon threads. Enumerations, autoboxing, annotations, generics.

MODULE IV: [10 Periods

Event Handling: Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes. The AWT class hierarchy, user

interface components- labels, button, canvas, scrollbars, text components, check box, checkbox groups, choices,

Lists Panels – scrollpane, dialogs, menubar, graphics, layout manager – layout manager types – border, grid, flow, card and grid bag.

MODULE V: **[09 Periods]**

Applets – Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets, passing parameters to applets. Swing – Introduction, limitations of AWT, MVC architecture, components, containers, exploring swing- JApplet, JFrame and JComponent, Icons and Labels, text fields, buttons – The JButton class, Check boxes, Radio buttons, Combo boxes, Tabbed Panes, Scroll Panes, Trees, and Tables.

Text Books:
1. Java the complete reference, 7th edition, Herbert schildt, TMH.
2. Understanding OOP with Java, updated edition, T. Budd, Pearson education.

References:
1. An Introduction to programming and OO design using Java, J.Nino and F.A. Hosch, John wiley & sons.
2. An Introduction to OOP, third edition, T. Budd, Pearson education.
3. Introduction to Java programming, Y. Daniel Liang, Pearson education.
4. An introduction to Java programming and object-oriented application development, R.A. Johnson- Thomson.
5. Core Java 2, Vol 1, Fundamentals, Cay.S. Horstmann and Gary Cornell, eighth Edition, Pearson Education.
6. Core Java 2, Vol 2, Advanced Features, Cay.S. Horstmann and Gary Cornell, eighth Edition, Pearson Education
7. Object Oriented Programming with Java, R.Buyya, S.T.Selvi, X.Chu, TMH.
8. Java and Object Orientation, an introduction, John Hunt, second edition, Springer. 9. Maurach's Beginning Java2 JDK 5, SPD.

E-RESOURCES:
1. http://ndl.iitkgp.ac.in/document/xttk-4kfhvUwVlXBW-RPf64_TFk2i4LJhgQFPQ WAEt-Zobbm3twyubjRA1YOe9WVwkN2qGcxBwdHaPdi_mMQ
2. https://ndl.iitkgp.ac.in/result?q={"t":"search","k":"object%20oriented%20programming", "s":["type=\"video\""],"b":{"filters":[]}}
3. http://www.rehancodes.com/files/oop-using-c++-by-joyce-farrell.pdf
4. http://www.nptel.ac.in/courses/106103115/36

Course Outcomes:

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

COs	Course Outcome	Bloom's Taxonomy Level
CO1	Demonstrate the behavior of programs involving the basic programming constructs like control structures, constructors, string handling and garbage collection	Understand
CO2	Demonstrate the implementation of inheritance (multilevel, hierarchical and multiple) by using extend and implement keywords	Understand
CO3	Use multithreading concepts to develop inter process communication	Analyze
CO4	Understand the process of graphical user interface design and implementation using AWT or swings.	Understand
CO5	Develop applets that interact abundantly with the client environment and deploy on the server.	Apply

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

2022-23 Onwards (MR22)	Malla Reddy Engineering College (Autonomous)	B.Tech. III Semester		
Code: C1202	Introduction to IOT	L	T	P
Credits: 3		3	-	-

Course Objectives:
The objectives of the course are to:
- Understand the concepts of Internet of Things and able to build IoT applications
- Learn the programming and use of Arduino and Raspberry Pi boards.
- Known about data handling and analytics in SDN.

Module–I
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
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
Introduction to Python programming, Introduction to Raspberry Pi, Interfacing Raspberry Pi with basic peripherals, Implementation of IoT with Raspberry Pi, Case studies.

Module–IV
Implementation of IoT with Raspberry Pi, Introduction to Software defined Network (SDN), SDN for IoT, Data Handling and Analytics.

Module–V
Cloud Computing, Sensor-Cloud, Smart Cities and Smart Homes, Connected Vehicles, Smart Grid, Industrial IoT.

Case Study: Agriculture, Healthcare, Activity Monitoring

Text Books:
1. Pethuru Raj And Anupama C. Raman "The Internet 'Of Things: Enabling Technologies, Platforms, and Use Cases", (CRC Press)
2. Terokarvinen, kemo, karvinen and villey valtokari, "Make sensors": 1st edition, maker media, 2014.

