ACADEMIC REGULATIONS, COURSE STRUCTURE AND DETAILED SYLLABUS

Effective from the Academic Year 2022-23 onwards

Course Structure and Syllabus for

B.Tech. Computer Science and Engineering – Data Science Programme.

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



For

B.Tech. - Four Year Degree Programme

MALLA REDDY ENGINEERING COLLEGE

(An UGC Autonomous Institution, Approved by AICTE and Affiliated to JNTUH, Hyderabad)
Recognized under section 2(f) &12 (B) of UGC Act 1956, Accredited 3 rd time by NAAC with 'A++' Grade, NIRF Rank Band 201-250,ARIIA Band Performer, NBA Tier-IAccredited (B.Tech.- CE, EEE, ME, ECE &CSE, M.Tech. - SE, EPS, TE) Maisammaguda (H), Dhulapally (Post Via Kompally), Medchal - Malkajgiri District, Secunderabad– 500100.
Telangana State. e-mail: principal@mrec.ac.in, Website: www.mrec.ac.in

MALLA REDDY ENGINEERING COLLEGE
COURSE STRUCTURE - B.Tech. CSE (DATA SCIENCE)
(MR22 Regulations)

YEAR I SEMESTER

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

I YEAR II SEMESTER

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

II YEAR I SEMESTER

SEMESTER – III							
S. No.	**Category**	**Course Code**	**Course Title**	**L**	**T**	**P**	**Credits**
1	PCC	C0508	Digital Logical Design	3	0	0	3
2	PCC	C0510	Data Structures	3	0	0	3
3	BSC	C0B22	Statistics for Data Science	3	1	0	3
4	PCC	C0509	Computer Organization and Architecture	3	0	0	3
5	PCC	C0511	Object Oriented Programming through Java	3	0	0	3
6	PCC	C0512	Data Structures Lab	0	0	3	1.5
7	PCC	C0513	Object Oriented Programming through Java Lab	0	0	3	1.5
8	MC	C00M1	Gender Sensitization	0	0	2	0
9	PCC	C0514	Skill Development Course (Data visualization- R Programming / Power BI)	0	1	2	2
Total				**15**	**2**	**10**	**20**
Total Contact Hours				**27**			

II YEAR II SEMESTER

SEMESTER – IV							
S. No.	**Category**	**Course Code**	**Course Title**	**L**	**T**	**P**	**Credits**
1	HSMC	C0H08	Business Economics & Financial Analysis	3	0	0	3
2	PCC	C0507	Discrete Mathematics	3	0	0	3
3	PCC	C0516	Operating Systems	3	0	0	3
4	PCC	C0515	Database Management Systems	3	0	0	3
5	PCC	C6701	Data Preparation and Analysis	3	1	0	4
6	PCC	C0520	Operating Systems Lab	0	0	2	1
7	PCC	C0519	Database Management Systems Lab	0	0	2	1
8	PCC	C67P1	Real-time Research Project/ Societal Related Project	0	0	2	1
9	MC	C00M2	Environmental Science	3	-	-	0
10	PCC	C0522	Skill Development Course (Node JS/ React JS/Django)	0	0	2	1
Total				**18**	**1**	**8**	**20**
Total Contact Hours				**27**			

III YEAR I SEMESTER

SEMESTER – V							
S. No.	**Category**	**Course Code**	**Course Title**	**L**	**T**	**P**	**Credits**
1	PCC	C0517	Design and Analysis of Algorithm	3	0	0	3
2		C6703	Introduction to Data Science	3	1	0	4
3		C6201	Computer Networks	3	0	0	3
Professional Elective - I							
4	PEC-I	C6619	Data Warehousing and Business Intelligence	3	0	0	3
		C6618	Artificial Intelligence				
		C1203	Web Technologies				
		C0527	Image Processing				
		C0525	Computer Graphics				
Professional Elective - II							
5	PEC-II	C0528	Embedded Systems	3	0	0	3
		C1208	Information Retrieval Systems				
		C0552	Software Process and Project Management				
		C0532	DevOps				
		C6609	Computer Vision and Robotics				
6	PCC	C1204	Design and Analysis of Algorithm Lab	0	0	2	1
7		C6202	Computer Networks Lab	0	0	2	1
8		C0H03	Advanced English Communication Skills Lab	0	0	2	1
9	MC	C00M5	Constitution of India	3	0	0	0
10	PCC	C6704	Skill Development Course (ETL-Kafka/Talend)	0	0	2	1
11	MC	C00M3	Quantitative Aptitude and Verbal Reasoning - 1	2	0	0	0
Total				**20**	**1**	**12**	**20**
Total Contact Hours				**33**			

III YEAR II SEMESTER

SEMESTER – VI							
S. No.	**Category**	**Course Code**	**Course Title**	**L**	**T**	**P**	**Credits**
1		C1213	Automata Theory and Compiler Design	3	0	0	3
2		C6620	Machine Learning	3	0	0	3
3		C6705	Big Data Analytics	3	0	0	3
Professional Elective – III							
4	PEC-III	C0536	Software Testing Methodologies	3	0	0	3
		C6707	Data Visualization Techniques				
		C0534	Scripting Languages				
		C0535	Mobile Application Development				
		C6203	Cryptography and Network Security				
5			**Open Elective - I**	3	0	0	3
6		C6626	Machine Learning Lab	0	0	2	1
7		C6706	Big Data Analytics Lab	0	0	2	1
Professional Elective - III Lab							
8	PEC-III	C0541	Software Testing Methodologies Lab	0	0	2	1
		C6708	Data Visualization Techniques Lab				
		C0539	Scripting Languages Lab				
		C0540	Mobile Application Development Lab				
		C6204	Cryptography and Network Security Lab				
9	MC	C00M6	Intellectual Property Rights	3	0	0	0
10		C00P1	Industrial Oriented Mini Project/ Summer Internship/ Skill Development Course (UI design- Flutter)	0	0	4	2
11	MC	C00M4	Quantitative Aptitude and Verbal Reasoning - 2	2	0	0	0
Total				**20**	**0**	**10**	**20**
Total Contact Hours				**30**			

IV YEAR I SEMESTER

SEMESTER – VII							
S. No.	**Category**	**Course Code**	**Course Title**	**L**	**T**	**P**	**Credits**
1	PCC	C6709	Predictive Analytics	3	0	0	4
2		C0546	Cloud Computing	3	0	0	3
Professional Elective – IV							
3		C0523	Quantum Computing	3	0	0	3
		C6713	Web and Social Media Analytics				
		C6610	Natural Language Processing				
		C0551	Robotic & Process Automations				
		C6917	Internet of Things				
Professional Elective – V							
4	PEC-V	C7328	Cognitive Computing	3	0	0	3
		C6714	Database Security				
		C6708	Data Science Applications				
		C0547	Data Mining				
		C6715	Exploratory Data Analysis				
5			**Open Elective – II**	3	0	0	3
6		C6710	Predictive Analytics Lab	0	0	2	1
7		C00P2	Project Stage – I	0	0	6	3
Total Credits				**15**	**0**	**10**	**20**
Total Contact Hours				**25**			

IV YEAR II SEMESTER

SEMESTER – VIII							
S. No.	**Category**	**Course Code**	**Course Title**	**L**	**T**	**P**	**Credits**
1	PCC	C0H09	Organizational Behavior	3	0	0	3
Professional Elective – VI							
2	PEC-VI	C0533	Full Stack Development	3	0	0	3
		C1209	Pattern Recognition				
		C6716	Video Analytics				
		C0550	Blockchain Technology				
		C0559	Cyber Forensics				
3			**Open Elective – III**	3	0	0	3
4		C00P3	Project Stage – II including Seminar	0	0	22	9+2
Total Credits				**9**	**0**	**22**	**20**

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. I Semester		
Code: C0B01	Linear Algebra and Numerical Methods (Common for CSE, CSE (Cyber Security), CSE (AI and ML), CSE (DS), CSE (IOT), AI and IT)	L	T	P
Credits: 4		3	1	-

Prerequisites: Matrices, Differentiation and Integration.

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- Hermit ia n; 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- Hamilto n Theorem; Singular Value Decomposition.

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.

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. Gauss seidel Iteration method.

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 differe nce 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 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.

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

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,
3. Reprint, 2008.
4. V. Krishnamurthy, V.P. Mainra and J.L. Arora, An introduction to Linear Algebra, Affiliated East–West press, Reprint 2005.
5. 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
9. (Numerical Solution of ODE)
10. https://www.youtube.com/watch?v=hizXlwJO1Ck (Numerical Integration) Course

Outcomes:

1. The student will be able to find rank of a matrix and analyze solutions of system of linear equations.
2. The student will be able to 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.
3. The student will be able to find the root of a given equation by various methods.
4. The student will be able to estimate the value for the given data using interpolation.
5. The student will be able to find the numerical solutions for a given ODE's and evaluations of integrals using numerical techniques.

CO- PO Mapping

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 (MR-22)	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 (AIML), CSE (DS), CSE (CS), CSE(IOT), IT and Min.E)	3	-	-

Course Objectives: This course will enable the students to:

1. Improve the language proficiency of students in English with an emphasis on Vocabulary, Grammar, Reading and Writing skills.
2. Develop study skills and communication skills in various professional situations.
3. Equip students to study engineering subjects more effectively and critically using the theoretical and practical components of the syllabus.

Course Outcomes: Students will be able to:

1. Understandthe importance of vocabulary and sentence structures.
2. Choose appropriate vocabulary and sentence structures for their oral and written communication.
3. Demonstrate their understanding of the rules of functional grammar.
4. Develop comprehension skills from the known and unknown passages.
5. Take an active part in drafting paragraphs, letters, essays, abstracts, précis and reports in various contexts.
6. Acquire basic proficiency in reading and writing modules of English.

MODULE – I

Chapter entitled '***Toasted English*' by R.K.Narayan** from ***"English: Language, Context and Culture"*** published by Orient Black Swan, Hyderabad.

Poem:"Mother to Son" by Langston Hughes

*This poem is for internal evaluation purpose(s).

Vocabulary: The Concept of Word Formation -The Use of Prefixes and Suffixes - Acquaintance with Prefixes and Suffixes from Foreign Languages to form Derivatives - Synonyms and Antonyms

Grammar: Identifying Common Errors in Writing with Reference to Articles and Prepositions.

Reading: Reading and Its Importance- Techniques for Effective Reading.

Writing: Sentence Structures -Use of Phrases and Clauses in Sentences- Importance of Proper Punctuation- Techniques for Writing precisely – Paragraph Writing – Types, Structures and Features of a Paragraph - Creating Coherence- Organizing Principles of Paragraphs in Documents

MODULE – II

Chapter entitled **'Appro JRD' by Sudha Murthy** from ***"English: Language, Context and Culture" published*** by Orient Black Swan, Hyderabad.

Vocabulary: Words Often Misspelt - Homophones, Homonyms and Homographs

Grammar: Identifying Common Errors in Writing with Reference to Noun-pronoun Agreement and Subject-verb Agreement.

Reading: Sub-Skills of Reading – Skimming and Scanning – Exercises for Practice **Writing:** Nature and Style of Writing- Defining /Describing People, Objects, Places and Events – Classifying- Providing Examples or Evidence.

Module – III

Chapter entitled **'Lessons from Online Learning' by F.HaiderAlvi, Deborah Hurst et al** from ***"English: Language, Context and Culture"*** published by Orient BlackSwan, Hyderabad.

Poem: "Father Returning Home" by Dilip Chitre

*This poem is for internal evaluation purpose(s).

Vocabulary: Words Often Confused - Words from Foreign Languages and their Use in English.

Grammar: Identifying Common Errors in Writing with Reference to Misplaced Modifiers and Tenses.

Reading: Sub-Skills of Reading – Intensive Reading and Extensive Reading – Exercises for Practice.

Writing: Format of a Formal Letter-Writing Formal Letters E.g.., Letter of Complaint, Letter of Requisition, Email Etiquette, Job Application with CV/Resume.

MODULE – IV

Chapter entitled **'Art and Literature' by Abdul Kalam** from ***"English: Language, Context and Culture"*** published by Orient Black Swan, Hyderabad.

Vocabulary: Standard Abbreviations in English

Grammar: Redundancies and Clichés in Oral and Written Communication.

Reading: Survey, Question, Read, Recite and Review (SQ3R Method) - Exercises for Practice

Writing: Writing Practices- Essay Writing-Writing Introduction and Conclusion - Précis Writing.

MODULE – V

Chapter entitled "After Twenty Years" by O' Henry

Vocabulary: Technical Vocabulary and their Usage

Grammar: Common Errors in English *(Covering all the other aspects of grammar which were not covered in the previous units)*

Reading: Reading Comprehension-Exercises for Practice

Writing: Technical Reports- Introduction – Characteristics of a Report – Categories of Reports Formats- Structure of Reports (Manuscript Format) -Types of Reports - Writing a Report

Note: ***Listening and Speaking Skills which are given under Unit-6 in AICTE Model Curriculumare covered in thesyllabus of ELCS Lab Course.***

Note: 1. As the syllabus of English given in AICTE *Model Curriculum-2018 for B.Tech First Year is* ***Open-ended,*** besides following the prescribed textbook, it is required to prepare teaching/learning materials **by the teachers collectively** in the form of handouts based on the needs of the students in their respective colleges for effective teaching/learning in the class.

Note: **2**. Based on the recommendations of NEP2020, teachers are requested to be flexible to adopt Blended Learning in dealing with the course contents. They are advised to teach 40 percent of each topic from the syllabus in blended mode.

TEXTBOOK:

1. "English: Language, Context and Culture" by Orient BlackSwan Pvt. Ltd, Hyderabad. 2022.Print.

Reference Books:

1. MREC English Complementary Materials.
2. Effective Academic Writing by Liss and Davis (OUP)
3. Richards, Jack C. (2022) Interchange Series. Introduction, 1,2,3. Cambridge University Press
4. Wood,F.T. (2007). Remedial English Grammar. Macmillan.
5. Chaudhuri, Santanu Sinha. (2018). Learn English: A Fun Book of Functional Language,Grammar and Vocabulary. (2nd ed.,). Sage Publications India Pvt. Ltd.
6. (2019). Technical Communication. Wiley India Pvt. Ltd.
7. Vishwamohan, Aysha. (2013). English for Technical Communication for Engineering Students.Mc Graw-Hill Education India Pvt. Ltd.
8. Swan, Michael. (2016). Practical English Usage. Oxford University Press. Fourth Edition.

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:

1. use written and spoken English considerably well for academic purposes.
2. communicate in Enrich accurately and fluently.
3. employ extensive and intensive reading skills.
4. gain confidence in writing for academic and real life situations.
5. use standard grammar, punctuation, and spelling in technical documents.

CO - PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak												
CO S	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 (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. I Semester		
Code: C0201	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING (Common for CE, EEE, ME, ECE, CSE, CSE (AIML), CSE (DS), CSE (CS), CSE(IOT), IT and Min.E)	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 [09 Periods]

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

MODULE II: AC Circuits [09 Periods]

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

MODULE III: Introduction to Electrical Machines [10 Periods]

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

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

MODULE IV: P-N Junction Diode [10 Periods]

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

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

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

MODULE V: BJT and Junction Field Effect Transistor (JFET) [10 Periods]

Bipolar Junction Transistor (BJT): Construction, Principle of Operation, Symbol, Amplifying Action, Common Emitter, Common Base and Common Collector configurat ions 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 Pi la, 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. Mehtha and Rohit Mehta, "Principles of Electrical Engineering and Electronics", S.Chand& Co., 2009.
2. Jacob Milliman, Christos C. Halkias, Satyabrata Jit (2011), "Electronic Devices andCircuits", 3rd edition, Tata McGraw Hill, New Delhi.
3. Thomas L. Floyd and R. P. Jain, "Digital Fundamentals", Pearson Education, 2009.
4. David A. Bell, "Electronic Devices and Circuits", Oxford University Press, 2008.
5. Nagrath I.J. and D. P. Kothari, "Basic Electrical Engineering", Tata McGraw Hill, 2001.
6. Mittle N., "Basic Electrical Engineering", Tata McGraw Hill Education, New Delhi, 2nd Edition, 2005.

E - RESOURCES

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

Course Outcomes:

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

1. Apply basic laws in electrical circuit.
2. Analyze the single phase circuits
3. Comprehend the construction and Operation of DC and AC machines
4. Know the practical importance of Diode and its characteristics
5. Recognize the construction and operation of BJT and JFET

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

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. I Semester		
Code: C0501	Programming for Problem Solving (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: 3		3	-	-

Prerequisites: **NIL Course Objectives:**

1. To learn the fundamentals of computers.
2. To understand the various steps in program development.
3. To learn the syntax and semantics of the C programming language.
4. To learn the usage of structured programming approaches in solving problems

MODULE I: Introduction to Programming [10 Periods]
Compilers, compiling and executing a program. Representation of Algorithm - Algorithms for finding roots of a quadratic equations, finding minimum and maximum numbers of a given set, finding if a number is prime number Flowchart/Pseudocode with examples, Program design and structured programming.

Introduction to C Programming Language: variables (with data types and space requirements), Syntax and Logical Errors in compilation, object and executable code, Operators, expressions and precedence, Expression evaluation, Storage classes (auto, extern, static and register), type conversion, The main method and command line arguments Bitwise operations: Bitwise AND, OR, XOR and NOT operators

Conditional Branching and Loops: Writing and evaluation of conditionals and consequent branching with if, if-else, switch-case, ternary operator, goto, Iteration with for, while, do-while loops

I/O: Simple input and output with scanf and printf, formatted I/O, Introduction to stdin, stdout and stderr.Command line arguments

MODULE II: Arrays, Strings, Structures and Pointers: [09 Periods]

Arrays: one and two dimensional arrays, creating, accessing and manipulating elements of arrays Strings: Introduction to strings, handling strings as array of characters, basic string functions available in C (strlen, strcat, strcpy, strstr etc.), arrays of strings

Structures: Defining structures, initializing structures, unions, Array of structures

Pointers: Idea of pointers, Defining pointers, Pointers to Arrays and Structures, Use of Pointers in self- referential structures, usage of self referential structures in linked list (no implementation) Enumeration data type

MODULE III: Preprocessor and File handling in C: [10 Periods]

Preprocessor: Commonly used Preprocessor commands like include, define, undef, if, ifdef, ifndef Files: Text and Binary files, Creating and Reading and writing text and binary files, Appending data to existing files, Writing and reading structures using binary files, Random access using fseek, ftell and rewind functions.

MODULE IV: Function and Dynamic Memory Allocation: [09 Periods]

Functions: Designing structured programs, Declaring a function, Signature of a functio n, Parameters and return type of a function, passing parameters to functions, call by value, Passing arrays to functions, passing pointers to functions, idea of call by reference, Some C standard functions and libraries

Recursion: Simple programs, such as Finding Factorial, Fibonacci series etc., Limitations of Recursive functions Dynamic memory allocation: Allocating and freeing memory, Allocating memory for arrays of different data types

MODULE V: Searching and Sorting: [10 Periods]

Basic searching in an array of elements (linear and binary search techniques), Basic algorithms to sort array of elements (Bubble, Insertion and Selection sort algorithms), Basic concept of order of complexity through the example programs.

TEXTBOOKS

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

REFERENCES

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

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

Outcomes:

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

1. To write algorithms and to draw flowcharts for solving problems.
2. To convert the algorithms/flowcharts to C programs.
3. To code and test a given logic in the C programming language.
4. To decompose a problem into functions and to develop modular reusable code.
5. To use arrays, pointers, strings and structures to write C programs.
6. Searching and sorting problems.

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

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. II Semester		
Code: C0H02	English Language and Communication skills Lab (Common for CE, EEE, ME, ECE, CSE, CSE(AIML), CSE(DS), CSE (CS), CSE(IOT),IT and Min.E)	L	T	P
Credits: 1		-	-	3

The **English Language and Communication Skills (ELCS) Lab** focuses on the production and practice of sounds of language and familiarizes the students with the use of English in everyday situations both in formal and informal contexts.

COURSE OBJECTIVES:

- To facilitate computer-assisted multi-media instruction enabling individualized and independent language learning
- To sensitize the students to the nuances of English speech sounds, word accent, intonation and rhythm
- To bring about a consistent accent and intelligibility in students' pronunciation of English by providing an opportunity for practice in speaking
- To improve the fluency of students in spoken English and neutralize the impact of dialects.
- To train students to use language appropriately for public speaking, group discussions andinterviews

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
- Role play – Individual/Group activities
- Just A Minute (JAM) Sessions.

The following course content is prescribed for the **English Language and Communication Skills Lab**. **Exercise – I**

CALL Lab:

Understand: Listening Skill- Its importance – Purpose- Process- Types- Barriers- Effective Listening. Practice: Introduction to Phonetics – Speech Sounds – Vowels and Consonants – Minimal Pairs- Consonant Clusters- Past Tense Marker and Plural Marker- Testing Exercises

ICS Lab:

Understand: Spoken vs. Written language- Formal and Informal English.