Reference Books:
1. Vijay Madisetti, Arshdeep Bahga, "Internet Of Things: A Hands-On Approach"
2. Waltenegus Dargie,Christian Poellabauer, "Fundamentals Of Wireless Sensor Networks:Theory And Practice"
3. Beginning Sensor Networks With Arduino And Raspberry Pi – Charles Bell, Apress, 2013

Course Outcomes:

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

COs	Course Outcome	Bloom's Taxonomy Level
CO1	Known basic protocols in sensor networks	Understand
CO2	Program and configure Arduino boards for various designs	Understand
CO3	Python programming and interfacing for Raspberry Pi	Analyze
CO4	Explore IoT applications in different domains	Understand

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

2022-23 Onwards (MR22)	**Malla Reddy Engineering College** (Autonomous)	**B.Tech. III Semester**		
Code: C0512	**Data Structures Lab**	**L**	**T**	**P**
Credits: 1.5		-	-	3

Prerequisites: A Course on "Programming for problem solving"

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

Software Requirements: 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:

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

COs	Course Outcome	Bloom's Taxonomy Level
CO1	Develop C programs for computing and real life applications using basic data structures like stacks, queues, linked lists, Binary Search Trees	Understand
CO2	Make use of basic data structures implementing various tree and graph traversal operations and algorithms	implement
CO3	Apply the concepts of basic data structures and implement advanced operations AVL Trees, Red –Black Trees, and Splay Trees concepts	Apply

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

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

Prerequisites: NIL

Software Requirements: JDK

Course Objectives:

- To write programs using abstract classes.
- To write programs for solving real world problems using the java collection framework.
- To write multithreaded programs.
- To write GUI programs using swing controls in Java.
- To introduce java compiler and eclipse platform.
- To impart hands-on experience with java programming.

Note:

1. Use LINUX and MySQL for the Lab Experiments. Though not mandatory, encourage the use of the Eclipse platform.
2. The list suggests the minimum program set. Hence, the concerned staff is requested to add more problems to the list as needed.

List of Programs:

1. Use Eclipse or Net bean platform and acquaint yourself with the various menus. Create a test project, add a test class, and run it. See how you can use auto suggestions, auto fill. Try code formatter and code refactoring like renaming variables, methods, and classes. Try debug step by step with a small program of about 10 to 15 lines which contains at least one if else condition and a for loop.

2. 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. Handle any possible exceptions like divided by zero.

3. A) Develop an applet in Java that displays a simple message.

   B) Develop an applet in Java that receives an integer in one text field, and computes its factorial Value and returns it in another text field, when the button named "Compute" is clicked.

4. 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 Num 2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw a Number Format Exception. If Num2 were Zero, the program would throw an Arithmetic Exception. Display the exception in a message dialog box.

5. Write a Java program that implements a multi-thread application that has three threads. First thread generates a random integer every 1 second and if the value is even, the second thread computes the square of the number and prints. If the value is odd, the third thread will print the value of the cube of the number.

6. Write a Java program for the following:
   Create a doubly linked list of elements. Delete a given element from the above list. Display the contents of the list after deletion.

7. Write a Java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green with radio buttons. On selecting a button, an appropriate message with "Stop" or "Ready" or "Go" should appear above the buttons in the selected color. Initially, there is no message shown.

8. Write a Java program to create an abstract class named Shape that contains two integers and an empty method named print Area (). Provide three classes named Rectangle, Triangle, and Circle such that each one of the classes extends the class Shape. Each one of the classes contains only the method print Area () that prints the area of the given shape.

9. Suppose that a table named Table.txt is stored in a text file. The first line in the file is the header, and the remaining lines correspond to rows in the table. The elements are separated by commas.
   Write a java program to display the table using Labels in Grid Layout.

10. Write a Java program that handles all mouse events and shows the event name at the center of the window when a mouse event is fired (Use Adapter classes).

11. Write a Java program that loads names and phone numbers from a text file where the data is organized as one line per record and each field in a record are separated by a tab (\t). It takes a name or phone number as input and prints the corresponding other value from the hash table (hint: use hash tables).

12. Write a Java program that correctly implements the producer – consumer problem using the concept of inter thread communication.

13. Write a Java program to list all the files in a directory including the files present in all its subdirectories.

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. Java for Programmers, P. J. Deitel and H. M. Deitel, 10th Edition Pearson education.
   2. Thinking in Java, Bruce Eckel, Pearson Education.
   3. Java Programming, D. S. Malik and P. S. Nair, Cengage Learning.
   4. Core Java, Volume 1, 9th edition, Cay S. Horstmann and G Cornell, Pearson.

Course Outcomes:

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

COs	Course Outcome	Bloom's Taxonomy Level
CO1	Able to write programs for solving real world problems using the java collection framework	Understand
CO2	Able to write programs using abstract classes	implement
CO3	Able to write multithreaded programs	Apply
CO4	Able to write GUI programs using swing controls in Java.	Analyze

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

2022-23 Onwards (MR22)	Malla Reddy Engineering College (Autonomous)	B.Tech. III Semester		
Code: C0514	**Data Visualization Programming/Power BI Lab**	L	T	P
Credits: 2		-	1	2

Course Objectives:
- Effective use of Business Intelligence (BI) technology (Tableau) to apply data visualization
- To discern patterns and relationships in the data.
- To build Dashboard applications.
- To communicate the results clearly and concisely.
- To be able to work with different formats of data sets.

LIST OF EXPERIEMENTS:

1. Understanding Data, What is data, where to find data, Foundations for building Data Visualizations, Creating Your First visualization?

2. Getting started with Tableau Software using Data file formats, connecting your Data to Tableau, creating basic charts(line, bar charts, Tree maps), Using the Show me panel.

3. Tableau Calculations, Overview of SUM, AVR, and Aggregate features, Creating custom calculations and fields.

4. Applying new data calculations to your visualizations, Formatting Visualizations, Formatting Tools and Menus, Formatting specific parts of the view.

5. Editing and Formatting Axes, Manipulating Data in Tableau data, Pivoting Tableau data.

6. Structuring your data, Sorting and filtering Tableau data, Pivoting Tableau data.

7. Advanced Visualization Tools: Using Filters, Using the Detail panel, using the Size panels, customizing filters, Using and Customizing tooltips, Formatting your data with colors.

8. Creating Dashboards & Storytelling, creating your first dashboard and Story, Design for different displays, adding interactivity to your Dashboard, Distributing & Publishing your Visualization.

9. Tableau file types, publishing to Tableau Online, Sharing your visualizations, printing, and Exporting.

10. Creating custom charts, cyclical data and circular area charts, Dual Axis charts.

REFERENCE BOOKS:
1. Microsoft Power BI cookbook, Brett Powell, 2nd edition.
2. R Programming for Data Science by Roger D. Peng (References)
3. The Art of R Programming by Norman Matloff Cengage Learning India

Course Outcomes:

At the end of the course a student should be able to

COs	Course Outcome	Bloom's Taxonomy Level
CO1	Understand How to import data into Tableau	Understand
CO2	Understand Tableau concepts of Dimensions and Measures	implement
CO3	Develop Programs and understand how to map Visual Layouts and Graphical Properties.	Apply
CO4	Create a Dashboard that links multiple visualizations	Analyze
CO5	Use graphical user interfaces to create Frames for providing solutions to real world problems.	Understand

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

2022-23 Onwards (MR22)	Malla Reddy Engineering College (Autonomous)	B.Tech. III Semester		
Code: C00M1	**Gender Sensitization**	L	T	P
Credits: NIL	(An Activity-based Course)	-	-	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 Attitudestowards 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." "Sharethe Load."-Work: Its Politics and Economics -Fact and Fiction. Unrecognized and Unaccounted work.-Gender Development Issues-Gender, Governance and Sustainable Development-Gender andHuman 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

HumanRights Perspective-Sexual Harassment: Say No! -Sexual Harassment, not Eve-teasing- Coping withEveryday Harassment- Further Reading: "*Chupulu*".