Practice: Ice-Breaking Activity and JAM Session- Situational Dialogues – Greetings – Taking Leave – Introducing Oneself and Others.

Exercise –

II CALL Lab:

Understand: Structure of Syllables – Word Stress– Weak Forms and Strong Forms – Stress pattern in sentences – Intonation.

Practice: Basic Rules of Word Accent - Stress Shift - Weak Forms and Strong Forms- Stress pattern in sentences – Intonation - Testing Exercises

ICS Lab:

Understand: Features of Good Conversation – Strategies for Effective Communicat io n. Practice: Situational Dialogues – Role Play- Expressions in Various Situations –Making Requests and Seeking Permissions - Telephone Etiquette.

Exercise - III CALL Lab:

Understand: Errors in Pronunciation-Neutralising Mother Tongue Interference (MTI). Practice: Common Indian Variants in Pronunciation – Differences between British and American Pronunciation -Testing Exercises

ICS Lab:

Understand: Descriptions- Narrations- Giving Directions and Guidelines – Blog Writing Practice: Giving Instructions – Seeking Clarifications – Asking for and Giving Directions – Thanking and Responding – Agreeing and Disagreeing – Seeking and Giving Advice – Making Suggestions.

Exercise – IVCALL Lab:

Understand: Listening for General Details.

Practice: Listening Comprehension Tests - Testing Exercises ICS Lab:

Understand: Public Speaking – Exposure to Structured Talks - Non-verbal Communication- Presentation Skills.

Practice: Making a Short Speech – Extempore- Making a Presentation. Exercise – VCALL Lab:

Understand: Listening for Specific Details.

Practice: Listening Comprehension Tests -Testing Exercises ICS Lab:

Understand: Group Discussion Practice: Group Discussion Minimum Requirement of infrastructural facilities for ELCS Lab:

1. **Computer Assisted Language Learning (CALL) Lab:**

The Computer Assisted Language Learning Lab has to accommodate 40 students with 40 systems, with one Master Console, LAN facility and English language learning software for self- study by students.

System Requirement (Hardware component):

Computer network with LAN facility (minimum 40 systems with multimedia) with the following specifications:

i) Computers with Suitable Configuration
ii) High Fidelity Headphones

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. or LCD, a digital stereo –audio & video system and camcorder etc.

Source of Material (Master Copy):

Exercises in Spoken English. Part 1,2,3. CIEFL and Oxford University Press

Note: Teachers are requested to make use of the master copy and get it tailor-made to suit the contents of the syllabus.

Suggested Software:

- Cambridge Advanced Learners' English Dictionary with CD.
- Grammar Made Easy by Darling Kindersley.
- Punctuation Made Easy by Darling Kindersley.
- Oxford Advanced Learner's Compass, 10th Edition.
- English in Mind (Series 1-4), Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge.
- English Pronunciation in Use (Elementary, Intermediate, Advanced) Cambridge University Press.
- English Vocabulary in Use (Elementary, Intermediate, Advanced) Cambridge University Press. TOEFL & GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS).
- Digital All
- Orell Digital Language Lab (Licensed Version)

Reference Books:

1. (2022). *English Language Communication Skills – Lab Manual cum Workbook.* Cengage Learning India Pvt. Ltd.
2. Shobha, KN&Rayen, J. Lourdes. (2019). *Communicative English – A workbook.* Cambridge University Press
3. Kumar, Sanjay & Lata, Pushp. (2019). *Communication Skills: A Workbook.* Oxford University Press
4. Board of Editors. (2016). *ELCS Lab Manual: A Workbook for CALL and ICS LabActivities.* Orient Black Swan Pvt. Ltd.
5. Mishra, Veerendra et al. (2020). *English Language Skills: A Practical Approach.* Cambridge University Press

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/da ta /a ccess/ra m/tic ke t/2/14309868938d576a 532b71360b 73542683807 27a2 2/An%20article%20for%20Monika%20(2010).pdf

Course Outcomes:

Course Outcomes: Students will be able to:

1. Understand the nuances of English language through audio- visual experience and group activities
2. Neutralise their accent for intelligibility
3. Speak with clarity and confidence which in turn enhances their employability skills

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

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. I Semester		
Code: C0202	Basic Electrical and Electronics Engineering Lab (Common for ALL)	L	T	P
Credits: 1		-	-	2

Prerequisites: NIL Course Objectives:

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

List of Experiments:

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

Course Outcomes:

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

1. Analyze electrical circuits by applying basic laws
2. Analyze the performance of DC Motor, three phase Induction motor and transformer
3. Understand V-I Characteristics of various diodes
4. Design Different Rectifier Circuits
5. Differentiate the Transistors and their Operations

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

COs	Programme Outcomes (POs)												PSOs		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	2		3		3				1		1	2	2	1	
CO2	2		2		3							1	1		
CO3	2		2		2							3			2

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. I Semester		
Code: C0502	Programming for Problem Solving Lab (Common for ALL)	L	T	P
Credits: 1		-	-	2

Prerequisites: NIL Software Requirements: C

[Note:The programs may be executed using any available Open Source/ Freely available IDESome of the Tools available are:

CodeLite: https://codelite.org/ Code:Blocks:

http://www.codeblocks.org/DevCpp :

http://www.bloodshed.net/devcpp.htmlEclipse: http://www.eclipse.org

This list is not exhaustive and is NOT in any order of preference]

Objectives: The students will learn the following:

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

List of Programs:

PRACTICE SESSIONS:

a. Write a simple program that prints the results of all the operators available in C (including pre/post increment , bitwise and/or/not , etc.). Read required operand values from standard input.
b. Write a simple program that converts one given data type to another using auto conversion and casting. Take the values from standard input.

SIMPLE NUMERIC PROBLEMS:

a. Write a program for finding the max and min from the three numbers.
b. Write the program for the simple, compound interest.
c. Write a program that declares Class awarded for a given percentage of marks, where mark <40%= Failed, 40% to <60% = Second class, 60% to <70%=First class, >= 70% =Distinction. Read percentage from standard input.

d. Write a program that prints a multiplication table for a given number and the number of rows inthe table. For example, for a number 5 and rows = 3, the output should be:
e. 5 x 1 = 5
f. 5 x 2 = 10
g. 5 x 3 = 15
h. Write a program that shows the binary equivalent of a given positive number between 0 to 255.

EXPRESSION EVALUATION:

a. A building has 10 floors with a floor height of 3 meters each. A ball is dropped from the top of the building. Find the time taken by the ball to reach each floor. (Use the formula s =ut+(1/2)at^2 where u and a are the initial velocity in m/sec (= 0) and acceleration in m/sec^2 (= 9.8 m/s^2)).
b. Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement)
c. Write a program that finds if a given number is a prime number
d. Write a C program to find the sum of individual digits of a positive integer and test given number is palindrome.
e. A Fibonacci sequence is defined as follows: the first and second terms in the sequence are0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.
f. Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
g. Write a C program to find the roots of a Quadratic equation.
h. Write a C program to calculate the following, where x is a fractional value. i. 1- x/2+x^2/4-x^3/6
i. Write a C program to read in two numbers, x and n, and then compute the sum of this geometric progression: 1+x+x^2+x^3+ +x^n. For example: if n is 3 and x is 5, then the program computes 1+5+25+125.

ARRAYS, POINTERS AND FUNCTIONS:

a. Write a C program to find the minimum, maximum and average in an array of integers.
b. Write a function to compute mean, variance, Standard Deviation, sorting of n elementsin a single dimension array.
c. Write a C program that uses functions to perform the following:
d. Addition of Two Matrices
e. Multiplication of Two Matrices
f. Transpose of a matrix with memory dynamically allocated for the new matrix as row and columncounts may not be the same.
g. Write C programs that use both recursive and non-recursive functions
h. To find the factorial of a given integer.
i. To find the GCD (greatest common divisor) of two given integers.
j. To find x^n
k. Write aprogram for reading elements using a pointer into an array and display the values using the array.
l. Write aprogram for display values reverse order from an array using a pointer.
m. Write aprogram through a pointer variable to sum of n elements from an array.

FILES:

a. Write a C program to display the contents of a file to standard output device.
b. Write a C program which copies one file to another, replacing all lowercase characterswith their uppercase equivalents.
c. Write a C program to count the number of times a character occurs in a text file. The filename and the character are supplied as command line arguments.
d. Write a C program that does the following:
e. It should first create a binary file and store 10 integers, where the file name and 10 values are given in the command line. (hint: convert the strings using atoi function)
f. Now the program asks for an index and a value from the user and the value at that index should be changed to the new value in the file. (hint: use fseek function)
g. The program should then read all 10 values and print them back.
h. Write a C program to merge two files into a third file (i.e., the contents of the first filefollowed by those of the second are put in the third file).

STRINGS:

a. Write a C program to convert a Roman numeral ranging from I to L to its decimal equivalent.
b. Write a C program that converts a number ranging from 1 to 50 to Roman equivalent
c. Write a C program that uses functions to perform the following operations:
d. To insert a sub-string into a given main string from a given position.
e. To delete n Characters from a given position in a given string.
f. Write a C program to determine if the given string is a palindrome or not (Spelled same inboth directions with or without a meaning like madam, civic, noon, abcba, etc.)
g. Write a C program that displays the position of a character ch in the string S or – 1 if Sdoesn‘t contain ch.
h. Write a C program to count the lines, words and characters in a given text.

MISCELLANEOUS:

a. Write a menu driven C program that allows a user to enter n numbers and then choose between finding the smallest, largest, sum, or average. The menu and all the choices are to befunctions. Use a switch statement to determine what action to take. Display an error message if an invalid choice is entered.
b. Write a C program to construct a pyramid of numbers as follows:

```
1        *        1        1        *
1 2      * *      2 3      2 2      * *
1 2 3    * * *    4 5 6    3 3 3    * *

                                    *
                           4 4 4 4  * *
                                    *
```

SORTING AND SEARCHING:

a. Write a C program that uses non recursive function to search for a Key value in a given
b. list of integers using linear search method.
c. Write a C program that uses non recursive function to search for a Key value in a given
d. sorted list of integers using binary search method.
e. Write a C program that implements the Bubble sort method to sort a given list of
f. integers in ascending order.
g. Write a C program that sorts the given array of integers using selection sort in descending order
h. Write a C program that sorts the given array of integers using insertion sort in ascending order
i. Write a C program that sorts a given array of names

TEXT BOOKS:

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

REFERENCES:

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

Outcomes:

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

1. formulate the algorithms for simple problems
2. translate given algorithms to a working and correct program
3. correct syntax errors as reported by the compilers
4. identify and correct logical errors encountered during execution
5. represent and manipulate data with arrays, strings and structures
6. use pointers of different types
7. create, read and write to and from simple text and binary files
8. modularize the code with functions so that they can be reused

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

Cos	Programme Outcomes (POs)												PSOs		
	PO 1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO 2	PSO 3
CO1	3	2	3										2	2	
CO2	3	3	3										2	2	
CO3	2	2	2										2	2	

2022-23 Onwards (MR-22)	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:

The Engineering and IT Workshop for engineers is a training lab course spread over 60 hours. The modules include training on PC Hardware, Internet & World Wide Web and Productivity tools including Word, Excel, PowerPoint and Publisher and Engineering workshop trades.

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:

Task 1: Identify the peripherals of a computer, components in a CPU and its functions. Draw the blockdiagram of the CPU along with the configuration of each peripheral and submit to your instructor.

Task 2: Every student should disassemble and assemble the PC back to working condition. Lab instructors should verify the work and follow it up with a Viva. Also students need to go through the video which shows the process of assembling a PC. A video would be given as part of the course content.

Task 3: Every student should individually install MS windows on the personal computer. Lab instructor should verify the installation and follow it up with a Viva.

Task 4: Every student should install Linux on the computer. This computer should have windows installed. The system should be configured as dual boot with both Windows and Linux. Lab instructors should verify the installation and follow it up with a Viva Internet & World Wide Web

Task1: **Orientation & Connectivity Boot Camp:** Students should get connected to their

Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally students should demonstrate, to the instructor, how to access the websites and email. If there is no internet connectivity preparations need to be made by the instructors to simulate the WWW on the LAN.

Task 2: Web Browsers, Surfing the Web: Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers. Also, plug-ins like Macromedia Flash and JRE for applets should be configured.

Task 3: **Search Engines & Netiquette:** Students should know what search engines are and how to use the search engines. A few topics would be given to the students for which they need to search on Google. This should be demonstrated to the instructors by the student.

Task 4: Cyber Hygiene: Students would be exposed to the various threats on the internet and would be asked to configure their computer to be safe on the internet. They need to customize their browsers to block pop ups, block active x downloads to avoid viruses and/or worms.

LaTeX and WORD

Task 1 – Word Orientation: The mentor needs to give an overview of LaTeX and Microsoft (MS) office or equivalent (FOSS) tool word: Importance of LaTeX and MS office or equivale nt (FOSS) tool Word as word Processors, Details of the four tasks and features that would be covered in each, Using LaTeX and word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter in word.

Task 2: Using LaTeX and Word to create a 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.

Task 3: 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.

Task 4: 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 and Mail Merge in word.

Excel

Excel Orientation: The mentor needs to tell the importance of MS office or equivalent (FOSS) tool Excel as a Spreadsheet tool, give the details of the four tasks and features that would be covered in each. Using Excel – Accessing, overview of toolbars, saving excel files, Using help and resources.

Task 1: Creating a Scheduler - Features to be covered: Gridlines, Format Cells, Summat io n, auto fill, Formatting Text

Task 2 : Calculating GPA - .Features to be covered:- Cell Referencing, Formulae in excel – average, std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count

function, LOOKUP/VLOOKUP

Task 3: Split cells, freeze panes, group and outline, Sorting, Boolean and logical operators, Conditional formatting

POWERPOINT

Task 1: Students will be working on basic power point utilities and tools which help them create basic powerpoint presentations. PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in PowerPoint.

Task 2: Interactive presentations - Hyperlinks, Inserting –Images, Clip Art, Audio, Video, Objects, Tables and Charts.

Task 3: Master Layouts (slide, template, and notes), Types of views (basic, presentation, slide slotter, notes etc), and Inserting – Background, textures, Design Templates, Hidden slides.

REFERENCE BOOKS:

1. Comdex Information Technology course tool kit Vikas Gupta, WILEY Dreamtech
2. The Complete Computer upgrade and repair book, 3rd edition Cheryl A Schmidt, WILEY Dreamtech
3. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
4. PC Hardware - A Handbook – Kate J. Chase PHI (Microsoft)
5. LaTeX Companion – Leslie Lamport, PHI/Pearson.
6. IT Essentials PC Hardware and Software Companion Guide Third Edition by David Anfinson and Ken Quamme. – CISCO Press, Pearson Education.
7. IT Essentials PC Hardware and Software Labs and Study Guide Third Edition by Patrick Regan– CISCO Press, Pearson Education.

Course Outcomes:

1. Perform Hardware troubleshooting
2. Understand Hardware components and inter dependencies
3. Safeguard computer systems from viruses/worms
4. Document/ Presentation preparation
5. Perform calculations using spreadsheets
6. Perform Engineering workshop practice.

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

COs	Programme Outcomes (POs)												PSO s		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	3	1		3							3	2		
CO2	3	3	1		3							3	2		
CO3	3	3	1		3							3	2		

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech II Semester		
Code: C0B17	Engineering Chemistry	L	T	P
Credits: 4	(for CE, EEE, ME, ECE, CSE, CSE (AIML), CSE (DS), CSE (CS), CSE (IOT), IT, AI and Min.E))	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 stereochemistr y, understanding the chemical reaction path way mechanisms and synthesis of drugs. Listing out various types of fuels and understanding the concept of calorific value and combustion.

Module I: Water and its treatment [10 Periods]

Introduction to water, hardness of water, causes of hardness, expression of hardness, units and types of hardness-Numerical Problems. Alkalinity of water, specifications of potable water (BIS); Estimation of temporary & permanent hardness of water by EDTA method. Boiler troubles - Scale & Sludge, Priming and foaming, caustic embrittlement and boiler corrosion; Treatment of boiler feed water - Internal treatment (colloidal, phosphate, carbonate and 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 ($[CoF6]^{3-}$ and $[Co(CN)6]^{3-}$) and tetrahedral ($[NiCl4]^{2-}$ and [Ni (CO)4]) fields - magnetic properties of complexes. Band structure of solids and effect of doping on conductance.

Module III: Electrochemistry and Corrosion

Electrochemistry: [7 Periods]

Introduction to Electrochemistry-Conductance (Specific and Equivalent) and units. Types of cells-electrolytic & electrochemical cells (Galvanic Cells)-Electrode potential- cell potential (EMF).Electrochemical series and its applications, Nernst equation its applications and numerical problems. Reference electrodes - Calomel Electrode 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.

Corrosion: [7 Periods]

Causes and effects of corrosion: Theories of corrosion - Chemical & Electrochemica l 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 (Galvanizatio n), Electroplating (Copper) and Electroless plating (Nickel).

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

Introduction to Isomers - classification of isomers - structural (chain, positional & functio nal) and stereoisomerism-geometrical (cis-trans & E-Z system) - characteristics of geometrica l isomerism, optical isomerism (chirality - optical activity, specific rotation, enantiomers and diastereomers) of tartaric acid and lactic acid. Conformational isomerism of n-Butane. Introduction to bond cleavage (homo & hetero cleavage) - reaction intermediates and their stability. Types of organic reactions - Mechanism of substitution (SN^1 & SN^2) and (E1&E2) reactions with suitable example. Ring opening (Beckmann rearrangement), oxidation and reduction (Cannizaro reaction), cyclization (Components of Diels-Alder reaction-Mechanis m 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-Numer ical problems on combustion.

Text Books:

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

Reference Books:

1. B.Rama Devi, Ch.VenkataRamana Reddy and PrasanthaRath, **"Text Book**

of 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.

3. K. P. C. Volhardt and N. E. Schore, **"Organic Chemistry: Structure and Function"**, 5th Edition, 2006.

E-Resources:

a) Concerned Website links:

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

b) Concerned Journals/Magazines links:

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

c) NPTEL Videos:

1. nptel.ac.in/courses/113108051/ (corrosion & electrochemistry web course)
2. https://www.youtube.com/watch?v=V7-8EOfZKeE (Stereochemistry) Course

Outcomes:

After completion of the course students will be able to:

1. Understand water treatment, specifically hardness of water and purification of water byvarious methods.
2. Analyze microscopic chemistry in terms of atomic and molecular orbital's splitting and bandtheory related to conductivity.
3. Acquire knowledge on electrochemical cells, fuel cells, batteries and their applications.
4. Acquire basic knowledge on the concepts of stereochemistry, reaction mechanisms and interpretation of NMR in organic molecules.
5. Acquire the knowledge of various fuels and identify a better fuel source of less pollution.

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

COs	Programme Outcomes (POs)												PSOs		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	2	2	3		3				1		1	2	2	1	
CO2	2	2	2		3		1					1	1		
CO3	2		2		2							3			2

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. II Semester		
Code: C0B02	Probability and Statistics for CSE, CSE (Cyber Security), CSE (AI andML), CSE (DS), CSE (IOT), AI and IT)	L	T	P
Credits: 3		3	-	-

Prerequisites: Basic Probability 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: [12 Periods]

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

MODULE II: Random variables: [12 Periods]

Discrete Probability distributions. Bernoulli, Binomial, Poission, Geometric distributions of their mean and variance, moment generating function–related problems. Continuo us probability distributions: Normal distribution, Uniform distribution of their mean and variance, moment generating function, Central Limit theorem.

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
(ii) Test of significance for difference of means
(iii) Test of significance for single proportion
(iv) Test of significance for difference of proportions

MODULE IV: Small sample tests: [12 Periods]

Student t-distribution, its properties and its assumptions, Test of significance differe nce 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]

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. 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, Universa1 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

a) Concerned Website links:

1. http://www.csie.ntu.edu.tw/~sdlin/download/Probability%20&%20Statistics.pdf(Prob ability& 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)

b) 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:

1. The students will understand and appreciate the role of P&S in data analytics and big data analysis.
2. Students would be able to find the Probability in certain realistic situation
3. Students would be able to 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 forall branches of engineering.
4. The student would be able to calculate mean and proportions (large and small sample) and to make Important decisions from few samples which are taken out of unmanageably huge populations.
5. Students will understand how to forecast the future observations.

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

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	3	3		3		2	2			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

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. II Semester		
Code: C0B09	Semiconductor Physics mon for CSE, CSE (Cyber Security), CSE (AI and ML), CSE (DS), CSE (IOT), AI and IT)	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 law and Ralygie n'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 significa nce 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 Characteristics; 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.

Course Outcomes:

At the end ofthe course, student will beable to

1. Explain the dual nature of the matter and evaluate the energy of a particle trapped in 1Dinfinite potential well.
2. Classify the materials into conductors, semiconductors and insulators based on the outcomes of Kronig - Penney model.
3. Analyze the working of semiconductor devices like PN junction diode, Photodiode, LED and Solar cell.
4. Compare and contrast Ruby, He-Ne, Semiconductor Lasers and discover the working principle of optical fibers besides and elucidating their applications.
5. Describe the Boolean algebra and examine various logic gates.

Text Books:

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

Reference Books:

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

e- RESOURCES

1. https://www.researchgate.net/publication/259574083_Lecture_Notes_on_Engineering_ Physics
2. https://www.researchgate.net/publication/292607115_Applied_Physics
3. https://www.livescience.com/33816-quantum-mechanics-explanation.html Journals:

1. http://www.springer.com/physics/theoretical%2C+mathematical+%26+computation al+p hysics/journal/40094
2. http://www.springer.com/physics/journal/340 NPTEL VIDEOS:

1. http://nptel.ac.in/courses/113104012/
2. https://www.youtube.com/watch?v=9seDKvbaoHU&list=PLzJaFd3A7DZse2tQ2qUF Ch SiCj7jBidO0&index=29
3. https://www.youtube.com/watch?v=4a0FbQdH3dY

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	3	3		3		2	2			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

2022-23 Onwards (MR-22)	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	-

Prerequisites: Nil

Course Objectives: This course will enable students to

1. Learn syntax and semantics along with the basic data structures of Python
2. Python functions to facilitate code reuse, Handle modules
3. Use Python to read and write files, Explore Python's object-oriented features
4. Understand Exception handling and multithreaded programming in Python.
5. Build GUI programming in Python.

MODULE - I **[10 Periods]**

Introduction: Introduction to Python, Input and Output Functions, Comments, Variables, Data Types - Integers, Strings, Booleans; Operators- Arithmetic Operators, Comparison (Relationa l) Operators, Assignment Operators, Logical Operators, Bitwise Operators, Membership Operators, Identity Operators, Type conversions, Expressions and order of evaluations Control Flow- if, if-elif-else, for, while, break, continue, pass.

Data Structures: Lists - Operations, Slicing, Methods; Tuples, Sets, Dictionaries.

MODULE - II **[9 Periods]**

Functions: Functions, Defining Functions, Ca ling Functions, Passing Arguments, Keyword Arguments, Default Arguments, Variable-length arguments, Anonymous Functions, Fruitful Functions(Function Returning Values), Scope of the Variables in a Function - Global and Local Variables, Lambda Functions Recursion.

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

MODULE - III **[10 Periods]**

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.

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 – IV [10 Periods]

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

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

MODULE - V [9 Periods]

GUI Programming: Introduction, Tkinter and Python Programming, Creating Your First Python GUI Application With Tkinter, Adding a Widget, Text and Images With Label Widgets, Clickable Buttons With Button Widgets, User Input With Entry Widgets, Multiline User Input With Text Widgets, Widgets to Frames With Frame Widgets, Standard attributes, Layout Controlling With Geometry Managers, pack(),place()grid().

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'reily Publishing, 2018.
2. Vamsi Kurama, "Python Programming: A Modern Approach", Pearson India, 2017.
3. Mark Lutz, "Learning Python", Fifth Edition, O'rielly Publishers, 2013.
4. Reema Thareja, Python Programming: Using Problem Solving Approach, OUP, 2017.

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/Beginn ersGuide/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

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. Implementregular expressions and exemplary applications related to GUI Programming in Python.

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

2022-23 Onwards (MR-22)	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: 10 Periods

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 Cycloid and Involutes.

Scales: Plane Scale, Diagonal scale.

MODULE II: 10 Period

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 one reference plane.

MODULE III: 9 Periods

Projection of Planes: Axis inclined to one reference plane.

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

MODULE IV: 10 Periods

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: 9
Periods

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 International Publishers, 1st Edition, 2018.
2. N.D. Bhat, "Engineering Drawing", Charotar Publishing House, 53rd Edition, 2014.

REFERENCES

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

E - RESOURCES

1 http://nptel.ac.in/courses/112103019/
2 https://www.slideshare.net/search/slideshow?searchfrom=header&q=engineering+drawi ng
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)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	3	3		3		2	2			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

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. I Semester		
Code: C0B18	Engineering Chemistry Lab (Common for CE, EEE, ME, ECE, CSE, CSE(AIML), CSE(DS), CSE (CS), CSE(IOT), IT and Min.E)	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^H metry.
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 KMnO4 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:

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

1 Estimate the hardness of given water samples.
2 Select lubricants for various purposes.
3 Prepare advanced polymers & drug materials.
4 Know the strength of an acid present in batteries.
5 Calculate the amount of Mn^{+2} present in unknown substances/ores using instrumental methods.

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

COs	Programme Outcomes (POs)												PSOs		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	2		3		3				1		1	2	2	1	
CO2	2		2		3							1	1		
CO3	2		2		2							3			2

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. II Semester		
Code: C0B11	Applied Physics Lab (Common for CSE, CSE (AI & ML), CSE (CS), CSE (IoT), CSE (Data Science), IT, ECE and EEE)	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 oftruth tables
14 Verification of truth tables of fundamental logic gates using ICs
15 Construction of fundamental logic gates using universal logic gates.

Course Outcomes:

1 At the end of the course, students will able to
2 Develop skills to impart practical knowledge in real time solution.
3 Understand principle, concept, working, application and comparison of results with theoretical calculations.

4 Design new instruments with practical knowledge.
5 Understand measurement technology.
6 Use new instruments and real time applications in engineering studies.

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

2022-23 Onwards (MR-22)	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), AIML, CSIT andCSE (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:

1 a) Write a program to demonstrate different number data types in Python

b) Write a program to purposefully raise Indentation Error and correct it.

c) Write a program to compute distance between two points taking input from the user (Pythagorean Theorem).

2 a) Write a program to perform different Arithmetic Operations on numbers in Python.

b) Write a program to create, concatenate and print a string and accessing sub-string from a given string

3 a) Write a program to count the numbers of characters in the given string and store them in a dictionary data structure

b) Write a program to combine two lists into a dictionary.

4 a) Write a Program for checking whether the given number is even number or not.

b) Write a Python script that prints prime numbers less than N (N to be taken from user), and print the sum of all primes.

5 a) Write a program using a while loop that asks the user for a number, and prints a countdown from that number to zero.

b) write a program, that prints out the decimal equivalents of 1/2, 1/3, 1/4, . . ., 1/10, using for loop.

6 a) Write a python program to define a module to find Fibonacci Numbers and import the module to another program.

b) Write a python program to define a module and import a specific function of that module to another program.

7 a) Write a function dups to find all duplicates in the list.

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

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

8 a) Write a script named copyfile.py. This script should prompt the user for the names of two text files. The contents of the first file should be input and written to the second file.

b) Write a program to print each line of a file in reverse order.

c) Write a program add.py that takes 2 numbers as command line arguments and prints its sum.

9 a) Write a program to compute the number of characters, words and lines in a file.

b) Find mean, median, mode for the given set of numbers in a list.

10 a) Write a program to perform addition of two square matrices

b) Write a program to perform multiplication of two square matrices

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

12 Write a GUI for an Expression Calculator using tk

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'reily Publishing, 2018.
2. VamsiKurama, "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

1. Able to understand basic fundamentals of writing Python scripts
2. Able to learn core Python scripting elements such as variables and flow control structures
3. Able to know how to work with lists and sequence data
4. Able to write Python functions to facilitate code reuse
5. Able to use Python to read and write files

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

COs	Programme Outcomes (POs)												PSOs		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	2		3		3				1		1	2	2	1	
CO2			2		3							1	1		
CO3			2		2							3			2

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. III Semester		
Code: C0508	Digital Logic Design (Common for CSE, CSE (Cyber Security), CSE (AI andML), CSE(DS), CSE(IOT), AIML and IT)	L	T	P
Credits: 3		3	-	-

Prerequisites: Nil Course Objectives:

This course aims at through understanding of binary number system, logic gates, combination logic and synchronous and asynchronous logic.

MODULE - I: [10 PERIODS]

BOOLEAN ALGEBRA AND LOGIC GATES: Digital Systems, Binary Numbers, Number base conversions, Octal and Hexadecimal Numbers, complements, Signed binary numbers, Binary codes, Binary Storage and Registers, Binary logic.

Basic Definitions, Axiomatic definition of Boolean Algebra, Basic theorems and properties of Boolean algebra, Boolean functions, canonical and standard forms, other logic operations, Digital logic gates.

MODULE - II: [9 PERIODS]

GATE – LEVEL MINIMIZATION: The map method, Four-variable map, Five-Variable map, product of sums simplification Don't-care conditions, NAND and NOR implementation other Two-level implementations, Exclusive – Or function.

MODULE - III: [10 PERIODS]

COMBINATIONAL LOGIC: Combinational Circuits, Analysis procedure Design procedure, Binary Adder-Subtractor Decimal Adder, Binary multiplier, magnitude comparator, Decoders, Encoders, Multiplexers, HDL for combinational circuits.

MODULE - IV: [9 PERIODS]

SEQUENTIAL LOGIC: Sequential circuits, latches, Flip-Flops Analysis of clocked sequential circuits, state Reduction and Assignment, Design Procedure. Registers, shift Registers, Ripple counters, synchronous counters, other counters.

MODULE – V: [10 PERIODS]

MEMORIES AND ASYNCHRONOUS SEQUENTIAL LOGIC: Introduction, Random- Access Memory, Memory Decoding, Error Detection and correction Read-only memory, Programmab le

logic Array programmable Array logic, Sequential Programmable Devices. Introduction, Analysis Procedure, Circuits with Latches, Design Procedure, Reduction of state and FlowTables, Race-Free state Assignment Hazards, Design Example.

TEXT BOOKS:

1. Digital Design – Third Edition, M. Morris Mano, Pearson Education/PHI.
2. Digital Principles and Applications Albert Paul Malvino Donald P. Leach TATA McGraw Hill Edition.
3. Fundamentals of Logic Design, Roth, 5th Edition, Thomson.

REFERENCE BOOKS:

1. Switching and Finite Automata Theory by Zvi. Kohavi, Tata McGraw Hill.
2. Switching and Logic Design, C.V.S. Rao, Pearson Education
3. Digital Principles and Design – Donald D.Givone, Tata McGraw Hill, Edition.
4. Fundamentals of Digital Logic and Microcomputer Design, 5TH Edition, M. Rafiquzzaman JohnWiley.

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

COs	Programme Outcomes (POs)												PSOs		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	2	2									2			
CO2		2	3									1			
CO3	2	2	3	2	2							2			
CO4	3														
CO5	3														

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. III Semester		
Code: C0510	**Data Structures** (Common for CSE, CSE (DS), CSE (AI and ML), CSE (Cyber Security), CSE (IOT), AIML and IT)	L	T	P
Credits: 3		3	-	-

Prerequisites: A course on "Programming for Problem Solving " Course Objectives:

- Exploring basic data structures such as stacks and queues.
- Introduces a variety of data structures such as hash tables, search trees, tries, heaps, graphs.
- Introduces sorting and pattern matching algorithms

MODULE-I: [10 Periods]

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

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, B- Trees, B+ Trees, AVL Trees, Definition, Height of an AVL Tree, Operations – Insertion, Deletion and Searching, Red –Black, Splay Trees.

MODULE-IV: [10 Periods]

Graphs: Graph Implementation Methods. Graph Traversal Methods.

Sorting: Quick Sort, 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. Fundamentals of Data Structures in C, 2 nd Edition, E. Horowitz, S. Sahni and Susan Anderson Freed, Universities Press.
2. Data Structures using C – A. S.Tanenbaum, Y. Langsam, and M.J. Augenstein, PHI/Pearson Education

REFERENCES:

3. Data Structures: A Pseudocode Approach with C, 2 nd Edition, R. F. Gilberg and B.A.Forouzan,Cengage Learning

E-RESOURCES:

4. http://gvpcse.azurewebsites.net/pdf/data.pdf
5. http://www.sncwgs.ac.in/wp-content/uploads/2015/11/Fundamental-Data- Structures.pdf
6. http://www.learnerstv.com/Free-Computer-Science-Video-lectures-ltv247- Page1.htm
7. http://ndl.iitkgp.ac.in/document/yVCWqd6u7wgye1qwH9xY7-3lcmoMApVUMmjlExpIb1zste4YXX1pSpX8a2mLgDzZ- E41CJ6PVmY4S0MqVbxsFQ
8. http://nptel.ac.in/courses/106102064/1 Course Outcomes:

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

- Ability to select the data structures that efficiently model the information in a problem.
- Ability to assess efficiency trade-offs among different data structure implementations or combinations.
- Implement and know the application of algorithms for sorting and pattern matching.
- Design programs using a variety of data structures, including hash tables, binary and general tree structures, search trees, tries, heaps, graphs, and AVL-tree

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

COs	Programme Outcomes (POs)												PSOs		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
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 (MR-22)	MALLAREDDYENGINEERINGCOLLEGE (Autonomous)	B.Tech. III Semester		
Code:C0B22	Statistics for Data Science CSE (Data Science)	L	T	P
Credits:3		3	-	-

Pre-requisite: Basic concepts of statistics Course Objectives:

1. To learn Analysis of variance, ANCOVA and design of experiments in manufacturing firms.
2. To learn advanced design of experiments and their applications.
3. To learn quality control, Six Sigma and its importance to real life problems.
4. To learn multiple regression and Application of Time-series.
5. To learn MANOVA and multivariate analysis

Module-I: Analysis of Variance & Analysis of Co-variance

[12Periods]

Analysis of Variance (ANOVA): one-way & two-way ANOVA and multiple comparisons. Analysis of Co- variance (ANCOVA) (Only one way). Conducting ANCOVA – Two way Comparison of the efficiencies of above designs. Introduction to Factorial design - 22 and 2n Factorial design.

Module-II: Design of Experiments

[12Periods]

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.

Module-III: Statistical Quality Control

[12Periods]

A: Importance of SQC in industry. Statistical basis of She wart control charts. Construction of control charts for variables (mean, range and standard deviation) and attributes (p, np, c & d charts with fixed and varying sample sizes).

B: Interpretation of control charts. Natural tolerance limits and specification limits process capability index. Concept of Six sigma and its importance, Single and double sampling plans.

Module-IV: Multiple Regression and Time Series

[12Periods] Multiple Regressions form-independent variables

Time Series: Fitting a trend line to a time series, Method of least Squares and Method of Moving Averages, Measure of Seasonal Variation.

Module-V: Multivariate Analysis

[12Periods]

Introduction to Multivariate analysis, Nature of Multivariate analysis, Classification of Multivariate techniques: PCA, Factor analysis, Cluster Analysis, Discriminant Analysis, Mahalanobis D square,

MANOVA, Nearest neighbour hood method. Text Books:

1. MonteGomery,"AppliedStatisticsandProbabilityforEngineers",6thEdition,WileyPublications.
2. J. K. Sharma, "Operations research Theory and applications" Macmillan publishers India limited, 4thedition.
3. Paul A Maeyer Introductory Probability and Statistical Applications, John Wiley Publicaitons.

Reference Books:

1. WillamFeller: "Introduction to Probability theory and its applications". Volume –I, Wiley2.
2. GoonAM, Gupta MK, Das Gupta B: "Fundamentals of Statistics", Vol-I, the WorldPress Pvt. Ltd., Kolakota.
3. V.K.KapoorandS.C.Gupta:"Fundamentals of Mathematical Statistics", Sultan Chand &Sons, New Delhi

EResources

a) ConcernedWebsitelinks

1. https://onlinecourses.science.psu.edu/stat502/node/183(ANCOVA)
2. http://www.uoguelph.ca/~dsparlin/sqc.htm(StatisticalQualitycontrol)
3. http://irh.inf.unideb.hu/~jsztrik/education/16/SOR_Main_Angol.pdf(BasicQueueing Theory)

b) ConcernedJournals/Magazineslinks

1. https://sci-hub.cc/10.1007/BF02294394(ANOVAandANCOVA)
2. http://www.ijpcsonline.com/files/34-781.pdf(DesignofExperiments)
3. https://sci-hub.cc/10.1016/0377-2217(95)00069-0(StatisticalQualitycontrol)

c) NPTEL Videos

1. http://nptel.ac.in/courses/110106064/5 (IntroductiontoDataAnalysis)
2. http://nptel.ac.in/courses/111104075/(ANOVAandDesignofExperiments)
3. http://nptel.ac.in/courses/110105039/(Qualitymanagement)

Course Outcomes:

At end of the course student can able to

1. Perform Analysis of variance, ANCOVA and design of experiments in manufacturing firms.
2. Understand advanced design of experiments and their applications.
3. Understand concept of quality control, Six Sigma and its importance to real life problems.
4. Understand the concept of multiple regression and Application of Time-series.
5. Perform MANOVA and multivariate analysis

CO-PO,PSOMapping (3/2/1indicatesstrengthofcorrelation)3-Strong,2-Medium,1-Weak															
COs	**ProgrammeOutcomes(POs)**												**PSOs**		
	PO 1	**PO2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PSO1**	**PSO2**	**PSO3**
CO1	1		3										2	3	
CO2	2	1						2					1	2	
CO3								2					3		
CO4															
CO5															

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. III Semester		
Code: C0509	Computer Organization and Architecture (Common for CSE, CSE(DS), CSE (AI and ML), CSE(Cyber Security), CSE(IOT), AIML and IT)	L	T	P
Credits: 3		3	-	-

Prerequisites: A Course on "DLD". Objectives

4. The purpose of the course is to introduce principles of Digital fundamentals computer organization and the basic architectural concepts.
5. It begins with basic organization, design, and programming of a simple digita l computer and introduces simple register transfer language to specify various computer operations.
6. Topics include computer arithmetic, instruction set design, microprogrammed control unit, pipelining and vector processing, memory organization and I/O systems, and multiprocessors.

MODULE – I [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 – II [10 Periods]

Micro programmed Control: Control memory, Address sequencing, micro program example, design of control unit. Central Processing Unit: General Register Organizat ion, Instructio n Formats, Addressing modes, Data Transfer and Manipulation, Program Control.

MODULE – III [9 Periods]

Data Representation: Data types, Complements, Fixed Point Representation, Floating Point Representation. Computer Arithmetic: Addition and subtraction, multiplication Algorit hms, Division Algorithms, Floating – point Arithmetic operations. Decimal Arithmetic unit, Decimal Arithmetic operations.

MODULE – IV [10 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.

MODULE – V [9 Periods]

Reduced Instruction Set Computer: CISC Characteristics, RISC Characteristics. Pipeline and Vector Processing: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processor. Multi Processors: Characteristics of Multiprocessors, Interconnection Structures, Interprocessor arbitration, Interprocessor communication and synchronization, Cache Coherence.

Textbook:

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

4. Computer Organization, Car Hamacher, ZvonksVranesic, SafeaZaky, 5th Edition, McGraw Hill.
5. Computer Organization and Architecture, William Stallings 6th Edition, Pearson/PHI.
6. 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_xn grkluevXOJLs1TbxS8q2icgUs3hL4_KAi5So5FgXcVg

Outcomes:

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

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

COs	Programme Outcomes (POs)												PSO s		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	2	2									2			
CO2		2	3									1			
CO3	2	2	3	2	2							2			
CO4	3														
CO5	3														

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. III Semester		
Code: C0511	Object Oriented Programming through Java (Common for CSE, CSE (DS), CSE (AI and ML), CSE (Cyber Security), CSE (IOT) and IT)	L	T	P
Credits: 3		3	-	-

Prerequisites: Computer Programming Course Objectives:

1 To understand the basic object-oriented programming concepts and apply them in problem solving.
2 To illustrate inheritance concepts for reusing the program.
3 To demonstrate multitasking by using multiple threads and event handling
4 To develop data-centric applications using JDBC.
5 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, implement ing 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 – Introductio n, 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:

6. Java the complete reference, 7th edition, Herbert schildt, TMH.
7. 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

1. Demonstrate the behavior of programs involving the basic programming constructs like control structures, constructors, string handling and garbage collection.
2. Demonstrate the implementation of inheritance (multilevel, hierarchical and multiple) by using extend and implement keywords
3. Use multithreading concepts to develop inter process communication.
4. Understand the process of graphical user interface design and implementation using AWT or swings.
5. Develop applets that interact abundantly with the client environment and deploy on the server.