Domestic Violence: Speaking OutIs 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 PopularLiterature- Gender Development Issues-Gender Issues-Gender Sensitive Language-Gender andPopular 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 onGender" written by A.Suneetha, Uma Bhrugubanda, DuggiralaVasanta, Rama Melkote,Vasudha Nagaraj, Asma Rasheed, GoguShyamala, Deepa Sreenivas and Susie Tharu**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 ToIrmgana People's Struggle. New Delhi: Kali for Women, 1989.
2. TriptiLahiri. "By the Numbers: Where Indian Women Work." Women's Studios Journal (14 November 2012) Available online at: http:// blogs.visj.com/ India real time/2012/11/14/by - the-numbers-where-Indan-womenworkP
3. K. Satyanarayana and Susie Thant (Ed.) Steel Nibs Are Sprouting: New Dalit Writing From South India, Dossier 2: Telugu And Kannada htto://harooreollins.co.in/BookDetailasp?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 end Nutrition, Hyderabad, National Institute of Nutrition, Indian Council of Medical Research. 1993.
6. Stree Shakti Sanghatana. 'We Were Making I listory ....' 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(GENDERAND 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.nordiclabourjournal.org/emner/likestilling (GENDER AND BIOLOGY)

Course Outcomes:

At the end of the course a student should be able to

COs	Course Outcome	Bloom's Taxonomy Level
CO1	Understanding of important issues related to gender in contemporary India.	Understand
CO2	sensitized to 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	implement
CO3	Attain a finer grasp of how gender discrimination works in our society and how to counter it..	Apply

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

2022-23 Onwards (MR22)	Malla Reddy Engineering College (Autonomous)	B.Tech. IV Semester		
Code:C0B07	**Applied Statistics and Optimization Techniques**	L	T	P
Credits: 4		4	-	-

Module – I [12 Periods]

Analysis of Variance & Analysis of Co-variance

Analysis of Variance (ANOVA):one-way & two-wav 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 [10 Periods]

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

2022-23 Onwards (MR22)	**Malla Reddy Engineering College** (Autonomous)	B.Tech. IV Semester		
Code: C0515	**Database Management Systems**	**L**	**T**	**P**
Credits: 3		**3**	**-**	**-**

Prerequisites: A course on "Data Structures".

COURSE OBJECTIVES:

- To understand the basic concepts and the applications of database systems.
- To master the basics of SQL and construct queries using SQL.
- Topics include data models, database design, relational model, relational algebra, transaction control, concurrency control, storage structures and access techniques.

MODULE – I [12 Periods]

Database System Applications: A Historical Perspective, File Systems versus a DBMS, the Data Model, Levels of Abstraction in a DBMS, Data Independence, Structure of a DBMS

Introduction to Database Design: Database Design and ER Diagrams, Entities, Attributes, and Entity Sets, Relationships and Relationship Sets, Additional Features of the ER Model, Conceptual Design With the ER Model.

MODULE – II [10 Periods]

Introduction to the Relational Model: Integrity constraint over relations, enforcing integrity constraints, querying relational data, logical database design, introduction to views, destroying/altering tables and views.

Relational Algebra, Tuple relational Calculus, Domain relational calculus.

MODULE – III [12 Periods]

SQL: QUERIES, CONSTRAINTS, TRIGGERS: form of basic SQL query, UNION, INTERSECT, and

EXCEPT, Nested Queries, aggregation operators, NULL values, complex integrity constraints in SQL, triggers and active databases.

Schema Refinement: Problems caused by redundancy, decompositions, problems related to decomposition, reasoning about functional dependencies, First, Second, Third normal forms, BCNF, lossless join decomposition, multivalued dependencies, Fourth normal form, Fifth normal form.

MODULE – IV [9 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.

MODULE – V [10 Periods]

Data on External Storage, File Organization and Indexing, Cluster Indexes, Primary and

Secondary Indexes, Index data Structures, Hash Based Indexing, Tree based Indexing, Comparison of File Organizations, Indexes- Intuitions for tree Indexes, Indexed Sequential Access Methods (ISAM),

B+ Trees: A Dynamic Index Structure.

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

REFERENCE BOOKS:

1. Database Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7thEdition.
2. Fundamentals of Database Systems, Elmasri Navrate, Pearson Education
3. Introduction to Database Systems, C. J. Date, Pearson Education
4. Oracle for Professionals, The X Team, S.Shah and V. Shah, SPD.
5. Database Systems Using Oracle: A Simplified guide to SQL and PL/SQL, Shah, PHI.
6. Fundamentals of Database Management Systems, M. L. Gillenson, Wiley Student Edition.