COs	**ProgrammeOutcomes(POs)**												**PSOs**		
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**	**PSO 3**
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 (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. III Semester		
Code: C0512	**Data Structures Lab** (Common for CSE, CSE (Cyber Security), CSE (AI and ML), CSE (DS), CSE (IOT), AI and IT)	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: Turbo C / C++List of Programs:

1. Write a program that uses functions to perform the following operations onsingly linked list.:
   i) Creation ii) Insertion iii) Deletion iv) Traversal
2. Write a program that uses functions to perform the following operations ondoubly linked list.:
   i) Creation ii) Insertion iii) Deletion iv) Traversal
3. Write a program that uses functions to perform the following operations oncircular linkedlist.:
   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 Queue (its operations) using
   i) Arrays ii) Pointers
6. Write a program that implements the following sorting methods to sort a given list of integers in ascending order
   i) Quick sort ii) Heap sort iii) Merge sort
7. Write a program to implement the tree traversal methods(Recursive and Non Recursive).
8. Write a program to implement
   i) Binary Search tree ii) B Trees iii) B+ Trees iv) AVL trees v) Red - Black trees
9. Write a program to implement the graph traversal methods.
10. Implement a Pattern matching algorithms using Boyer- Moore, Knuth-Morris-Pratt

TEXT BOOKS

1. Fundamentals of Data Structures in C, 2nd Edition, E. Horowitz, S. Sahni and SusanAnderson Freed, Universities Press.
2. Data Structures using C – A. S. Tanenbaum, Y. Langsam, and M. J. Augenstein,PHI/Pearson Education.

REFERENCES

3. Data Structures: A Pseudocode Approach with C, 2nd Edition, R. F. Gilberg and B. A. Forouzan, Cengage Learning.

Outcomes:

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

- Ability to develop C programs for computing and real-life applications using basic elements like control statements, arrays, functions, pointers and strings, and data structures like stacks, queues and linked lists.
- Ability to Implement searching and sorting algorithms

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

COs	Programme Outcomes (POs)												PSOs		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	2	3	2										3	2	
CO2	2	2	3										2	3	
CO3		2	3										2	3	1

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. III Semester		
Code: C0513	**Object Oriented Programming through Java Lab (Common for CSE, CSE (Cyber Security), CSE (AI and ML), CSE (DS), CSE (IOT), AI and IT)**	**L**	**T**	**P**
Credits: 1.5		**-**	**-**	**3**

Prerequisites: NIL

Software Requirements: JDK Course Objectives:

1 To write programs using abstract classes.
2 To write programs for solving real world problems using the java collection framework.
3 To write multithreaded programs.
4 To write GUI programs using swing controls in Java.
5 To introduce java compiler and eclipse platform.
6 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 ofthree 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. Initia lly, 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 oneof 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 areseparated 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 thedata 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

- Able to write programs for solving real world problems using the java collection framework.
- Able to write programs using abstract classes.
- Able to write multithreaded programs.
- Able to write GUI programs using swing controls in Java.

CO- PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COs	**ProgrammeOutcomes (POs)**												**PSOs**		
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**	**PSO 3**
CO1		2	3										3	2	
CO2			3		2								2	3	
CO3		2	2		2									2	

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. III Semester		
Code: C0514	Data visualization- R Programming/ Power BI Lab (Common for CSE, CSE (Cyber Security), CSE (AI and ML), CSE (DS), CSE (IOT), AI and IT)	L	T	P
Credits: 2		-	1	2

Course Objectives:

- Effective use of Business Intelligence (BI) technology (Tableau) to apply datavisualization
- 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.

Software Requirements: Microsoft Power BI, Google data studio, Data wrapper and Tableau Public

LAB PROBLEMS:

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.

Course Outcomes:

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

- Understand How to import data into Tableau.
- Understand Tableau concepts of Dimensions and Measures.

- Develop Programs and understand how to map Visual Layouts and Graphical Properties.
- Create a Dashboard that links multiple visualizations.
- Use graphical user interfaces to create Frames for providing solutions to real world
- problems.

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.

CO- PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COs	**ProgrammeOutcomes (POs)**												**PSOs**		
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**	**PSO 3**
CO1		2	3										3	2	
CO2			3		2								2	3	
CO3		2	2		2									2	

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. III Semester		
Code: C00M1	GENDER SENSITIZATION (An Activity-based Course) (Common for All)	L	T	P
Credits: NIL		-	-	2

Prerequisites: **NIL COURSE DESCRIPTION**

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

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

Objectives of the Course:

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

MODULE I: UNDERSTANDING GENDER [06 Periods]

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

MODULE II: GENDER ROLES AND RELATIONS [06 Periods]

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

Binary

MODULE III: GENDER AND LABOUR [07 Periods]

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

MODULE IV: GENDER - BASED VIOLENCE [07 Periods]

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

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

MODULE V: GENDER AND CULTURE [06 Periods]

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

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

Note: Since it is Interdisciplinary Course, Resource Persons can be drawn from thefields 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
2. 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.
3. 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
4. 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
5. 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.
6. 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.
7. 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 (UNDERSTANDIN G 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,

- Students will have developed a better understanding of important issues related to gender in contemporary India.
- Students will be sensitized to basic dimensions of the biological, sociologica l, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.
- Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
- Students will acquire insight into the gendered division of labour and its relation to politics

and economics.

- ❖ Men and women students and professionals will be better equipped to work and live together as equals.
- ❖ Students will develop a sense of appreciation of women in all walks of life.
- ❖ Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women, the textbook will empower students to understand and respond to gender violence.

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

COs	Programme Outcomes (POs)												PSOs		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1						3		3	3		2	3	1		
CO2						3		3	3		2	3	2		
CO3						3		3	3		2	3	1		

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B. Tech. IV Semester		
Code: C0H08	)NOMICS ANDFINANCIAL ANALYSIS	L	T	P
CREDIT:3		3	0	0

Course Objective:

To learn the basic business types, impact of the economy on Business and Firms specificall y.To analyze the Business from the Financial Perspective. Course Outcome: The students will understand the various Forms of Business and the impact of economic variables on the Business. The Demand, Supply, Production, Cost, Market Structure, Pricing aspects are learnt. The Students can study the firm's financial position by analysing the Financial Statements of a Company.

Unit – I: Introduction to Business and Economics Business: Structure of Business Firm, Theory of Firm, Types of Business Entities, Limited Liability Companies, Sources of Capitalfor a Company, Non-Conventional Sources of Finance. Economics: Significance of Economics, Micro and Macro Economic Concepts, Concepts and Importance of National Income, Inflation, Money Supply and Inflation, Business Cycle, Features and Phases of Business Cycle. Nature and Scope of Business Economics, Role of Business Economist, Multidisciplinary nature of Business Economics.

UNIT - II: Demand and Supply Analysis Elasticity of Demand: Elasticity, Types of Elastic ity, Law of Demand, Measurement and Significance of Elasticity of Demand, Factors affecting Elasticity of Demand, Elasticity of Demand in decision making, Demand Forecasting: Characteristics of Good Demand Forecasting, Steps in Demand Forecasting, Methods of Demand Forecasting. Supply Analysis: Determinants of Supply, Supply Functionand Law of Supply.

UNIT - III: Production, Cost, Market Structures & Pricing Production Analysis: Factorsof Production, Production Function, Production Function with one variable input, two variable inputs, Returns to Scale, Different Types of Production Functions. Cost analysis: Types of Costs, Short run and Long run Cost Functions. Market Structures: Nature of Competition, Features of Perfect competition, Monopoly, Oligopoly, Monopolistic Competition. Pricing: Types of Pricing, Product Life Cycle based Pricing, Break Even Analysis, Cost Volume Profit Analysis.

UNIT - IV: Financial Accounting: Accounting concepts and Conventions, Accounting Equation, Double-Entry system of Accounting, Rules for maintaining Books of Accounts, Journal, Posting to Ledger, Preparation of Trial Balance, Elements of Financial Statements, Preparation of Final Accounts (Simple Problems). UNIT - V: Financial Ratios Analysis: Concept of Ratio Analys is, Importance and Types of Ratios, Liquidity Ratios, Turnover Ratios, Profitability Ratios, Proprietary Ratios, Solvency, Leverage Ratios – Analysis and Interpretation (simple problems).

TEXT BOOKS:

1. D. D. Chaturvedi, S. L. Gupta, Business Economics - Theory and Applications, International Book House Pvt. Ltd. 2013.

2. Dhanesh K Khatri, Financial Accounting, Tata Mc –Graw Hill, 2011. 3. Geethika Ghosh, Piyali Gosh, Purba Roy Choudhury, Managerial Economics, 2e, Tata Mc Graw Hill Education Pvt. Ltd. 2012.

REFERENCE BOOKS:

3. Paresh Shah, Financial Accounting for Management 2e,Oxford Press, 2015.
4. S. N. Maheshwari, Sunil K Maheshwari, Sharad K Maheshwari, Financial Accounting, 5e, Vikas Publications, 2013.

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. IV Semester		
Code: C0507	Discrete Mathematics (Common for CSE, CSE (Cyber Security), CSE (AI and ML), CSE(DS), CSE(IOT), AIML and IT)	L	T	P
Credits: 3		3	-	-

Prerequisites: NIL Course Objectives:

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

MODULE I: [10 Periods]

Mathematical logic: Introduction, Statements and Notation, Connectives, Normal Forms, Theory of Inference for the Statement Calculus, The Predicate Calculus, Inference Theory of the Predicate Calculus.

MODULE II: [09 Periods]

Set theory: Introduction, Basic Concepts of Set Theory, Representation of Discrete Structures, Relations and Ordering, Functions

MODULE III: [09 Periods]

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

MODULE IV: [10 Periods]

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

MODULE V: [10 Periods]

Graph Theory: Basic Concepts, Isomorphism and Subgraphs, Trees and their Properties, Spanning Trees, Directed Trees, Binary Trees, Planar Graphs, Euler's Formula, Multi-graphs and

Euler Circuits, Hamiltonian Graphs, Chromatic Numbers, The Four-Color Problem.

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TEXT BOOKS:

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

REFERENCES:

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

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/yVCWqd6u7wgye1qwH9xY7xPG734QA9tMJN2nc qS12 ZbN7pUSSlWCxSgPOZJEokyWJlxQLYsrFyeITA70W9C8Pg
4. http://nptel.ac.in/courses/106106094/ Course Outcomes:

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

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

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

COs	Programme Outcomes (POs)												PSOs		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
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 (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. IV Semester		
Code: C0516	Operating Systems (Common for CSE, CSE (Cyber Security), CSE (AI andML), CSE (DS), CSE (IOT), AI and IT)	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:

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

MODULE I: [10 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: **[10 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: [08 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:

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

REFERENCES:

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

Course outcomes

1. Will be able to control access to a computer and the files that may be shared
2. Demonstrate the knowledge of the components of computers and their respective roles in computing.
3. Ability to recognize and resolve user problems with standard operating environments.
4. Gain practical knowledge of how programming languages, operating systems, and architectures interact and how to use each effectively.

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

COs	Programme Outcomes (POs)												PSOs		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
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 (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. IV Semester		
Code: C0515	Database Management Systems (Common for CSE, CSE (Cyber Security), CSE (AI andML), CSE (DS), CSE (IOT), AI and IT)	L	T	P
Credits: 3		3	-	-

Prerequisites

1. A course on "Data Structures" The purpose of learning this course is to:

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

MODULE I: **[10 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: **[09 Periods]**

Introduction to the Relational Model: Integrity constraint over relations, enforcing integr ity 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: **[10 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: **[10 Periods]**

Transaction Concept, Transaction State, Implementation of Atomicity and Durability, Concurrent Executions, Serializability, Recoverability, Implementation of Isolation, Testing for serializabilit y, Lock Based Protocols, Timestamp Based Protocols, Validation- Based Protocols, Multip le Granularity, Recovery and Atomicity, Log–Based Recovery, Recovery with Concurrent Transactions.

MODULE V: **[09 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

REFERENCES:

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

E-RESOURCES:

1. https://kakeboksen.td.org.uit.no/Database%20System%20Concepts%206th%20editio n.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 fundamentals of DBMS, database design and normal forms
2 Master the basics of SQL for retrieval and management of data.
3 Be acquainted with the basics of transaction processing and concurrency control.
4 Familiarity with database storage structures and access techniques

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			
CO5	3	1	1			1						1			

2022-23 Onwards (MR-22)	MALLA REDDYENGINEERINGCOLLEGE (Autonomous)	B.Tech. IV Semester		
Code: C6701	Data Preparation and Analysis (Commonfor CSE, CSE(DS), CSE(AI and ML), CSE(Cyber Security), CSE(IOT) and IT)	L	T	P
Credits: 3		3	-	-

Prerequisites: Nil

MODULE-I [10 Hours]

Data Gathering and Preparation: Data formats, parsing and transformation, Scalability and real-time issues

MODULE-II [10 Hours]

Data Cleaning: Consistency checking, Heterogeneous and missing data, Data Transformation and segmentation

MODULE- III [10 Hours]

Exploratory Analysis: Descriptive and comparative statistics, Clustering and association, Hypothesis generation

MODULE-IV [10 Hours]

Visualization: Designing visualizations, Time series, Geolocated data, Correlations and connections, Hierarchies and networks, interactivity

MODULE-V [8 Hours]

Visualizations using R, Case Studies. TEXTBOOK(S):

1. Glenn J. Myatt, Making sense of Data: A practical Guide to Exploratory Data Analysisand Data Mining, John Wiley Publishers, 2007.

Reference Books:

1. Tamaraparani Dasu, Exploratory Data Mining and Data Clearning, Wiley-Interscience;1st Edition.
2. Ben Fry, Visualizing Data: Exploring and Explaining Data with the Processing Environment
3. Edward R. Tufte, The Visual Display of Quantitative Information

CO- PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COs	Programme Outcomes (POs)												PSOs		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	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 (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. IV Semester		
Code: C0520	**Operating Systems Lab** (Common for CSE, CSE (Cyber Security), CSE (AI andML), CSE (DS), CSE (IOT), AI and IT)	**L**	**T**	**P**
Credits: 1		**-**	**-**	**2**

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

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

1. To provide an understanding of the design aspects of operating system concepts through simulation
2. Introduce basic Unix commands, system call interface for process management, interprocess communication and I/O in Unix
3. Software Requirements: UNIX/LINUX Operating System, Windows and Turbo C /C++

List of Experiments:

1. Write C programs to simulate the following CPU Scheduling algorithms a) FCFS b) SJF c) Round Robin d) priority
2. Write programs using the I/O system calls of UNIX/LINUX operating system (open, read, write, close,fcntl, seek, stat, opendir, readdir)
3. Write a C program to simulate Bankers Algorithm for Deadlock Avoidance and Prevention.
4. Write a C program to implement the Producer – Consumer problem using semaphores using UNIX/LINUX system calls.
5. Write C programs to illustrate the following IPC mechanisms a) Pipes b) FIFOs
6. Write C programs to illustrate the following IPC mechanisms a) Message Queues b) Shared Memory
7. Write C programs to simulate the following memory management techniques a) Paging b)Segmentation
8. Write C programs to simulate Page replacement policies a) FCFS b) LRU c) Optimal

Course Outcomes:

- Simulate and implement operating system concepts such as scheduling, deadlock management, file management and memory management.
- Able to implement C programs using Unix 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

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

COs	Programme Outcomes (POs)												PSOs		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	2	3	1									2	1		
CO2	2	2										2	2		
CO3	1	2										1	1		

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. IV Semester		
Code: C0519	Database Management Systems Lab (Common for CSE, CSE (Cyber Security), CSE (AI andML), CSE (DS), CSE (IOT), AI and IT)	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

Course Outcomes:

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

List of Experiments:

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

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.

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. IV Semester		
Code: C67P1	Real-time ResearchProject/ Societal RelatedProject (Common for CSE, CSE (Cyber Security), CSE (AI and ML), CSE (DS), CSE (IOT), AI and IT)	L	T	P
Credits: 1		-	-	2

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. III Semester		
Code: C00M2	**Environmental Science** (Common for All)	L	T	P
Credits: NIL		2	-	-

Pre-Requisites: NIL Objectives

An interdisciplinary approach to complex environmental problems using basic tools of the natural and social sciences, including geo systems, biology, chemistry, economics, political science and international processes. The ability to work effectively as a member of an interdisciplinary team on complex problem of environment.

Module I: Ecosystems **5 Periods**

Definition, Scope and Importance of ecosystem, Concept of ecosystem, Classification of ecosystems, Structure and Structural Components of an ecosystem, Functions of ecosystem, Food chains, food webs and ecological pyramids. Flow of energy.

Activity: Plantation.

Module II: Natural resources, Biodiversity and Biotic resources:

A: Natural Resources: **5 Periods**

Classification of Resources: Living and Non-Living resources, Renewable and non- renewable resources. Water resources: use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. Mineral resources: use and exploitation, environme ntal effects of extracting and using mineral resources–case studies. Energy resources: growing energy needs, introduction to renewable and non renewable energy sources.

B: Biodiversity and Biotic resources: 4 Periods

Introduction, Definition, genetic, species and ecosystem diversity. Value of biodivers ity: consumptive use, productive use, social, ethical, aesthetic and intrinsic values. Threats to Biodiversity (habitat loss, poaching of wildlife, man-wild life conflicts). Conservation of Biodiversity (In-situ and Ex-situ conservation),

Activity: case studies.

Module III: ENVIRONMENTAL

POLLUTION AND CONTROL: **7 Periods**

A: Classification of pollution and pollutants, Causes, effects and control technologies. Air Pollution: Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. Water pollution: Point and non-point sources of pollution, Major pollutant of water and their sources, drinking water quality standards.

B: Soil Pollution, Soil as sink for pollutants, Impact of modern agriculture on soil, degradation of soil. Marine Pollution: Misuse of International water for dumping of hazardous waste, Coastal pollution due to sewage and marine disposal of industrial effluents.

E-waste and its management. Activity: Field visit.

Module IV: Global Environmental Problems and Global effects: 6 Periods

Green house effect, Green House Gases (GHG), Global Warming, Sea level rise, climate change and their impacts on human environment. Ozone depletion and Ozone depleting substances (ODS). Deforestation and desertification. International conventions/Protocols: Earth summit, Kyoto protocol and Montréal Protocol.

Activity: Poster Making.

Module V: Towards sustainable future: 5 Periods

Concept of Sustainable Development, Threats to Sustainability, Population and its explosion, Crazy Consumerism, Over-exploitation of resources, Strategies for Achieving Sustainable development, Environmental Education, Conservation of Resources, Urban Sprawl, Sustainable Cities and Sustainable Communities, Human health, Role of IT in Environment, Environme ntal Ethics, Environmental Economics, Concept of Green Building, Clean Developme nt Mechanism(CDM).

Text Books:

1. R. Rajagopalan, "Environmental Studies from crisis to cure", Oxford University Press 2nd Edition, 2005.
2. Anubha Kaushik, C.P. Kaushik, "Environmental studies" New age International Publishers,4th Edition,2012

Reference Books:

1. Erach Bharucha, "Environmental studies" University Grants Commission, and University Press, I Edition, 2005.
2. M. Anji Reddy "Text book of Environmental Science and Technology" 3rd Edition, 2007
3. Richard T. Wright, "Environmental Science: towards a sustainable future" PHLLearning, Private Ltd. New Delhi, 2nd Edition., 2008
4. Gilbert McMasters and Wendell P. Ela, "Environmental Engineering and science",3rd Edition, PHI Learning Pvt. Ltd.,2008.

E-Resources:

1. http://www.gdrc.org/uem/ait-terms.html (Glossary of Environmental terms).
2. http://www.environmentalscience.org/ (Environmental sciences Lectures series).
3. Journal of earth science and climatic change (OMICS International Journal).
4. Journal of pollution effects & control (OMICS International Journal).
5. nptel.ac.in/courses/120108004/ (Principles of Environment Management Lectures).
6. http://www.nptelvideos.in/2012/12/fundamentals-of-environmental-pollution.html(NPTEL online video courses IIT lectures).

Course Outcomes:

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

- To enable the students to realize the importance of ecosystem, its structure, services. To make the students aware of Different natural functions of ecosystem, which helps to sustain the life on the earth.
- To use natural resources more efficiently.
- To make the students aware of the impacts of human actions on the environment, its effects and minimizing measures to mitigate them.
- To educate the students regarding environmental issues and problems at local, national and international level.
- To know more sustainable way of living

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. IV Semester		
Code: C0522	NODE JS/ REACT JS/ DJANGO	**L**	**T**	**P**
Credits: 1	**CSE, CSE (Cyber Security), CSE (AI and ML), CSE (DS), CSE (IOT), AI and IT)**	**-**	**-**	**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.

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

- Build a custom website with HTML, CSS, and Bootstrap and little JavaScript.
- Demonstrate Advanced features of JavaScript and learn about JDBC
- Develop Server – side implementation using Java technologies like
- Develop the server – side implementation using Node JS.
- Design a Single Page Application 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 and experiment 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 session tracking 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 CRUD operations 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, 2nd Edition, 2008.
3. Vasan Subramanian, Pro MERN Stack, Full Stack Web App Development with Mongo,Express, React, and Node, 2nd Edition, A Press.

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

COs	Programme Outcomes (POs)												PSOs		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2	PSO3
CO1	2	3	1									2	1		
CO2	2	2										2	2		
CO3	1	2										1	1		

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech V Semester		
Code: C0517	DESIGN AND ANALYSIS OF ALGORITHM (Common for CSE, CSE (Cyber Security), CSE (AI and ML), CSE (DS), CSE (IOT) and IT)	L	T	P
Credits: 3		3	-	-

Prerequisites: Programming for problem solving and Data Structures

Course Objectives:

- Introduces the notations for analysis of the performance of algorithms.
- Describes major algorithmic techniques (divide-and-conquer, backtracking, dynamic programming, greedy, branch and bound methods) and mention problems for which eachtechnique is appropriate;
- Describes how to evaluate and compare different algorithms using worst, average, and best-case analysis.
- Explains the difference between tractable and intractable problems, and introduces theproblems that are P, NP and NP complete.

Course Outcomes:

1. Analyze the performance of algorithms
2. Choose appropriate data structures and algorithm design methods for a specified application
3. Understand the choice of data structures and the algorithm design methods

UNIT - I

Introduction: Algorithm, Performance Analysis-Space complexity, Time complexity, AsymptoticNotations- Big oh notation, Omega notation, Theta notation and Little oh notation.
Divide and conquer: General method, applications-Binary search, Quick sort, Merge sort, Strassen'smatrix multiplication.

UNIT - II

Disjoint Sets: Disjoint set operations, union and find algorithms, Priority Queue- Heaps, Heapsort **Backtracking:** General method, applications, n-queen's problem, sum of subsets problem, graphColoring, Hamiltonian cycles.

UNIT - III

Dynamic Programming: General method, applications- Optimal binary search tree, 0/1 knapsack problem, All pairs shortest path problem, Traveling sales person problem, Reliability design.

UNIT - IV

Greedy method: General method, applications- Job sequencing with deadlines, knapsack problem,Minimum cost spanning trees, Single source shortest path problem.
Basic Traversal and Search Techniques: Techniques for Binary Trees, Techniques for Graphs,Connected components, Biconnected components.

UNIT - V

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

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

TEXT BOOK:

1. Fundamentals of Computer Algorithms, Ellis Horowitz, Satraj Sahni and Rajasekharan, University Press.

REFERENCE BOOKS:

2. Design and Analysis of algorithms, Aho, Ullman and Hopcroft, Pearson education.
3. Introduction to Algorithms, second edition, T. H. Cormen, C.E. Leiserson, R. L. Rivest, and C. Stein, PHI Pvt. Ltd./ Pearson Education.
4. Algorithm Design: Foundations, Analysis and Internet Examples, M.T. Goodrich and R.Tamassia, John Wiley and sons.

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech V Semester		
Code: C6703	INTRODUCTION TO DATA SCIENCE (Common for CSE, CSE (Cyber Security), CSE (AI and ML), CSE (DS), CSE (IOT) and IT)	**L**	**T**	**P**
Credit:4		**3**	**1**	**0**

Course Objectives:

- Learn concepts, techniques and tools they need to deal with various facets of data sciencepractice, including data collection and integration
- Understand the basic types of data and basic statistics
- Identify the importance of data reduction and data visualization techniques

Course Outcomes:

- Understand basic terms of statistical modeling and data science
- Implementation of R programming concepts
- utilize R elements for data visualization and prediction

UNIT- I

Introduction

Definition of Data Science- Big Data and Data Science hype – and getting past the hype - Datafication

- Current landscape of perspectives - Statistical Inference - Populations and samples - Statisticalmodeling, probability distributions, fitting a model – Over fitting.

Basics of R: Introduction, R-Environment Setup, Programming with R, Basic Data Types.

UNIT- II Data Types & Statistical Description

Types of Data: Attributes and Measurement, Attribute, The Type of an Attribute, The Different Types of Attributes, Describing Attributes by the Number of Values, Asymmetric Attributes, Binary Attribute, Nominal Attributes, Ordinal Attributes, Numeric Attributes, Discrete versus Continuous Attributes.

Basic Statistical Descriptions of Data: Measuring the Central Tendency: Mean, Median, and Mode, Measuring the Dispersion of Data: Range, Quartiles, Variance, Standard Deviation, and Interquartile Range, Graphic Displays of Basic Statistical Descriptions of Data.

UNIT- III

Vectors: Creating and Naming Vectors, Vector Arithmetic, Vector sub setting,

Matrices: Creating and Naming Matrices, Matrix Sub setting, Arrays, Class.

Factors and Data Frames: Introduction to Factors: Factor Levels, Summarizing a Factor, Ordered Factors, Comparing Ordered Factors, Introduction to Data Frame, subsetting of Data Frames, Extending Data Frames, Sorting Data Frames.

Lists: Introduction, creating a List: Creating a Named List, Accessing List Elements, Manipulating ListElements, Merging Lists, Converting Lists to Vectors

UNIT- IV

Conditionals and Control Flow: Relational Operators, Relational Operators and Vectors, LogicalOperators, Logical Operators and Vectors, Conditional Statements. **Iterative Programming in R:** Introduction, While Loop, For Loop, Looping Over List. **Functions in R:** Introduction, writing a Function in R, Nested Functions, Function Scoping, Recursion,Loading an R Package, Mathematical Functions in R.

UNIT- V

Charts and Graphs: Introduction, Pie Chart: Chart Legend, Bar Chart, Box Plot, Histogram, Line Graph: Multiple Lines in Line Graph, Scatter Plot.

Regression: Linear Regression Analysis, Multiple Linear regression

TEXT BOOKS:

1. Doing Data Science, Straight Talk from The Frontline. Cathy O'Neil and Rachel Schutt, O'Reilly,2014.
2. K G Srinivas, G M Siddesh, "Statistical programming in R", Oxford Publications.

REFERENCE BOOKS:

1. Jiawei Han, Micheline Kamber and Jian Pei. Data Mining: Concepts and Techniques, 3rd ed.The Morgan Kaufmann Series in Data Management Systems.
2. Introduction to Data Mining, Pang-Ning Tan, Vipin Kumar, Michael Steinbanch, PearsonEducation.
3. Brain S. Everitt, "A Handbook of Statistical Analysis Using R", Second Edition, 4 LLC, 2014.
4. Dalgaard, Peter, "Introductory statistics with R", Springer Science & Business Media, 2008.
5. Paul Teetor, "R Cookbook", O'Reilly, 2011.

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech V Semester		
Code: C6201	COMPUTER NETWORKS (Common for CSE, CSE (Cyber Security), CSE (AI and ML), CSE (DS), CSE (IOT) and IT)	**L**	**T**	**P**
Credit:3		**3**	**1**	**0**

Prerequisites

1. A course on "Programming for problem solving"
2. A course on "Data Structures"

Course Objectives

1. The objective of the course is to equip the students with a general overview of the conceptsand fundamentals of computer networks.
2. Familiarize the students with the standard models for the layered approach to communicationbetween machines in a network and the protocols of the various layers.

Course Outcomes

- Gain the knowledge of the basic computer network technology.
- Gain the knowledge of the functions of each layer in the OSI and TCP/IP reference model.
- Obtain the skills of subnetting and routing mechanisms.
- Familiarity with the essential protocols of computer networks, and how they can be applied innetwork design and implementation.

UNIT - I

Network hardware, Network software, OSI, TCP/IP Reference models, Example Networks: ARPANET,Internet.

Physical Layer: Guided Transmission media: twisted pairs, coaxial cable, fiber optics, WirelessTransmission.

Data link layer: Design issues, framing, Error detection and correction.

UNIT - II

Elementary data link protocols: simplex protocol, A simplex stop and wait protocol for an error-freechannel, A simplex stop and wait protocol for noisy channel.

Sliding Window protocols: A one-bit sliding window protocol, A protocol using Go-Back-N, A protocolusing Selective Repeat, Example data link protocols.

Medium Access sublayer: The channel allocation problem, Multiple access protocols: ALOHA, Carrier sense multiple access protocols, collision free protocols. Wireless LANs, Data link layer switching.

UNIT - III

Network Layer: Design issues, Routing algorithms: shortest path routing, Flooding, Hierarchical routing, Broadcast, Multicast, distance vector routing, Congestion Control Algorithms, Quality of Service, Internetworking, The Network layer in the internet.

UNIT - IV

Transport Layer: Transport Services, Elements of Transport protocols, Connection

management, TCP and UDP protocols.

UNIT - V

Application Layer –Domain name system, SNMP, Electronic Mail; the World WEB, HTTP, Streamingaudio and video.

TEXT BOOK:

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

REFERENCE BOOKS:

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

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech V Semester		
Code: C6619	**DATA WAREHOUSING AND BUSINESS INTELLIGENCE**	**L**	**T**	**P**
Credit:3	**(Professional Elective – I)**	**3**	**0**	**0**

Course Objectives:

- This course is concerned with extracting data from the information systems that deal with the day-to-day operations and transforming it into data that can be used by businesses to drive high-level decision making
- Students will learn how to design and create a data warehouse, and how to utilize the processof extracting, transforming, and loading (ETL) data into data warehouses.

Course Outcomes:

- Understand architecture of data warehouse and OLAP operations.
- Understand Fundamental concepts of BI
- Application of BI Key Performance indicators
- Understand Utilization of Advanced BI Tools and their Implementation.
- Implementation of BI Techniques and BI Ethics.

UNIT - I

Data Warehouse, Data Warehouse Modelling, OLAP operations, Data Qube Computation methods

UNIT - II

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

UNIT - III

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

UNIT - IV

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

UNIT - V

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

TEXT BOOKS:

1. Data Mining – Concepts and Techniques - JIAWEI HAN & MICHELINE KAMBER, Elsevier, 4th Edition.
2. Rajiv Sabherwal "Business Intelligence" Wiley Publications, 2012.

REFERENCE BOOKS:

1. Efraim Turban, Ramesh Sharda, Jay Aronson, David King, Decision Support and BusinessIntelligence Systems, 9th Edition, Pearson Education, 2009.
2. David Loshin, Business Intelligence - The Savy Manager's Guide Getting Onboard with Emerging IT, Morgan Kaufmann Publishers, 2009.
3. Philo Janus, Stacia Misner, Building Integrated Business Intelligence. Solutions with SQLServer, 2008 R2 & Office 2010, TMH, 2011.
4. Business Intelligence Data Mining and Optimization for decision making [Author: Carlo- Verellis] [Publication: (Wiley)]
5. Data Warehousing, Data Mining & OLAP- Alex Berson and Stephen J. Smith- Tata McGraw-Hill Edition, Tenth reprint 2007
6. Building the Data Warehouse- W. H. Inmon, Wiley Dreamtech India Pvt. Ltd.
7. Data Mining Introductory and Advanced topics – Margaret H Dunham, PEA.

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech V Semester		
Code: C6618	**ARTIFICIAL INTELLIGENCE**	**L**	**T**	**P**
Credit:3	**(Professional Elective – I)**	**3**	**0**	**0**

Prerequisites:

1. Programming for problem solving, Data Structures.

Course Objectives:

1. To learn the distinction between optimal reasoning Vs. human like reasoning
2. To understand the concepts of state space representation, exhaustive search, heuristicsearch together with the time and space complexities.
3. To learn different knowledge representation techniques.
4. To understand the applications of AI, namely game playing, theorem proving, and machinelearning.

Course Outcomes:

- Understand search strategies and intelligent agents
- Understand different adversarial search techniques
- Apply propositional logic, predicate logic for knowledge representation
- Apply AI techniques to solve problems of game playing, and machine learning.

UNIT - I

Introduction to AI, Intelligent Agents, problem-Solving Agents, Searching for Solutions, Uninformed Search Strategies: Breadth-first search, Uniform cost search, Depth-first search, Iterative deepening Depth-first search, Bidirectional search, Informed (Heuristic) Search Strategies: Greedy best-first search, A* search, Heuristic Functions, Beyond Classical Search: Hill-climbing search, Simulated annealing search, Local Search in Continuous Spaces

UNIT - II

Problem Solving by Search-II and Propositional Logic

Adversarial Search: Games, Optimal Decisions in Games, Alpha-Beta Pruning, Imperfect Real-Time Decisions. Constraint Satisfaction Problems: Defining Constraint Satisfaction Problems, Constraint Propagation, Backtracking Search for CSPs, Local Search for CSPs, The Structure of Problems. Propositional Logic: Knowledge-Based Agents, The Wumpus World, Logic, Propositional Logic, Propositional Theorem Proving: Inference and proofs, Proof by resolution, Horn clauses and definite clauses, Forward and backward chaining, Effective Propositional Model Checking, Agents Based on Propositional Logic.

UNIT - III

Logic and Knowledge Representation

First-Order Logic: Representation, Syntax and Semantics of First-Order Logic, Using First-Order Logic, Knowledge Engineering in First-Order Logic.

Inference in First-Order Logic: Propositional vs. First-Order Inference, Unification and Lifting,Forward Chaining, Backward Chaining, Resolution.

UNIT - IV

Knowledge Representation: Ontological Engineering, Categories and Objects, Events. Mental Events and Mental Objects, Reasoning Systems for Categories, Reasoning with Default Information.

Classical Planning: Definition of Classical Planning, Algorithms for Planning with State-Space Search, Planning Graphs, other Classical Planning Approaches, Analysis of Planning approaches.

UNIT - V

Uncertain knowledge and Learning Uncertainty: Acting under Uncertainty, Basic ProbabilityNotation, Inference Using Full Joint Distributions, Independence, Bayes' Rule and Its Use

Probabilistic Reasoning: Representing Knowledge in an Uncertain Domain, The Semantics ofBayesian Networks, Efficient Representation of Conditional Distributions, Approximate Inference inBayesian Networks, Relational and First-Order Probability, Other Approaches to Uncertain Reasoning;Dempster-Shafer theory.

TEXT BOOK:

1. Artificial Intelligence: A Modern Approach, Third Edition, Stuart Russell and Peter Norvig, Pearson Education.

REFERENCE BOOKS:

2. Artificial Intelligence, 3rd Edn, E. Rich and K. Knight (TMH)
3. Artificial Intelligence, 3rd Edn., Patrick Henry Winston, Pearson Education.
4. Artificial Intelligence, Shivani Goel, Pearson Education.
5. Artificial Intelligence and Expert systems – Patterson, Pearson Education

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech V Semester		
Code: C1203	**WEB TECHNOLOGIES**	**L**	**T**	**P**
Credit:3	**(Professional Elective – I)**	**3**	**0**	**0**

Course Objectives:

1. To introduce WWW planning the site and navigation
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 Javascript 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 Javascript, Javascript language – declaring variables, scope of variables, functions. Event handlers (onclick, on submit 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.
4. Programming world wide web, R.W.Sebesta, 4th Edition, Pearson.
5. Internet and World Wide Web – How to program, Dietel and Nieto, Pearson.

E-RESOURCES:

1. https://kakeboksen.td.org.uit.no/Database%20System%20Concepts%206th%20edition.pdf
2. http://agce.sets.edu.in/cse/ebook/DBMS%20BY%20RAGHU%20RAMAKRISHNAN.pdf
3. http://airccse.org/journal/ijdms/ijdms.html

4. http://www.springer.com/computer/database+management+%26+information+retrieval?SGWID=0- 153-12-114576-0
5. http://textofvideo.nptel.iitm.ac.in/video.php?courseId=106106093
6. http://www.nptelvideos.in/2012/11/database-management-system.html

Outcomes

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

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech V Semester		
Code: C0527	**IMAGE PROCESSING**	**L**	**T**	**P**
Credit:3	**(Professional Elective – I)**	**3**	**0**	**0**

Prerequisites

1. Students are expected to have knowledge in linear signals and systems, Fourier Transform, basic linear algebra, basic probability theory and basic programming techniques; knowledge ofdigital signal processing is desirable.
2. A course on "Computational Mathematics"
3. A course on "Computer Oriented Statistical Methods"

Course Objectives

- Provide a theoretical and mathematical foundation of fundamental Digital Image Processing concepts.
- The topics include image acquisition; sampling and quantization; preprocessing; enhancement; restoration; segmentation; and compression.

Course Outcomes

- Demonstrate the knowledge of the basic concepts of two-dimensional signal acquisition,sampling, and quantization.
- Demonstrate the knowledge of filtering techniques.
- Demonstrate the knowledge of 2D transformation techniques.
- Demonstrate the knowledge of image enhancement, segmentation, restoration andcompression techniques.

UNIT - I

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

UNIT - II

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

UNIT - III

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

UNIT - IV

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

UNIT - V

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

TEXT BOOK:

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

REFERENCE BOOKS:

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

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech V Semester		
Code: C0525	**COMPUTER GRAPHICS**	**L**	**T**	**P**
Credit:3	**(Professional Elective – I)**	**3**	**0**	**0**

Prerequisites

1. Programming for problem solving and Data Structures

Course Objectives

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

Course Outcomes

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

UNIT - I

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

Output primitives: Points and lines, line drawing algorithms (DDA and Bresenham's Algorithm) circle-generating algorithms and ellipse - generating algorithms

Polygon Filling: Scan-line algorithm, boundary-fill and flood-fill algorithms

UNIT - II

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

2-D viewing: The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, clipping operations, point clipping, Line clipping-Cohen Sutherland algorithms, Polygon clipping-Sutherland Hodgeman polygon clipping algorithm.

UNIT - III

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

UNIT - IV

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

D. viewing: Viewing pipeline, viewing coordinates, projections, view volume and general projection transforms and clipping.

UNIT - V

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

Visible surface detection methods: Classification, back-face detection, depth-buffer method, BSP- tree method, area sub-division method and octree method.

TEXT BOOKS:

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

REFERENCE BOOKS:

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

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech V Semester		
Code: C0528	**EMBEDDED SYSTEMS**	**L**	**T**	**P**
Credit:3	**(Professional Elective – II)**	**3**	**0**	**0**

Prerequisites: Nil

Course Outcomes:

By the end of the course, the student will be able to:

1. learn about the general principles of computer architecture
2. learn about the working of a simple embedded system and embedded system applications
3. learn the hardware aspects of embedded systems
4. understand the sensors, ADCs and actuators used in embedded systems
5. understand the real world examples of embedded systems

UNIT I: 8 Periods

Basics of computer architecture and the binary number system Basics of computer architecture, computer languages, RISC and CISC architectures, number systems, number format conversions, computer arithmetic, units of memory capacity

UNIT II: 8 Periods

Introduction to embedded systems Application domain of embedded systems, desirable features and general characteristics of embedded systems, model of an embedded system, microprocessor Vs microcontroller, example of a simple embedded system, figure of merit for an embedded system, classification of MCUs: 4/8/16/32 bits, history of embedded systems, current trends

UNIT III: 10 Periods

Embedded systems-The hardware point of view Microcontroller unit(MCU), a popular 8-bit MCU, memory for embedded systems, low power design, pull up and pull down resistors

UNIT IV: 12 Periods

Sensors, ADCs and Actuators Sensors: Temperature Sensor, Light Sensor, Proximity/range Sensor; Analog to digital converters: ADC Interfacing; Actuators Displays, Motors, Opto couplers/Opto isolators, relays.

UNIT V: 12 Periods

Examples of embedded systems Mobile phone, automotive electronics, radio frequency identification (RFID), wireless sensor networks(WISENET), robotics, biomedical applications, brain machine interface

Text Books:

6. Lyla B Das, Embedded systems: An Integrated Approach, 1st Ed., Pearson, 2013

Reference Books:

1. Shibu, K.V., Introduction to Embedded Systems, 1st Ed., TMH, 2009
2. Kanta Rao B, Embedded Systems, 1st Ed., PHI
3. Frank Vahid & Tony Givargis, Embedded System Design, 2nd Edition, John Wiley,

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech V Semester		
Code: C1208	**INFORMATION RETRIEVAL SYSTEMS**	**L**	**T**	**P**
Credit:3	**(Professional Elective – II)**	**3**	**0**	**0**

Prerequisites:

1. Data Structures

Course Objectives:

1. To learn the concepts and algorithms in Information Retrieval Systems
2. To understand the data/file structures that are necessary to design, and implement informationretrieval (IR) systems.

Course Outcomes:

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

UNIT - I

Introduction to Information Retrieval Systems: Definition of Information Retrieval System, Objectives ofInformation Retrieval Systems, Functional Overview, Relationship to Database Management Systems, Digital Libraries and Data Warehouses Information Retrieval System Capabilities: Search Capabilities,Browse Capabilities, Miscellaneous Capabilities

UNIT - II

Cataloging and Indexing: History and Objectives of Indexing, Indexing Process, Automatic Indexing, Information Extraction Data Structure: Introduction to Data Structure, Stemming Algorithms, Inverted File Structure, N-Gram Data Structures, PAT Data Structure, Signature File Structure, Hypertext and XML Data Structures, Hidden Markov Models.