Course Outcomes:
At the end of the course a student should be able to

COs	Course Outcome	Bloom's Taxonomy Level
CO1	Gain knowledge of fundamentals of DBMS, database design and normal forms	Understand
CO2	Master the basics of SQL for retrieval and management of data	Analyze
CO3	Be acquainted with the basics of transaction processing and concurrency control	Apply
CO4	Familiarity with database storage structures and access techniques	Analyze

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

2022-23 Onwards (MR22)	**Malla Reddy Engineering College** (Autonomous)	**B.Tech. IV Semester**		
Code: C0516	**Operating Systems**	**L**	**T**	**P**
Credits: 3		3	-	-

Prerequisites:

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

COURSE OBJECTIVES:

- Introduce operating system concepts (i.e., processes, threads, scheduling, synchronization, deadlocks, memory management, file and I/O subsystems and protection)
- Introduce the issues to be considered in the design and development of operating system
- Introduce basic Unix commands, system call interface for process management, interprocess communication and I/O in Unix

MODULE – I   **[12 PERIODS]**

Operating System - Introduction, Structures - Simple Batch, Multiprogrammed, Time-shared, Personal Computer, Parallel, Distributed Systems, Real-Time Systems, System components, Operating System services, System Calls

Process - Process concepts and scheduling, Operations on processes, Cooperating Processes, Threads

MODULE – II   **[9 Periods]**

CPU Scheduling - Scheduling Criteria, Scheduling Algorithms, Multiple -Processor Scheduling. System call interface for process management-fork, exit, wait, waitpid, exec

Deadlocks - System Model, Deadlocks Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, and Recovery from Deadlock.

MODULE – III   **[10 Periods]**

Process Management and Synchronization - The Critical Section Problem, Synchronization Hardware, Semaphores, and Classical Problems of Synchronization, Critical Regions, Monitors **Interprocess Communication Mechanisms:** IPC between processes on a single computer system, IPC between processes on different systems, using pipes, FIFOs, message queues, shared memory.

MODULE – IV   **[9 Periods]**

Memory Management and Virtual Memory - Logical versus Physical Address Space, Swapping, Contiguous Allocation, Paging, Segmentation, Segmentation with Paging, Demand Paging, Page Replacement, Page Replacement Algorithms.

MODULE – V   [10 Periods]

File System Interface and Operations -Access methods, Directory Structure, Protection, File System Structure, Allocation methods, Free-space Management. Usage of open, create, read, write, close, lseek, stat, ioctl system calls.

TEXT BOOKS:

1. Operating System Principles- Abraham Silberchatz, Peter B. Galvin, Greg Gagne 7th Edition,John Wiley.
2. Advanced programming in the UNIX environment, W.R. Stevens, Pearson education.

REFERENCE BOOKS:

1. Operating Systems- Internals and Design Principles, William Stallings, Fifth Edition–2005,Pearson Education/PHI
2. Operating System A Design Approach- Crowley, TMH.
3. Modern Operating Systems, Andrew S. Tanenbaum 2nd edition, Pearson/PHI
4. UNIX programming environment, Kernighan and Pike, PHI/ Pearson Education.
5. UNIX Internals -The New Frontiers, U. Vahalia, Pearson Education.

Course outcomes:

COs	Course Outcome	Bloom's Taxonomy Level
CO1	Will be able to control access to a computer and the files that may be shared	Understand
CO2	Demonstrate the knowledge of the components of computers and their respective roles in computing.	Analyze
CO3	Ability to recognize and resolve user problems with standard operating environments	Apply
CO4	Gain practical knowledge of how programming languages, operating systems, and architectures interact and how to use each effectively	Analyze

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

2022-23 Onwards (MR22)	**Malla Reddy Engineering College** (Autonomous)	**B.Tech.** IV Semester		
Code: C0517	**Design and Analysis of Algorithms**	L	T	P
Credits: 3		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

Text Books:

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

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

E-Resources:
1. https://comsciers.files.wordpress.com/2015/12/horowitz-and-sahani-fundamentals-of-computer-algorithms-2nd-edition.pdf
2. http://en.cnki.com.cn/Article_en/CJFDTOTAL-JFYZ200208019.htm
3. http://nptel.ac.in/courses/106101060/