UNIT - III

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

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

UNIT - IV

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

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

UNIT - V

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

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

TEXT BOOK:

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

REFERENCE BOOKS:

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

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech V Semester		
Code: C0552	**SOFTWARE PROJECT MANAGEMENT**	**L**	**T**	**P**
Credit:3	**(Professional Elective – II)**	**3**	**0**	**0**

Prerequisites:

1. A course on "Software Engineering".

Course Objectives

- To acquire knowledge on software process management
- To acquire managerial skills for software project development
- To understand software economics, workflows and frameworks.

Course Outcomes

- Understand the software economics to improve various phases of development.
- Examine the life cycle phases, artifacts, workflows and checkpoints of a process.
- Demonstrate the software project framework components.
- Analyze the need for various software management disciplines and metrics.

UNIT - I

Software Management Renaissance

Conventional Software Management: The waterfall model, conventional software Management performance. Evolution of Software Economics-Software economics, pragmatic software cost estimation. Improving Software Economics- Reducing Software product size, improving software processes, improving team effectiveness, improving automation, Achieving required quality, peer inspections.

UNIT – II

A Software Management Process Framework-I

The principles of conventional software Engineering, principles of modern software management, transitioning to an iterative process. Life cycle phases- Engineering and production stages, inception, Elaboration, construction, transition phases. Artifacts of the process- The artifact sets, Managementartifacts, Engineering artifacts, programmatic artifacts.

UNIT – III

A Software Management Process Framework-II

Model based software architectures- A Management perspective and technical perspective. Work Flows of the process- Software process workflows, Iteration workflows. Checkpoints of the process-Major milestones, Minor Milestones, Periodic status assessments.

UNIT – IV

Software Management Discipline-I

Iterative Process Planning- Work breakdown structures, planning guidelines, cost and

schedule estimating, Iteration planning process, Pragmatic planning. Project Organizations and Responsibilities- Line-of-Business Organizations, Project Organizations, evolution of Organizations. Process Automation: Automation building blocks, The Project Environment.

UNIT – V

Software Management Discipline-II

Project Control and Process instrumentation: The seven core Metrics, Management indicators, quality indicators, life cycle expectations, pragmatic Software Metrics, Metrics automation. Tailoring the Process: Process discriminates. Future Software Project Management: modern Project Profiles, Next generation Software economics, modern process transitions. Case Study: The command CenterProcessing and Display system-Replacement (CCPDS-R).

TEXT BOOK:

1. Software Project Management, Walker Royce, Addison-Wesley Pearson Education, 2005.

REFERENCE BOOKS:

1. Software Project Management, Bob Hughes and Mike Cotterell: Tata McGraw-Hill Edition.
2. Software Project Management, Joel Henry, Pearson Education.
3. Software Project Management in practice, Pankaj Jalote, Pearson Education. 2005.

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech V Semester		
Code: C0532	**DEVOPS**	**L**	**T**	**P**
Credit:3	**(Professional Elective – II)**	**3**	**0**	**0**

Pre-Requisites:

1. Software Engineering
2. Software Project Management

Course Objectives:

- Understand the skill sets and high-functioning teams involved in Agile, DevOps and relatedmethods to reach a continuous delivery capability.
- Implement automated system update and DevOps lifecycle.

Course Outcomes:

- Understand the various components of DevOps environment.
- Identify Software development models and architectures of DevOps
- Use different project management and integration tools.
- Select an appropriate testing tool and deployment model for project.

UNIT- I

Introduction to DevOps:

Introduction, Agile development model, DevOps and ITIL. DevOps process and Continuous Delivery, Release management, Scrum, Kanban, delivery pipeline, identifying bottlenecks.

UNIT- II:

Software development models and DevOps:

DevOps Lifecycle for Business Agility, DevOps, and Continuous Testing. DevOps influence on Architecture: Introducing software architecture, The monolithic scenario, Architecture rules of thumb, The separation of concerns, Handling database migrations, Micro services and the data tier, DevOps,architecture, and resilience.

UNIT- III

Introduction to project management:

The need for source code control, the history of source code management, Roles and code, source code management system and migrations, shared authentication, Hosted Git servers, Different Git server implementations, Docker intermission, Gerrit, The pull request model, GitLab.

UNIT- IV

Integrating the system:

Build systems, Jenkins build server, Managing build dependencies, Jenkins plugins, and file system layout, The host server, Build slaves, Software on the host, Triggers, Job chaining and build pipelines,Build servers and infrastructure as code, Building by dependency order, Build phases, Alternative buildservers, Collating quality measures.

UNIT- V

Testing Tools and Deployment:

Various types of testing, Automation of testing Pros and cons, Selenium - Introduction, Selenium features, JavaScript testing, Testing backend integration points, Test-driven development, REPL-driven development. Deployment of the system: Deployment systems, Virtualization stacks, code execution at the client, Puppet master and agents, Ansible, Deployment tools: Chef, SaltStackand Docker.

TEXT BOOK:

1. Joakim Verona., Practical DevOps, Packt Publishing, 2016.

REFERENCE BOOKS:

1. Deepak Gaikwad, Viral Thakkar. DevOps Tools from Practitioner's Viewpoint. Wiley publications.
2. Len Bass, Ingo Weber, Liming Zhu. DevOps: A Software Architect's Perspective. AddisonWesley.

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. V Semester		
Code: C6723	Data Mining [Professional Elective - II]	L	T	P
Credits: 3	ion for CSE, CSE (Cyber Security), CSE (AI and ML), CSE (DS), CSE (IOT), AI and IT)	3	-	-

Prerequisites: NIL Course Objectives:

1. Understands stages in building a Data Warehouse
2. Makes Identify the need and importance of preprocessing techniques
3. Implement similarity and dissimilarity techniques
4. Analyze and evaluate performance of algorithms for Association Rules
5. Analyze Classification and Clustering algorithms.

MODULE I: Introduction and Mining Issues & Data [09 Periods]

Introduction – Data, Why Data Mining? What Is Data Mining? What Kinds of Data Can Be mined? What Kinds of Patterns Can Be Mined? Which Technologies Are Used? Which Kinds of Applications Are Targeted? Mining Issues and Data - Major Issues in Data Mining, Types of Data, Data Quality

MODULE II: Data, Data Preprocessing [9 Periods]

A: Data Pre-processing: Data Warehousing, Data Cleaning, Data Integration, Data Reduction, Data Transformation, Aggregation, Sampling

B: Techniques: Dimensionality Reduction, Feature Subset Selection, Feature Creation, Data Discretization and Binarization, Variable transformation.

MODULE III: Data Similarity and Dissimilarity Classification [10 Periods]

A. Measuring Data Similarity and Dissimilarity - Similarity and Dissimilarity between simple attributes, Dissimilarities and similarities between data objects, Examples of Proximity measures, Issues in Proximity Calculation, Selection of right proximity measure.
B. Classification - Basic Concepts, General Approach to solving a classification problem, Decision Tree Induction: Working of Decision Tree, building a decision tree.

MODULE IV: Classifier and Association Analysis [10 Periods]

Classifiers - Alterative Techniques, Bayes' Theorem, Naïve Bayesian Classification, Bayesian Belief Networks Association Analysis - Basic Concepts and Algorithms: Problem Definition, Frequent Item Set generation, Rule generation, compact representation of frequent item sets, FP- Growth Algorithm.

MODULE V: Cluster Analysis and DBSCAN [10 Periods]

Cluster Analysis - Basic Concepts and Algorithms: Overview: What Is Cluster Analysis? Different Types of Clustering, Different Types of Clusters; K-means: The Basic K-means Algorithm, K- means Additional Issues, Bisecting K-means, Strengths and Weaknesses; Agglomerative Hierarchical Clustering: Basic Agglomerative Hierarchical Clustering Algorithm DBSCAN - Traditional Density Center-Based Approach, DBSCAN Algorithm, Strengths and Weaknesses.

TEXT BOOKS:

1. Vikram Pudi & P.Radha Krishna, "Data Mining",4th Edition, Oxford Higher Education .
2. Jiawei Han, Michel Kamber," Data Mining concepts and Techniques", 3/e, Elsevier.

REFERENCES:

1. Hongbo Du, "Data Mining Techniques and Applications: An Introduction",Cengage Learning.
2. Vikram Pudi and P. Radha Krishna, "Data Mining", Oxford.
3. Mohammed J. Zaki, Wagner Meira, Jr ,"Data Mining and Analysis-fundamental Concepts and Algorithms", Oxford
4. Alex Berson, Stephen Smith ,"Data Warehousing Data Mining & OLAP" , TMH.

E-RESOURCES:

1. http://www-users.cs.umn.edu/~kumar/dmbook/index.php
2. http://myweb.sabanciuniv.edu/rdehkharghani/files/2016/02/The-Morgan-
1. Kaufmann-Series-in-Data-Management-Systems-Jiawei-Han-Micheline-Kamber- Jian- Pei-Data-Mining.-Concepts-and-Techniques-3rd-Edition-Morgan-Kaufmann- 2011.pdf
2. http://www.ijctee.org/files/Issuethree/IJCTEE_1111_20.pdf
3. https://gunjesh.wordpress.com/

COURSE OUTCOMES:

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

1. Acquire knowledge in building a Data Warehouse
2. Understand the need and importance of preprocessing techniques
3. Implement Similarity and dissimilarity techniques
4. Analyze and evaluate performance of algorithms for Association Rules.
5. Deploy Classification and Clustering algorithms

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

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech V Semester		
Code: C1204	**Design and Analysis of Algorithms Lab**	**L**	**T**	**P**
Credit:1		**0**	**0**	**2**

COURSE OBJECTIVES:

This course will make students

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

Software Requirements: Turbo C LIST OF PROGRAMS:

1. Write a program to evaluate a postfix expression E. Assume E is presented dataString.
2. Write a program to obtain the postfix form of an in fix expression E.Again assumeE 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 sub sets problem.

TEXTBOOKS

1. Ellis Horowitz, Satraj Sahni and Raja sekharan, "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 Parag Himanshu Dave, Himanshu Balchandra Dave, "Design and Analysis of algorithms" Pearson.

REFERENCES

a. M.T.Goodrich and R.Tomassia "Algorithm Design, Foundations, Analysis andInternet examples", John wiley and sons.

b. 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

1. Analyze asymptotic performance of algorithms, understand different methods
2. Develop solutions to Job sequencing problems, Knapsack algorithm, shortestpath algorithms,
3. Implement solutions traveling sales person.
4. Apply dynamic programming method N-Queen's Problem.
5. Apply synthesizing branch and bound NP problems.

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech V Semester		
Code: C6202	**COMPUTER NETWORKS LAB**	**L**	**T**	**P**
Credit:1		**0**	**0**	**2**

Course Objectives

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

Course Outcomes

- Implement data link layer farming methods
- Analyze error detection and error correction codes.
- Implement and analyze routing and congestion issues in network design.
- Implement Encoding and Decoding techniques used in presentation layer
- To be able to work with different network tools

List of Experiments

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

i. Packet Capture Using Wire shark
ii. Starting Wire shark
iii. Viewing Captured Traffic
iv. Analysis and Statistics & Filters. How to run Nmap scan

Operating System Detection using Nmap Do the following using NS2 Simulator

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

TEXT BOOK:

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

REFERENCE BOOKS:

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

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech V Semester		
Code: C0H03	**Advanced English Communications Skills Lab**	**L**	**T**	**P**
Credit:1		**0**	**0**	**2**

1. **Introduction**

The introduction of the Advanced English Communication Skills Lab is considered essential at the B.Tech 3rd year level. At this stage, the students need to prepare themselves for their career which mayrequire them to listen to, read, speak and write in English both for their professional and interpersonal communication in the globalised context.

The proposed course should be a laboratory course to enable students to use appropriate English andperform the following:

1. Gathering ideas and information to organise ideas relevantly and coherently.
2. Making oral presentations.
3. Writing formal letters.
4. Transferring information from non-verbal to verbal texts and vice-versa.
5. Writing project/research reports/technical reports.
6. Participating in group discussions.
7. Engaging in debates.
8. Facing interviews.
9. Taking part in social and professional communication.

2. **Objectives:**

This Lab focuses on using multi-media instruction for language development to meet the followingtargets:

- To improve the students' fluency in English, with a focus on vocabulary
- To enable them to listen to English spoken at normal conversational speed by educated Englishspeakers
- To respond appropriately in different socio-cultural and professional contexts
- To communicate their ideas relevantly and coherently in writing
- To prepare the students for placements.

3. **Syllabus**:

The following course content to conduct the activities is prescribed for the Advanced English Communication Skills (AECS) Lab:

1. **Activities on Listening and Reading Comprehension:** Active Listening – Development of Listening Skills Through Audio clips - Benefits of Reading – Methods and Techniques of Reading

– Basic Steps to Effective Reading – Common Obstacles – Discourse Markers or Linkers

- Sub- skills of reading - Reading for facts, negative facts and Specific Details- Guessing Meanings fromContext, Inferring Meaning - Critical Reading – Reading Comprehension – Exercises for Practice.

2. **Activities on Writing Skills**: Vocabulary for Competitive Examinations - Planning for Writing – Improving Writing Skills - Structure and presentation of different types of writing – Free Writing and Structured Writing - Letter Writing –Writing a Letter of Application – Resume vs. Curriculum Vitae
   – Writing a Résumé – Styles of Résumé - e-Correspondence – Emails – Blog Writing - (N)etiquette
   – Report Writing – Importance of Reports – Types and Formats of Reports– Technical Report Writing– Exercises for Practice.
3. **Activities on Presentation Skills -** Starting a conversation – responding appropriately and relevantly – using the right language and body language – Role Play in different situations including Seeking Clarification, Making a Request, Asking for and Refusing Permission, Participating in a Small Talk – Oral presentations (individual and group) through JAM sessions- PPTs – Importanceof Presentation Skills – Planning, Preparing, Rehearsing and Making a Presentation – Dealing with Glossophobia or Stage Fear – Understanding Nuances of Delivery - Presentations through Posters/Projects/Reports – Checklist for Making a Presentation and Rubrics of Evaluation

4. **Activities on Group Discussion (GD):** Types of GD and GD as a part of a Selection Procedure -Dynamics of Group Discussion- Myths of GD - Intervention, Summarizing - Modulation of Voice, Body Language, Relevance, Fluency and Organization of Ideas – Do's and Don'ts - GD Strategies
   – Exercises for Practice.
5. **Interview Skills**: Concept and Process - Interview Preparation Techniques - Types of Interview Questions – Pre-interview Planning, Opening Strategies, Answering Strategies - Interview Through Tele-conference & Video-conference - Mock Interviews.

4. Minimum Requirement:

The Advanced English Communication Skills (AECS) Laboratory shall have the followinginfrastructural facilities to accommodate at least 35 students in the lab:

- Spacious room with appropriate acoustics
- Round Tables with movable chairs
- Audio-visual aids
- LCD Projector
- Public Address system
- One PC with latest configuration for the teacher
- T. V, a digital stereo & Camcorder
- Headphones of High quality

5. Suggested Software: **The software consisting of the prescribed topics elaborated above should be procured and used.**

- **TOEFL & GRE** (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)
- **Oxford Advanced Learner's Dictionary**, 10th Edition
- **Cambridge Advanced Learner's Dictionary**
- **DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice.**

- **Lingua TOEFL CBT Insider**, by Dreamtech

6. Books Recommended:

1. Rizvi, M. Ashraf (2018). *Effective Technical Communication*. (2nd ed.). McGraw Hill Education(India) Pvt. Ltd.
2. Suresh Kumar, E. (2015). *Engineering English.* Orient BlackSwan Pvt. Ltd.
3. Bailey, Stephen. (2018). Academic *Writing: A Handbook for International Students.* (5th Edition). Routledge.
4. Koneru, Aruna. (2016). *Professional Communication*. McGraw Hill Education (India) Pvt. Ltd.
5. Raman, Meenakshi & Sharma, Sangeeta. (2022). *Technical Communication, Principles andPractice.* (4TH Edition) Oxford University Press.
6. Anderson, Paul V. (2007). *Technical Communication***.** Cengage Learning Pvt. Ltd. New Delhi.
7. McCarthy, Michael; O'Dell, Felicity & Redman, Stuart. (2017). *English Vocabulary in Use*
   Series. Cambridge University Press
8. Sen, Leela. (2009). *Communication Skills.* PHI Learning Pvt Ltd., New Delhi.
9. Elbow, Peter. (1998). *Writing with Power.* Oxford University Press.
10. Goleman, Daniel. (2013). *Emotional Intelligence*: *Why it can matter more than IQ.* BloomsburyPublishing.

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech V Semester		
Code: C00M5	**CONSTITUTION OF INDIA**	**L**	**T**	**P**
Credit : 0		**3**	**0**	**0**

Course Objectives: Students will be able to:

- Understand the premises informing the twin themes of liberty and freedom from a civil rightsperspective.
- To address the growth of Indian opinion regarding modern Indian intellectuals' constitutionalrole and entitlement to civil and economic rights as well as the emergence of nationhood in the early years of Indian nationalism.
- To address the role of socialism in India after the commencement of the Bolshevik Revolutionin 1917 and its impact on the initial drafting of the Indian Constitution.

Course Outcomes: Students will be able to:

- Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.
- Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.
- Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP]under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution
- Discuss the passage of the Hindu Code Bill of 1956.

Unit - 1 History of Making of the Indian Constitution- History of Drafting Committee.
Unit - 2 Philosophy of the Indian Constitution- Preamble Salient Features
Unit - 3 Contours of Constitutional Rights & Duties - Fundamental Rights

- Right to Equality
- Right to Freedom
- Right against Exploitation
- Right to Freedom of Religion
- Cultural and Educational Rights
- Right to Constitutional Remedies
- Directive Principles of State Policy
- Fundamental Duties.

Unit - 4 Organs of Governance: Parliament, Composition, Qualifications and Disqualifications, Powers and Functions, Executive, President, Governor, Council of Ministers, Judiciary, Appointment and Transfer of Judges, Qualifications, Powers and Functions

Unit - 5 Local Administration: District's Administration head: Role and Importance, Municipalities: Introduction, Mayor and role of Elected Representative, CEO of Municipal Corporation. Panchayat raj:Introduction, PRI: Zila Panchayat. Elected officials and their

roles, CEO ZilaPanchayat: Position and role. Block level: Organizational Hierarchy (Different departments), Village level: Role of Elected and Appointed officials, Importance of grass root democracy

Unit - 6 Election Commission: Election Commission: Role and Functioning. Chief Election Commissioner and Election Commissioners. State Election Commission: Role and Functioning. Institute and Bodies for the welfare of SC/ST/OBC and women.

Suggested Reading:

1. The Constitution of India, 1950 (Bare Act), Government Publication.
2. Dr. S. N. Busi, Dr. B. R. Ambedkar framing of Indian Constitution, 1st Edition, 2015.
3. M. P. Jain, Indian Constitution Law, 7th Edn., Lexis Nexis, 2014.
4. D.D. Basu, Introduction to the Constitution of India, Lexis Nexis, 2015.

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech V Semester		
Code: C6704	**ETL- KAFKA/TALEND**	**L**	**T**	**P**
Credit : 1		**0**	**0**	**2**

Course Objectives:

- Develop a comprehensive understanding of Extract, Transform, Load (ETL) processes using Apache Kafka and Talend.
- Understand how to scale Kafka clusters seamlessly to handle growing data volumes, ensuring optimal performance for ETL operations.

Course Outcomes:

- Learn to design and deploy fault-tolerant Kafka clusters, ensuring data integrity and availability in real-world scenarios.
- Gain practical experience in cluster management, topic creation, and basic operations such as producing and consuming messages.

LIST OF EXPERIMENTS:

1. Install Apache Kafka on a single node.
2. Demonstrate setting up a single-node, single-broker Kafka cluster and show basic operations such as creating topics and producing/consuming messages.
3. Extend the cluster to multiple brokers on a single node.
4. Write a simple Java program to create a Kafka producer and Produce messages to a topic.
5. Implement sending messages both synchronously and asynchronously in the producer.
6. Develop a Java program to create a Kafka consumer and subscribe to a topic and consume messages.
7. Write a script to create a topic with specific partition and replication factor settings.
8. Simulate fault tolerance by shutting down one broker and observing the cluster behavior.
9. Implement operations such as listing topics, modifying configurations, and deleting topics.
10. Introduce Kafka Connect and demonstrate how to use connectors to integrate with external systems.
11. Implement a simple word count stream processing application using Kafka Stream
12. Implement Kafka integration with the Hadoop ecosystem.

TEXT BOOK:

1. Neha Narkhede, Gwen Shapira, Todd Palino, Kafka – The Definitive Guide: Real-time data and stream processing at scale, O'Reilly

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech V Semester		
Code: C00M3	**Quantitative Aptitude and Verbal Reasoning – I**	**L**	**T**	**P**
Credit : 1		**0**	**0**	**2**

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech VI Semester		
Code: C1213	**AUTOMATA THEORY AND COMPILER DESIGN**	**L**	**T**	**P**
Credit : 3		**3**	**0**	**0**

Course Objectives

- To introduce the fundamental concepts of formal languages, grammars and automata theory.
- To understand deterministic and non-deterministic machines and the differences betweendecidability and undecidability.
- Introduce the major concepts of language translation and compiler design and impart theknowledge of practical skills necessary for constructing a compiler.
- Topics include phases of compiler, parsing, syntax directed translation, type checking use ofsymbol tables, intermediate code generation

Course Outcomes

- Able to employ finite state machines for modeling and solving computing problems.
- Able to design context free grammars for formal languages.
- Able to distinguish between decidability and undecidability.
- Demonstrate the knowledge of patterns, tokens & regular expressions for lexical analysis.
- Acquire skills in using lex tool and design LR parsers

UNIT - I

Introduction to Finite Automata: Structural Representations, Automata and Complexity, the Central Concepts of Automata Theory – Alphabets, Strings, Languages, Problems.

Nondeterministic Finite Automata: Formal Definition, an application, Text Search, Finite Automatawith Epsilon-Transitions.

Deterministic Finite Automata: Definition of DFA, How A DFA Process Strings, The language of DFA, Conversion of NFA with €-transitions to NFA without €-transitions. Conversion of NFA to DFA

UNIT - II

Regular Expressions: Finite Automata and Regular Expressions, Applications of Regular Expressions, Algebraic Laws for Regular Expressions, Conversion of Finite Automata to Regular Expressions.

Pumping Lemma for Regular Languages:

Statement of the pumping lemma, Applications of the Pumping Lemma.

Context-Free Grammars: Definition of Context-Free Grammars, Derivations Using a Grammar, Leftmost and Rightmost Derivations, the Language of a Grammar, Parse Trees, Ambiguity in Grammars and Languages.

UNIT - III

Push Down Automata: Definition of the Pushdown Automaton, the Languages of a PDA, Equivalenceof PDA's and CFG's, Acceptance by final state

Turing Machines:

Introduction to Turing Machine, Formal Description, Instantaneous description, The language of a Turing machine

Undecidability:

Undecidability, A Language that is Not Recursively Enumerable, An Undecidable Problem That isRE, Undecidable Problems about Turing Machines

UNIT - IV

Introduction: The structure of a compiler

Lexical Analysis: The Role of the Lexical Analyzer, Input Buffering, Recognition of Tokens, TheLexical- Analyzer Generator Lex

Syntax Analysis: Introduction, Context-Free Grammars, Writing a Grammar, Top-Down Parsing, Bottom- Up Parsing, Introduction to LR Parsing: Simple LR, More Powerful LR Parsers

UNIT - V

Syntax-Directed Translation: Syntax-Directed Definitions, Evaluation Orders for SDD's, Syntax-Directed Translation Schemes, Implementing L-Attributed SDD's.

Intermediate-Code Generation: Variants of Syntax Trees, Three-Address Code

Run-Time Environments: Stack Allocation of Space, Access to Nonlocal Data on the Stack, HeapManagement

TEXT BOOKS:

1. Introduction to Automata Theory, Languages, and Computation, 3rd Edition, John E. Hopcroft, Rajeev Motwani, Jeffrey D. Ullman, Pearson Education.
2. Theory of Computer Science- Automata languages and computation, Mishra and Chandrashekaran, 2nd Edition, PHI.

REFERENCE BOOKS:

1. Compilers: Principles, Techniques and Tools, Alfred V. Aho, Monica S. Lam, Ravi Sethi, Jeffry D. Ullman, 2nd Edition, Pearson.
2. Introduction to Formal languages Automata Theory and Computation, Kamala Krithivasan,Rama R, Pearson.
3. Introduction to Languages and The Theory of Computation, John C Martin, TMH.
4. lex & yacc – John R. Levine, Tony Mason, Doug Brown, O'reilly
5. Compiler Construction, Kenneth C. Louden, Thomson. Course Technology.

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech VI Semester		
Code: C6620	**MACHINE LEARNING**	**L**	**T**	**P**
Credit : 3		**3**	**0**	**0**

Course Objectives:

- To introduce students to the basic concepts and techniques of Machine Learning.
- To have a thorough understanding of the Supervised and Unsupervised learning techniques
- To study the various probability-based learning techniques

Course Outcomes:

- Distinguish between, supervised, unsupervised and semi-supervised learning
- Understand algorithms for building classifiers applied on datasets of non-linearly separableclasses
- Understand the principles of evolutionary computing algorithms
- Design an ensembler to increase the classification accuracy

UNIT - I

Learning – Types of Machine Learning – Supervised Learning – The Brain and the Neuron – Design a Learning System – Perspectives and Issues in Machine Learning – Concept Learning Task – Concept Learning as Search – Finding a Maximally Specific Hypothesis – Version Spaces and the Candidate Elimination Algorithm – Linear Discriminants: – Perceptron – Linear Separability – Linear Regression.

UNIT - II

Multi-layer Perceptron– Going Forwards – Going Backwards: Back Propagation Error – Multi-layer Perceptron in Practice – Examples of using the MLP – Overview – Deriving Back-Propagation – Radial Basis Functions and Splines – Concepts – RBF Network – Curse of Dimensionality – Interpolations and Basis Functions – Support Vector Machines

UNIT - III

Learning with Trees – Decision Trees – Constructing Decision Trees – Classification and Regression Trees – Ensemble Learning – Boosting – Bagging – Different ways to Combine Classifiers – Basic Statistics – Gaussian Mixture Models – Nearest Neighbor Methods – Unsupervised Learning – K meansAlgorithms

UNIT - IV

Dimensionality Reduction – Linear Discriminant Analysis – Principal Component Analysis – Factor Analysis – Independent Component Analysis – Locally Linear Embedding – Isomap – Least SquaresOptimization

Evolutionary Learning – Genetic algorithms – Genetic Offspring: - Genetic Operators – Using Genetic Algorithms

UNIT - V

Reinforcement Learning – Overview – Getting Lost Example

Markov Chain Monte Carlo Methods – Sampling – Proposal Distribution – Markov Chain Monte Carlo

– Graphical Models – Bayesian Networks – Markov Random Fields – Hidden Markov Models – TrackingMethods

TEXT BOOKS:

1. Stephen Marsland, ¯Machine Learning – An Algorithmic Perspective, Second Edition,Chapman and Hall/CRC Machine Learning and Pattern Recognition Series, 2014.

REFERENCE BOOKS:

1. Tom M Mitchell, ¯Machine Learning, First Edition, McGraw Hill Education, 2013.
2. Peter Flach, ¯Machine Learning: The Art and Science of Algorithms that Make Sense of Data‖,First Edition, Cambridge University Press, 2012.
3. Jason Bell, ¯Machine learning – Hands on for Developers and Technical Professionals‖, FirstEdition, Wiley, 2014
4. Ethem Alpaydin, ¯Introduction to Machine Learning 3e (Adaptive Computation and MachineLearning Series), Third Edition, MIT Press, 2014

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech VI Semester		
Code: C6705	**Big Data Analytics**	**L**	**T**	**P**
Credit : 3		**3**	**0**	**0**

Course Objectives

- Provide the knowledge of principles and techniques for Big data Analytics and give an exposure of the frontiers of Big data Analytics

Courses Outcomes

- Understand the importance of big data analytics and its types
- Perform analytics on big data
- Proficiency in big data storage and processing in Hadoop
- Data analytics through MongoDB
- Data analytics through R

UNIT - I

Types of Digital data: Classification of Digital Data,
Introduction to Big Data: Evolution of Big Data, definition of big data, Traditional Business Intelligencevs BigData, Coexistence of Big Data and Data Warehouse.
Big Data Analytics: introduction to Big Data Analytics, What Big Data Analytics Isn't, Sudden Hype Around Big Data Analytics, Classification of Analytics, Greatest Challenges that Prevent Business from Capitalizing Big Data, Top Challenges Facing Big Data, Big Data Analytics Importance, Data Science,Terminologies used in Big Data Environments.

UNIT - II

Hadoop: Features of Hadoop, Key advantages of hadoop, versions of hadoop, overview of hadoop ecosystem, Hadoop distributions. Need of hadoop, RDBMS vs Hadoop, Distribution computing challenges, History of hadoop, Hadoop overview,HDFS

UNIT - III

Processing data with hadoop, introduction to mapreduce programming, mapper, reducer, combiner, partitioner
NoSQL: Types of NoSQL Databases, advantages of NoSQL, Use of NoSQL in industry, SQL vsNoSQL, newSQL, comparison of Nosql, sql and newsql

UNIT - IV

MongoDB, necessity of mongodb, terms used in mongodb and RDBMS, datatypes in mongoDB,mongodb query language

UNIT - V

Introduction to R programming, operators, control statements and functions, interfacing with R, vectors, matrices, lists, data frames, factors and tables, accessing input and output, graphs in R, R apply family

TEXT BOOKS:

1. Big Data Analytics, Seema Acharya, Subhashini Chellappan, Wiley 2015.
2. R programming for beginners, sandhya arora, latesh malik, university press.

REFERENCE BOOKS:

1. chandramouli subramanian, Asha A Geroge, C R Rene Robin, big data analytics, Universitypress.
2. Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Business, Michael Minelli, Michehe Chambers, 1st Edition, Ambiga Dhiraj, Wiley CIO Series, 2013.
3. Hadoop: The Definitive Guide, Tom White, 3rd Edition, O'Reilly Media, 2012.
4. Big Data Analytics: Disruptive Technologies for Changing the Game, Arvind Sathi, 1st Edition, IBM Corporation, 2012.

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech VI Semester		
Code: C0536	**SOFTWARE TESTING METHODOLOGIES (Professional Elective – III)**	**L**	**T**	**P**
Credit : 3		**3**	**0**	**0**

Prerequisites

1. Software Engineering

Course Objectives

- To provide knowledge of the concepts in software testing such as testing process, criteria,strategies, and methodologies.
- To develop skills in software test automation and management using the latest tools.

Course Outcomes

- Understand purpose of testing and path testing
- Understand strategies in data flow testing and domain testing
- Develop logic-based test strategies
- Understand graph matrices and its applications
- Implement test cases using any testing automation tool

UNIT - I

Introduction: Purpose of testing, Dichotomies, model for testing, consequences of bugs, taxonomy of bugs Flow graphs and Path testing: Basics concepts of path testing, predicates, path predicates and achievable paths, path sensitizing, path instrumentation, application of path testing.

UNIT - II

Transaction Flow Testing: transaction flows, transaction flow testing techniques.

Data Flow testing: Basics of data flow testing, strategies in data flow testing, application of data flowtesting.

Domain Testing: domains and paths, Nice & ugly domains, domain testing, domains and interfacestesting, domain and interface testing, domains and testability.

UNIT - III

Paths, Path products and Regular expressions: path products & path expression, reduction procedure,applications, regular expressions & flow anomaly detection.

Logic Based Testing: overview, decision tables, path expressions, kv charts, specifications.

UNIT - IV

State, State Graphs and Transition testing: state graphs, good & bad state graphs, state testing,Testability tips.

UNIT - V

Graph Matrices and Application: Motivational overview, matrix of graph, relations, power of a matrix, node reduction algorithm, building tools. (Student should be given an exposure to a tool like Jmeter/selenium/soapUI/Catalon).

TEXT BOOKS:

1. Software Testing techniques - Baris Beizer, Dreamtech, second edition.
2. Software Testing Tools – Dr. K. V. K. K. Prasad, Dreamtech.

REFERENCE BOOKS:

1. The craft of software testing - Brian Marick, Pearson Education.
2. Software Testing Techniques – SPD(Oreille)
3. Software Testing in the Real World – Edward Kit, Pearson.
4. Effective methods of Software Testing, Perry, John Wiley.
5. Art of Software Testing – Meyers, John Wiley.

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech VI Semester		
Code: C6707	**DATA VISUALIZATION TECHNIQUES**	**L**	**T**	**P**
Credit : 3	**(Professional Elective – III)**	**3**	**0**	**0**

Course Objectives:

- To understand various data visualization techniques

Course Outcomes:

- Know the historical development and evolution of data visualization techniques.
- Analyze and visualize high-dimensional datasets using appropriate techniques.
- Visualize large multidimensional datasets using appropriate methods.
- Create insightful visual representations for diverse types of data.

UNIT - I

Introduction, A Brief History of Data Visualization, Good Graphics, Static Graphics.

UNIT - II

Data Visualization Through Their Graph Representations, Graph-theoretic Graphics, High-dimensional Data Visualization, Multivariate Data Glyphs: Principles and Practice, Linked Views for Visual Exploration, Linked Data Views, Visualizing Trees and Forests.

UNIT - III

Multidimensional Scaling, Huge Multidimensional Data Visualization, Multivariate Visualization by Density Estimation, Structured Sets of Graphs, Structural Adaptive Smoothing by Propagation- Separation Methods, Smoothing Techniques for Visualization.

UNIT - IV

Data Visualization via Kernel Machines, Visualizing Cluster Analysis and Finite Mixture Models, Visualizing Contingency Tables, Mosaic Plots and their Variants.

UNIT - V

Parallel Coordinates: Visualization, Exploration and Classification of High- Dimensional Data, Matrix Visualization, Visualization in Bayesian Data Analysis.

TEXT BOOKS:

1. Handbook of Data Visualization by Chun-houh Chen, 2008.
2. Matthew Ward, Georges Grinstein and Daniel Keim, “Interactive Data Visualization Foundations, Techniques, Applications”, 2010.
3. Colin Ware, “Information Visualization Perception for Design”, 2nd edition, Margon KaufmannPublishers, 2004.

REFERENCE BOOKS:

1. Robert Spence “Information visualization – Design for interaction”, Pearson Education, 2ndEdition, 2007.
2. Alexandru C. Telea, “Data Visualization: Principles and Practice,” A. K. Peters Ltd, 2008.

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech VI Semester		
Code: C0534	**SCRIPTING LANGUAGES**	**L**	**T**	**P**
Credit : 3	**(Professional Elective – III)**	**3**	**0**	**0**

Prerequisites:

1. A course on "Computer Programming and Data Structures".
2. A course on "Object Oriented Programming Concepts".

Course Objectives:

- This course introduces the script programming paradigm
- Introduces scripting languages such as Perl, Ruby and TCL.
- Learning TCL

Course Outcomes:

- Comprehend the differences between typical scripting languages and typical system andapplication programming languages.
- Gain knowledge of the strengths and weakness of Perl, TCL and Ruby; and select anappropriate language for solving a given problem.
- Acquire programming skills in scripting language

UNIT - I

Introduction: Ruby, Rails, The structure and Execution of Ruby Programs, Package Management with RUBYGEMS, Ruby and web: Writing CGI scripts, cookies, Choice of Webservers, SOAP and web services RubyTk - Simple Tk Application, widgets, Binding events, Canvas, scrolling

UNIT - II

Extending Ruby: Ruby Objects in C, the Jukebox extension, Memory allocation, Ruby Type System,Embedding Ruby to Other Languages, Embedding a Ruby Interpreter

UNIT - III

Introduction to PERL and Scripting

Scripts and Programs, Origin of Scripting, Scripting Today, Characteristics of Scripting Languages, Uses for Scripting Languages, Web Scripting, and the universe of Scripting Languages. PERL- Names and Values, Variables, Scalar Expressions, Control Structures, arrays, list, hashes, strings, pattern andregular expressions, subroutines.

UNIT - IV

Advanced perl

Finer points of looping, pack and unpack, filesystem, eval, data structures, packages, modules, objects, interfacing to the operating system, Creating Internet ware applications, Dirty Hands Internet Programming, security Issues.

UNIT - VTCL

TCL Structure, syntax, Variables and Data in TCL, Control Flow, Data Structures, input/output,procedures, strings, patterns, files, Advance TCL- eval, source, exec and uplevel commands, Name spaces, trapping errors, event driven programs, making applications internet aware, Nuts and Bolts Internet Programming, Security Issues, C Interface.

Tk

Tk-Visual Tool Kits, Fundamental Concepts of Tk, Tk by example, Events and Binding, Perl-Tk.

TEXT BOOKS:

1. The World of Scripting Languages, David Barron, Wiley Publications.
2. Ruby Programming language by David Flanagan and Yukihiro Matsumoto O'Reilly
3. "Programming Ruby" The Pramatic Progammers guide by Dabve Thomas Second edition

REFERENCE BOOKS:

1. Open Source Web Development with LAMP using Linux Apache, MySQL, Perl and PHP, J.Leeand B. Ware (Addison Wesley) Pearson Education.
2. Perl by Example, E. Quigley, Pearson Education.
3. Programming Perl, Larry Wall, T. Christiansen and J. Orwant, O'Reilly, SPD.
4. Tcl and the Tk Tool kit, Ousterhout, Pearson Education.
5. Perl Power, J. P. Flynt, Cengage Learning.

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech VI Semester		
Code: C0535	**MOBILE APPLICATION DEVELOPMENT (Professional Elective – III)**	**L**	**T**	**P**
Credit : 3		**3**	**0**	**0**

Prerequisites

1. Acquaintance with JAVA programming.
2. A Course on DBMS.

Course Objectives

- To demonstrate their understanding of the fundamentals of Android operating systems
- To improves their skills of using Android software development tools
- To demonstrate their ability to develop software with reasonable complexity on mobile platform
- To demonstrate their ability to deploy software to mobile devices
- To demonstrate their ability to debug programs running on mobile devices

Course Outcomes

- Understand the working of Android OS Practically.
- Develop Android user interfaces
- Develop, deploy and maintain the Android Applications.

UNIT - I

Introduction to Android Operating System: Android OS design and Features – Android development framework, SDK features, Installing and running applications on Android Studio, Creating AVDs, Types of Android applications, Best practices in Android programming, Android tools Android application components – Android Manifest file, Externalizing resources like values, themes, layouts, Menus etc, Resources for different devices and languages, Runtime Configuration Changes

Android Application Lifecycle – Activities, Activity lifecycle, activity states, monitoring state changes

UNIT - II

Android User Interface: Measurements – Device and pixel density independent measuring unit - sLayouts – Linear, Relative, Grid and Table Layouts

User Interface (UI) Components –Editable and non-editable TextViews, Buttons, Radio and Toggle Buttons, Checkboxes, Spinners, Dialog and pickers

Event Handling – Handling clicks or changes of various UI components

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

UNIT - III

Intents and Broadcasts: Intent – Using intents to launch Activities, Explicitly starting new Activity,

Implicit Intents, Passing data to Intents, Getting results from Activities, Native Actions, using Intent to dial a number or to send SMS
Broadcast Receivers – Using Intent filters to service implicit Intents, Resolving Intent filters, finding andusing Intents received within an Activity
Notifications – Creating and Displaying notifications, Displaying Toasts

UNIT - IV

Persistent Storage: Files – Using application specific folders and files, creating files, reading data from files, listing contents of a directory Shared Preferences – Creating shared preferences, saving andretrieving data using Shared Preference

UNIT - V

Database – Introduction to SQLite database, creating and opening a database, creating tables, insertingretrieving and etindelg data, Registering Content Providers, Using content Providers (insert, delete, retrieve and update)

TEXT BOOK:

1. Professional Android 4 Application Development, Reto Meier, Wiley India, (Wrox), 2012

REFERENCE BOOKS:

1. Android Application Development for Java Programmers, James C Sheusi, Cengage Learning,2013
2. Beginning Android 4 Application Development, Wei-Meng Lee, Wiley India (Wrox), 2013

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech VI Semester		
Code: C6203	**CRYPTOGRAPHY AND NETWORK SECURITY (Professional Elective – III)**	**L**	**T**	**P**
Credit : 3		**3**	**0**	**0**

Course Objectives:

- Explain the importance and application of each of confidentiality, integrity, authentication andavailability
- Understand various cryptographic algorithms.
- Understand the basic categories of threats to computers and networks
- Describe public-key cryptosystem.
- Describe the enhancements made to IPv4 by IPSec
- Understand Intrusions and intrusion detection

Course Outcomes:

- Student will be able to understand basic cryptographic algorithms, message and web authentication and security issues.
- Ability to identify information system requirements for both of them such as client and server.
- Ability to understand the current legal issues towards information security.

UNIT - I

Security Concepts: Introduction, The need for security, Security approaches, Principles of security,Types of Security attacks, Security services, Security Mechanisms, A model for Network Security **Cryptography Concepts and Techniques:** Introduction, plain text and cipher text, substitutiontechniques, transposition techniques, encryption and decryption, symmetric and asymmetric keycryptography, steganography, key range and key size, possible types of attacks.

UNIT - II

Symmetric key Ciphers: Block Cipher principles, DES, AES, Blowfish, RC5, IDEA, Block cipheroperation, Stream ciphers, RC4.

Asymmetric key Ciphers: Principles of public key cryptosystems, RSA algorithm, ElgamalCryptography, Diffie-Hellman Key Exchange, Knapsack Algorithm.