Course Outcomes:

CO	Statement	Blooms Taxanomy Level
CO1	**Analyze** performance of algorithms using asymptotic notations, performance analysis, disjoint sets, spanning trees and connected components	**Analyze**
CO2	**Describe and analyze** paradigms for designing good algorithms using Divide-and-Conquer and Greedy Techniques, applications, binary search, sorting and Strassen's matrix, greedy method, job sequencing, spanning trees and shortest path problem	**Analyze**
CO3	**Synthesize** dynamic-programming algorithms and analyze matrix chain, optimal binary search, knapsack problem and optimization methods, all pairs shortest path, travelling sales problem and reliability design	Apply
CO4	**Apply** backtracking and branch and bound techniques to solve some complex problems, n-queen problems, subset problem, graph coloring, Hamiltonian cycles and branch bound methods, travelling sales, knapsack problem, branch and bound, FIFO branch	Apply
CO5	**Apply** algorithm design techniques to solve certain NP-complete problems.	Apply

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

2021-22 Onwards (MR21)	**Malla Reddy Engineering College** (Autonomous)	**B.Tech.** **IV Semester**		
Code: C1203	**Web Technologies**	**L**	**T**	**P**
Credits: 3		**3**	**-**	**-**

COURSE OBJECTIVES:
1. To introduce Web Terminology
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 WWW : Protocols and programs, secure connections, application and development tools, the web browser, What is server, choices, setting up UNIX and Linux web servers, Logging users, dynamic IP
Web Design: Web site design principles, planning the site and navigation,

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%20RAMAKRISHNA N.pdf
3. http://airccse.org/journal/ijdms/ijdms.html
4. http://www.springer.com/computer/database+management+%26+information+retri eval?SGWID=0-153-12-114576-0
5. http://textofvideo.nptel.iitm.ac.in/video.php?courseId=106106093
6. http://www.nptelvideos.in/2012/11/database-management-system.html

COURSE OUTCOMES

1. Gain knowledge of client side scripting, validation of forms and AJAX programming
2. Have understanding of server side scripting with PHP language
3. Have understanding of what is XML and how to parse and use **XML** Data with Java
4. To introduce Server side programming with Java Servlets and JSP

<table>
<tr><td colspan="17" align="center">CO- PO, PSO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak</td></tr>
<tr><td rowspan="2">COs</td><td colspan="12" align="center">Programme Outcomes (POs)</td><td colspan="3" align="center">PSOs</td></tr>
<tr><td>PO1</td><td>PO2</td><td>PO3</td><td>PO4</td><td>PO5</td><td>PO6</td><td>PO7</td><td>PO8</td><td>PO9</td><td>PO10</td><td>PO11</td><td>PO12</td><td>PSO1</td><td>PSO2</td><td>PSO3</td></tr>
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<tr><td>CO5</td><td>3</td><td>1</td><td>1</td><td></td><td></td><td>1</td><td></td><td></td><td></td><td></td><td></td><td>1</td><td></td><td></td><td></td></tr>
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2022-23 Onwards (MR22)	**Malla Reddy Engineering College** (Autonomous)	**B.Tech. IV Semester**		
Code: C0519	**Database Management Systems Lab**	**L**	**T**	**P**
Credits: 1		**-**	**-**	**2**

Co-requisites: "Database Management Systems"

Course Objectives:
- Introduce ER data model, database design and normalization
- Learn SQL basics for data definition and data manipulation

List of Experiments:
1. Concept design with E-R Model
2. Relational Model
3. Normalization
4. Practicing DDL commands
5. Practicing DML commands
6. A. Querying (using ANY, ALL, UNION, INTERSECT, JOIN, Constraints etc.)
   B. Nested, Correlated subqueries
7. Queries using Aggregate functions, GROUP BY, HAVING and Creation and dropping of Views.
8. Triggers (Creation of insert trigger, delete trigger, update trigger)
9. Procedures
10. Usage of Cursors

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

Reference Books:

1. Database Systems design, Implementation, and Management, Peter Rob& Carlos Coronel 7th Edition.
2. Fundamentals of Database Systems, Elmasri Navrate, Pearson Education
3. Introduction to Database Systems, C.J. Date, Pearson Education
4. Oracle for Professionals, The X Team, S. Shah and V. Shah, SPD.
5. Database Systems Using Oracle: A Simplified guide to SQL and PL/SQL, Shah, PHI.
6. Fundamentals of Database Management Systems, M. L. Gillenson, Wiley Student Edition.

Course Outcomes:

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

CO	Statement	Blooms Taxanomy Level
CO1	Design database schema for a given application and apply normalization	Analyze
CO2	Acquire skills in using SQL commands for data definition and data manipulation	Apply
CO3	Develop solutions for database applications using procedures, cursors and triggers	Analyze

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

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

2022-23 Onwards (MR22)	Malla Reddy Engineering College (Autonomous)	B.Tech. IV Semester		
Code: C1204	**Design & Analysis of Algorithms Lab**	L	T	P
Credits: 1		-	-	2

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++ / JDK

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 eE 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 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./ PearsonEducation
3. Parag Himanshu Dave, Himanshu Balchandra Dave, "Design and anlysis of algorithms" Pearson.

REFERENCES

1. M.T.Goodrich and R.Tomassia"Algorithm Design, Foundations, Analysis and Internet examples", John wileyandsons.
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 GrawHill.

COURSE OUTCOMES:

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

CO	Statement	Blooms Taxanomy Level
CO1	**Analyze** asymptotic performance of algorithms, understand different methods	Analyze
CO2	**Develop** solutions to Job sequencing problems, Knapsack algorithm, shortest path algorithms,	Apply
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

COs															

<table>
<tr><td colspan="16">CO- PO, PSO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak</td></tr>
<tr><td rowspan="2">COs</td><td colspan="12">Programme Outcomes (POs)</td><td colspan="3">PSOs</td></tr>
<tr><td>PO1</td><td>PO2</td><td>PO3</td><td>PO4</td><td>PO5</td><td>PO6</td><td>PO7</td><td>PO8</td><td>PO9</td><td>PO10</td><td>PO11</td><td>PO12</td><td>PSO1</td><td>PSO2</td><td>PSO3</td></tr>
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<tr><td>CO2</td><td>3</td><td>3</td><td>3</td><td>2</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>3</td><td>2</td><td></td></tr>
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<tr><td>CO4</td><td>3</td><td>3</td><td>3</td><td>2</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>3</td><td>2</td><td></td></tr>
<tr><td>CO5</td><td>3</td><td>3</td><td>3</td><td>2</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>3</td><td>2</td><td></td></tr>
</table>

2022-23 Onwards (MR22)	**Malla Reddy Engineering College** (Autonomous)	**B.Tech.** **IV Semester**		
Code: C0522	**Node JS/React JS/ Django**	**L**	**T**	**P**
Credits: 1		**-**	**-**	**2**

Prerequisites: Object Oriented Programming through Java, HTML Basics
Course Objectives:

- To implement the static web pages using HTML and do client side validation using JavaScript.
- To design and work with databases using Java
- To develop an end to end application using java full stack.
- To introduce Node JS implementation for server side programming.
- To experiment with single page application development using React.

Exercises:

1. Build a responsive web application for shopping cart with registration, login, catalog and cart pages using CSS3 features, flex and grid.
2. Make the above web application responsive web application using Bootstrap framework.
3. Use JavaScript for doing client – side validation of the pages implemented in experiment 1 andexperiment 2.
4. Explore the features of ES6 like arrow functions, callbacks, promises, async/await. Implement an application for reading the weather information from openweathermap.org and display the information in the form of a graph on the web page.
5. Develop a java stand alone application that connects with the database (Oracle / mySql) and perform the CRUD operation on the database tables.
6. Create an xml for the bookstore. Validate the same using both DTD and XSD.
7. Design a controller with servlet that provides the interaction with application developed in experiment 1 and the database created in experiment 5.
8. Maintaining the transactional history of any user is very important. Explore the various sessiontracking mechanism (Cookies, HTTP Session)
9. Create a custom server using http module and explore the other modules of Node JS like OS,path, event.
10. Develop an express web application that can interact with REST API to perform CRUDoperations on student data. (Use Postman)
11. For the above application create authorized end points using JWT (JSON Web Token).
12. Create a react application for the student management system having registration, login, contact, about pages and implement routing to navigate through these pages.
13. Create a service in react that fetches the weather information from openweathermap.org and the display the current and historical weather information using graphical representation usingchart.js
14. Create a TODO application in react with necessary components and deploy it into github.

Reference Books:

1. Jon Duckett, Beginning HTML, XHTML, CSS, and JavaScript, Wrox Publications, 2010
2. Bryan Basham, Kathy Sierra and Bert Bates, Head First Servlets and JSP, O'Reilly Media, 2ndEdition, 2008.
3. Vasan Subramanian, Pro MERN Stack, Full Stack Web App Development with Mongo, Express, React, and Node, 2nd Edition, A Press.

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

CO	Statement	Blooms Taxanomy Level
CO1	Build a custom website with HTML, CSS, and Bootstrap and little JavaScript.	Apply
CO2	Demonstrate Advanced features of JavaScript and learn about JDBC	Analyze
CO3	Develop Server – side implementation using Java technologies like	Apply
CO4	Develop the server – side implementation using Node JS.	Apply
CO5	Design a Single Page Application using React.	Analyze

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

2022-23 Onwards (MR22)	Malla Reddy Engineering College (Autonomous)	B.Tech. IV Semester		
Code: C00M2	**Environmental Science**	L	T	P
Credits: NIL		2	-	-

Course Objectives:

- Understanding the importance of ecological balance for sustainable development.
- Understanding the impacts of developmental activities and mitigation measures
- Understanding the environmental policies and regulations

MODULE – I [10 Periods]

Ecosystems: Definition, Scope and Importance of ecosystem. Classification, structure, and function of an ecosystem, Food chains, food webs, and ecological pyramids. Flow of energy, Biogeochemical cycles, Bioaccumulation, Biomagnification, ecosystem value, services and carrying capacity, Field visits.

MODULE – II [12 Periods]

Natural Resources: Classification of Resources: Living and Non-Living resources, **water resources:** use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. **Mineral resources:** use and exploitation, environmental effects of extracting and using mineral resources, **Land resources:** Forest resources, **Energy resources:** growing energy needs, renewable and non renewable energy sources, use of alternate energy source, case studies.

MODULE – III [9 Periods]

Biodiversity And Biotic Resources: Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values. India as a mega diversity nation, Hot spots of biodiversity. Field visit. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity: In-Situ and Ex-situ conservation. National Biodiversity act.

MODULE – IV [10 Periods]

Environmental Pollution and Control Technologies: 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. **Global Environmental Problems and Global Efforts:** Climate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS). Deforestation and desertification. International conventions / Protocols: Earth summit, Kyoto protocol, and Montréal Protocol.

MODULE – V [12 Periods]

Environmental Policy, Legislation & EIA: Environmental Protection act, Legal aspects Air Act- 1981, Water Act, Forest Act, Wild life Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. EIA: EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water, biological and Socio- economical aspects. Strategies for risk assessment, Concepts of Environmental Management Plan

(EMP). **Towards Sustainable Future:** Concept of Sustainable Development, Population

and its explosion, Crazy Consumerism, Environmental Education, Urban Sprawl, Human health, Environmental Ethics, Concept of Green Building, Ecological Foot Print, Life Cycle assessment (LCA),Low carbon life style.

TEXT BOOKS:
1. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission.
2. Environmental Studies by R. Rajagopalan, Oxford University Press.

REFERENCE BOOKS:
1. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL LearningPrivate Ltd. New Delhi.
2. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela. 2008 PHILearning Pvt. Ltd.
3. Environmental Science by Daniel B. Botkin & Edward A. Keller, Wiley INDIA edition.
4. Environmental Studies by Anubha Kaushik, 4th Edition, New age international publishers.
5. Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications.

Course Outcomes:
At the end of the course, it is expected that students will be able to:

CO	Statement	Blooms Taxanomy Level
CO1	Identify and analyze environmental problems as well as the risks associated with these problems	Analyze
CO2	Understand what it is to be a steward in the environment	Understand
CO3	Studying how to live their lives in a more sustainable manner	Apply

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