UNIT - III

Cryptographic Hash Functions: Message Authentication, Secure Hash Algorithm (SHA-512), **Message authentication codes:** Authentication requirements, HMAC, CMAC, Digital signatures,Elgamal Digital Signature Scheme.

Key Management and Distribution: Symmetric Key Distribution Using Symmetric & Asymmetric Encryption, Distribution of Public Keys, Kerberos, X.509 Authentication Service, Public – Key Infrastructure

UNIT - IV

Transport-level Security: Web security considerations, Secure Socket Layer and Transport Layer Security, HTTPS, Secure Shell (SSH)

Wireless Network Security: Wireless Security, Mobile Device Security, IEEE 802.11 Wireless LAN,IEEE 802.11i Wireless LAN Security

UNIT - V

E-Mail Security: Pretty Good Privacy, S/MIME IP Security: IP Security overview, IP Security architecture, Authentication Header, Encapsulating security payload, Combining security associations,Internet Key Exchange

Case Studies on Cryptography and security: Secure Multiparty Calculation, Virtual Elections, Single sign On, Secure Inter-branch Payment Transactions, Cross site Scripting Vulnerability.

TEXT BOOKS:

1. Cryptography and Network Security - Principles and Practice: William Stallings, PearsonEducation, 6th Edition
2. Cryptography and Network Security: Atul Kahate, Mc Graw Hill, 3rd Edition

REFERENCE BOOKS:

1. Cryptography and Network Security: C K Shyamala, N Harini, Dr T R Padmanabhan, WileyIndia, 1st Edition.
2. Cryptography and Network Security: Forouzan Mukhopadhyay, Mc Graw Hill, 3rd Edition
3. Information Security, Principles, and Practice: Mark Stamp, Wiley India.
4. Principles of Computer Security: WM. Arthur Conklin, Greg White, TMH
5. Introduction to Network Security: Neal Krawetz, CENGAGE Learning
6. Network Security and Cryptography: Bernard Menezes, CENGAGE Learning

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech VI Semester		
Code: C6621	**MACHINE LEARNING LAB**	**L**	**T**	**P**
Credit : 1		**0**	**0**	**2**

Course Objective:

- The objective of this lab is to get an overview of the various machine learning techniques andcan demonstrate them using python.

Course Outcomes:

- Understand modern notions in predictive data analysis
- Select data, model selection, model complexity and identify the trends
- Understand a range of machine learning algorithms along with their strengths and weaknesses
- Build predictive models from data and analyze their performance

List of Experiments

1. Write a python program to compute Central Tendency Measures: Mean, Median, Mode Measure of Dispersion: Variance, Standard Deviation
2. Study of Python Basic Libraries such as Statistics, Math, Numpy and Scipy
3. Study of Python Libraries for ML application such as Pandas and Matplotlib
4. Write a Python program to implement Simple Linear Regression
5. Implementation of Multiple Linear Regression for House Price Prediction using sklearn
6. Implementation of Decision tree using sklearn and its parameter tuning
7. Implementation of KNN using sklearn
8. Implementation of Logistic Regression using sklearn
9. Implementation of K-Means Clustering
10. Performance analysis of Classification Algorithms on a specific dataset (Mini Project)

TEXT BOOK:

1. Machine Learning – Tom M. Mitchell, - MGH

REFERENCE BOOK:

1. Machine Learning: An Algorithmic Perspective, Stephen Marshland, Taylor & Francis

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech VI Semester		
Code: C6706	**BIG DATA ANALYTICS LAB**	**L**	**T**	**P**
Credit : 1		**0**	**0**	**2**

Course Objectives

- Provide knowledge of Big data Analytics principles and techniques.
- Designed to give an exposure of the frontiers of Big data Analytics

Course Outcomes

- Use Excel as an Analytical tool and visualization tool.
- Ability to program using HADOOP and Map reduce
- Ability to perform data analytics using ML in R.
- Use MongoDB to perform data analytics

List of Experiments

1. Create a Hadoop cluster
2. Implement a simple map-reduce job that builds an inverted index on the set of input documents(Hadoop)
3. Process big data in HBase
4. Store and retrieve data in Pig
5. Perform data analysis using MongoDB
6. Using Power Pivot (Excel) Perform the following on any dataset

a. Big Data Analytics
b. Big Data Charting

TEXT BOOKS:

1. Big Data Analytics, Seema Acharya, Subhashini Chellappan, Wiley 2015.
2. Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Business, Michael Minelli, Michehe Chambers, 1st Edition, Ambiga Dhiraj, Wiley CIO Series,2013.
3. Hadoop: The Definitive Guide, Tom White, 3rd Edition, O"Reilly Media, 2012.
4. Big Data Analytics: Disruptive Technologies for Changing the Game, Arvind Sathi, 1st Edition, IBM Corporation, 2012.

REFERENCE BOOKS:

1. Big Data and Business Analytics, Jay Liebowitz, Auerbach Publications, CRC press (2013)
2. Using R to Unlock the Value of Big Data: Big Data Analytics with Oracle R Enterprise and Oracle R Connector for Hadoop, Tom Plunkett, Mark Hornick, McGraw-Hill/Osborne Media(2013), Oracle press.
3. Professional Hadoop Solutions, Boris lublinsky, Kevin t. Smith, Alexey Yakubovich, Wiley, ISBN: 9788126551071, 2015.

4. Understanding Big data, Chris Eaton, Dirk deroos et al., McGraw Hill, 2012.
5. Intelligent Data Analysis, Michael Berthold, David J. Hand, Springer, 2007.
6. Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics, Bill Franks, 1st Edition, Wiley and SAS Business Series, 2012.

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech VI Semester		
Code: C0541	**SOFTWARE TESTING METHODOLOGIES LAB (Professional Elective – III)**	**L**	**T**	**P**
Credit : 1		**0**	**0**	**2**

Prerequisites

- A basic knowledge of programming.

Course Objectives

- To provide knowledge of software testing methods.
- To develop skills in automation of software testing and software test automation management using the latest tools.

Course Outcomes

1. Design and develop the best test strategies in accordance with the development model.
2. Design and develop GUI, Bitmap and database checkpoints
3. Develop database checkpoints for different checks
4. Perform batch testing with and without parameter passing

List of Experiments

1. Recording in context sensitive mode and analog mode
2. GUI checkpoint for single property
3. GUI checkpoint for single object/window
4. GUI checkpoint for multiple objects
5.

a. Bitmap checkpoint for object/window
b. Bitmap checkpoint for screen area

6. Database checkpoint for Default check
7. Database checkpoint for custom check
8. Database checkpoint for runtime record check
9.

a. Data driven test for dynamic test data submission
b. Data driven test through flat files
c. Data driven test through front grids
d. Data driven test through excel test

10.

a. Batch testing without parameter passing
b. Batch testing with parameter passing

11. Data driven batch
11. Silent mode test execution without any interruption
12. Test case for calculator in windows application

TEXT BOOKS

1. Software Testing techniques, Baris Beizer, 2nd Edition, Dreamtech.
2. Software Testing Tools, Dr. K.V.K.K.Prasad, Dreamtech.

REFERENCE BOOKS

1. The craft of software testing, Brian Marick, Pearson Education.
2. Software Testing Techniques – SPD(Oreille)
3. Software Testing in the Real World, Edward Kit, Pearson.
4. Effective methods of Software Testing, Perry, John Wiley.
5. Art of Software Testing, Meyers, John Wiley.

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech VI Semester		
Code: C6708	**DATA VISUALIZATION TECHNIQUES LAB**	**L**	**T**	**P**
Credit : 1	**(Professional Elective – III)**	**0**	**0**	**2**

Course Objectives:

- Understand the various types of data, apply and evaluate the principles of data visualization.
- Acquire skills to apply visualization techniques to a problem and its associated dataset.

Course Outcomes:

- Identify the different data types, visualization types to bring out the insight.
- Relate the visualization towards the problem based on the dataset to analyze and bring out valuable insight on a large dataset.
- Demonstrate the analysis of a large dataset using various visualization techniques and tools.
- Identify the different attributes and showcasing them in plots. Identify and create various visualizations for geospatial and table data.
- Ability to create and interpret plots using R/Python.

List of Experiments

1. Acquiring and plotting data.
2. Statistical Analysis – such as Multivariate Analysis, PCA, LDA, Correlation regression and analysis of variance
3. Financial analysis using Clustering, Histogram and HeatMap
4. Time-series analysis – stock market
5. Visualization of various massive dataset - Finance - Healthcare - Census - Geospatial
6. Visualization on Streaming dataset (Stock market dataset, weather forecasting)
7. Market-Basket Data analysis-visualization
8. Text visualization using web analytics

TEXT BOOKS:

1. Matthew Ward, Georges Grinstein and Daniel Keim, “Interactive Data Visualization Foundations, Techniques, Applications”, 2010.
2. Colin Ware, “Information Visualization Perception for Design”, 2nd edition, Margon Kaufmann Publishers, 2004.

REFERENCE BOOKS:

1. Robert Spence “Information visualization – Design for interaction”, Pearson Education, 2 nd Edition, 2007.
2. Alexandru C. Telea, “Data Visualization: Principles and Practice,” A. K. Peters Ltd, 2008.

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech VI Semester		
Code: C0539	**SCRIPTING LANGUAGES LAB**	**L**	**T**	**P**
Credit : 1	**(Professional Elective – III)**	**0**	**0**	**2**

Prerequisites: Any High level programming language (C, C++)

Course Objectives

- To Understand the concepts of scripting languages for developing web based projects
- To understand the applications the of Ruby, TCL, Perl scripting languages

Course Outcomes

- Ability to understand the differences between Scripting languages and programming languages
- Gain some fluency programming in Ruby, Perl, TCL

LIST OF EXPERIMENTS

1. Write a Ruby script to create a new string which is n copies of a given string where n is a non-negative integer
2. Write a Ruby script which accept the radius of a circle from the user and compute the parameter and area.
3. Write a Ruby script which accept the users first and last name and print them in reverse order with a space between them
4. Write a Ruby script to accept a filename from the user print the extension of that
5. Write a Ruby script to find the greatest of three numbers
6. Write a Ruby script to print odd numbers from 10 to 1
7. Write a Ruby script to check two integers and return true if one of them is 20 otherwise return their sum
8. Write a Ruby script to check two temperatures and return true if one is less than 0 and the other is greater than 100
9. Write a Ruby script to print the elements of a given array
10. Write a Ruby program to retrieve the total marks where subject name and marks of a student stored in a hash
11. Write a TCL script to find the factorial of a number
12. Write a TCL script that multiplies the numbers from 1 to 10
13. Write a TCL script for sorting a list using a comparison function
14. Write a TCL script to (i) create a list (ii) append elements to the list (iii) Traverse the list (iv) Concatenate the list
15. Write a TCL script to comparing the file modified times.
16. Write a TCL script to Copy a file and translate to native format.
17. a) Write a Perl script to find the largest number among three numbers.
    b) Write a Perl script to print the multiplication tables from 1-10 using subroutines.
18. Write a Perl program to implement the following list of manipulating functions

a) Shift

b) Unshift
c) Push

19. a) Write a Perl script to substitute a word, with another word in a string.
    b) Write a Perl script to validate IP address and email address.
20. Write a Perl script to print the file in reverse order using command line arguments

TEXT BOOKS:

1. The World of Scripting Languages, David Barron,Wiley Publications.
2. Ruby Programming language by David Flanagan and Yukihiro Matsumoto O'Reilly
3. "Programming Ruby" The Pramatic Progammers guide by Dabve Thomas Second edition

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech VI Semester		
Code: C0540	**MOBILE APPLICATION DEVELOPMENT LAB**	**L**	**T**	**P**
Credit : 1	**(Professional Elective – III)**	**0**	**0**	**2**

Course Objectives:

- To learn how to develop Applications in an android environment.
- To learn how to develop user interface applications.
- To learn how to develop URL related applications.

Course Outcomes:

- Understand the working of Android OS Practically.
- Develop user interfaces.
- Develop, deploy and maintain the Android Applications.

LIST OF EXPERIMENTS:

1. Create an Android application that shows Hello + name of the user and run it on an emulator.

(b) Create an application that takes the name from a text box and shows hello message along with the name entered in the text box, when the user clicks the OK button.

2. Create a screen that has input boxes for User Name, Password, Address, Gender (radio buttons for male and female), Age (numeric), Date of Birth (Datepicker), State (Spinner) and a Submit button. On clicking the submit button, print all the data below the Submit Button. Use (a) Linear Layout (b) Relative Layout and (c) Grid Layout or Table Layout.
3. Develop an application that shows names as a list and on selecting a name it should show the details of the candidate on the next screen with a “Back” button. If the screen is rotated to landscape mode (width greater than height), then the screen should show list on left fragment and details on the right fragment instead of the second screen with the back button. Use Fragment transactions and Rotation event listeners.
4. Develop an application that uses a menu with 3 options for dialing a number, opening a website and to send an SMS. On selecting an option, the appropriate action should be invoked using intents.
5. Develop an application that inserts some notifications into Notification area and whenever a notification is inserted, it should show a toast with details of the notification.
6. Create an application that uses a text file to store usernames and passwords (tab separated fields and one record per line). When the user submits a login name and password through a screen, the details should be verified with the text file data and if they match, show a dialog saying that login is successful. Otherwise, show the dialog with a Login Failed message.
7. Create a user registration application that stores the user details in a database table.
8. Create a database and a user table where the details of login names and passwords are stored. Insert some names and passwords initially. Now the login details entered by the user should be verified with the database and an appropriate dialog should be shown to

the user.

9. Create an admin application for the user table, which shows all records as a list and the admin can select any record for edit or modify. The results should be reflected in the table.
10. Develop an application that shows all contacts of the phone along with details like name, phone number, mobile number etc.
11. Create an application that saves user information like name, age, gender etc. in shared preference and retrieves them when the program restarts.
12. Create an alarm that rings every Sunday at 8:00 AM. Modify it to use a time picker to set alarm time.

TEXT BOOKS:

1. Professional Android 4 Application Development, Reto Meier, Wiley India, (Wrox), 2012.
2. Android Application Development for Java Programmers, James C Sheusi, Cengage, 2013.

REFERENCE BOOK:

1. Beginning Android 4 Application Development, Wei-Meng Lee, Wiley India (Wrox), 2013.

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech VI Semester		
Code: C6204	**CRYPTOGRAPHY AND NETWORK SECURITY LAB**	**L**	**T**	**P**
Credit : 1	**(Professional Elective – III)**	**0**	**0**	**2**

Course Objectives:

- Explain the objectives of information security
- Explain the importance and application of each of confidentiality, integrity, authentication and availability
- Understand various cryptographic algorithms.

Course Outcomes:

- Understand basic cryptographic algorithms, message and web authentication and security issues.
- Identify information system requirements for both of them such as client and server.
- Understand the current legal issues towards information security.

List of Experiments:

1. Write a C program that contains a string (char pointer) with a value 'Hello world'. The program should XOR each character in this string with 0 and display the result.
2. Write a C program that contains a string (char pointer) with a value 'Hello world'. The program should AND or and XOR each character in this string with 127 and display the result.
3. Write a Java program to perform encryption and decryption using the following algorithms

a. Ceaser cipher b. Substitution cipher c. Hill Cipher

4. Write a C/JAVA program to implement the DES algorithm logic.
5. Write a C/JAVA program to implement the Blowfish algorithm logic.
6. Write a C/JAVA program to implement the Rijndael algorithm logic.
7. Write the RC4 logic in Java Using Java cryptography; encrypt the text "Hello world" using Blowfish. Create your own key using Java key tool.
8. Write a Java program to implement the RSA algorithm.
9. Implement the Diffie-Hellman Key Exchange mechanism using HTML and JavaScript.
10. Calculate the message digest of a text using the SHA-1 algorithm in JAVA.
11. Calculate the message digest of a text using the MD5 algorithm in JAVA

TEXT BOOKS:

1. Cryptography and Network Security - Principles and Practice: William Stallings, Pearson Education, 6th Edition
2. Cryptography and Network Security: Atul Kahate, McGraw Hill, 3rd Edition

REFERENCE BOOKS:

1. Cryptography and Network Security: C K Shyamala, N Harini, Dr T R Padmanabhan,

Wiley India, 1st Edition.
2. Cryptography and Network Security: Forouzan Mukhopadhyay, McGraw Hill, 3rd Edition
3. Information Security, Principles, and Practice: Mark Stamp, Wiley India.
4. Principles of Computer Security: WM. Arthur Conklin, Greg White, TMH
5. Introduction to Network Security: Neal Krawetz, CENGAGE Learning
6. Network Security and Cryptography: Bernard Menezes, CENGAGE Learning

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech VI Semester		
Code: C00P1	**UI DESIGN - FLUTTER**	**L**	**T**	**P**
Credit : 2		**0**	**0**	**4**

Course Objectives:

- Learns to Implement Flutter Widgets and Layouts
- Understands Responsive UI Design and with Navigation in Flutter
- Knowledge on Widges and customize widgets for specific UI elements, Themes
- Understand to include animation apart from fetching data

Course Outcomes:

- Implements Flutter Widgets and Layouts
- Responsive UI Design and with Navigation in Flutter
- Create custom widgets for specific UI elements and also Apply styling using themes and custom styles.
- Design a form with various input fields, along with validation and error handling
- Fetches data and write code for unit Test for UI components and also animation

List of Experiments: Students need to implement the following experiments

1. a) Install Flutter and Dart SDK.
   b) Write a simple Dart program to understand the language basics.

2. a) Explore various Flutter widgets (Text, Image, Container, etc.).
   b) Implement different layout structures using Row, Column, and Stack widgets.

3. a) Design a responsive UI that adapts to different screen sizes.
   b) Implement media queries and breakpoints for responsiveness.

4. a) Set up navigation between different screens using Navigator.
   b) Implement navigation with named routes.

5. a) Learn about stateful and stateless widgets.
   b) Implement state management using set State and Provider.

6. a) Create custom widgets for specific UI elements.
   b) Apply styling using themes and custom styles.

7. a) Design a form with various input fields.
   b) Implement form validation and error handling.

8. a) Add animations to UI elements using Flutter's animation framework.
   b) Experiment with different types of animations (fade, slide, etc.).

9. a) Fetch data from a REST API.
   b) Display the fetched data in a meaningful way in the UI.

10. a) Write unit tests for UI components.
    b) Use Flutter's debugging tools to identify and fix issues.

TEXT BOOK:

1. Marco L. Napoli, Beginning Flutter: A Hands-on Guide to App Development.

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech VI Semester		
Code: C00M6	**INTELLECTUAL PROPERTY RIGHTS**	**L**	**T**	**P**
Credit : 0		**3**	**0**	**0**

Course Objectives:

- Significance of intellectual property and its protection
- Introduce various forms of intellectual property

Course Outcomes:

- Distinguish and Explain various forms of IPRs.
- Identify criteria to fit one's own intellectual work in particular form of IPRs.
- Apply statutory provisions to protect particular form of IPRs.
- Appraise new developments in IPR laws at national and international level

UNIT – I

Introduction to Intellectual property: Introduction, types of intellectual property, international organizations, agencies and treaties, importance of intellectual property rights.

UNIT – II

Trade Marks: Purpose and function of trademarks, acquisition of trade mark rights, protectable matter,selecting, and evaluating trade mark, trade mark registration processes.

UNIT – III

Law of copyrights: Fundamental of copyright law, originality of material, rights of reproduction, rights to perform the work publicly, copyright ownership issues, copyright registration, notice of copyright, International copyright law.

Law of patents: Foundation of patent law, patent searching process, ownership rights and transfer

UNIT – IV

Trade Secrets: Trade secret law, determination of trade secret status, liability for misappropriations oftrade secrets, protection for submission, trade secret litigation.

Unfair competition: Misappropriation right of publicity, false advertising.

UNIT – V

New development of intellectual property: new developments in trade mark law; copyright law, patent law, intellectual property audits.

International overview on intellectual property, international – trade mark law, copyright law, international patent law, and international development in trade secrets law.

TEXT BOOK:

1. Intellectual property right, Deborah. E. Bouchoux, Cengage learning.

REFERENCE BOOK:

1. Intellectual property right – Unleashing the knowledge economy, prabuddha ganguli, TataMcGraw Hill Publishing company ltd.

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech VI Semester		
Code: C00M4	**QUANTITATIVE APTITUDE AND VERBAL REASONING - 2**	**L**	**T**	**P**
Credit : 0		**2**	**0**	**0**

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. VII Semester		
Code: C6709	PREDICTIVE ANALYTICS (Common for CE, EEE, ME, ECE, CSE, CSE (AIML), CSE (DS), CSE (CS), CSE(IOT), IT and Min.E)	L	T	P
Credits: 3		3	0	0

Course Objectives: The course serves to advance and refine expertise on theories, approaches and techniques related to prediction and forecasting.

Course Outcomes

1. Understand prediction-related principles, theories and approaches.
2. Learn model assessment and validation.
3. Understand the basics of predictive techniques and statistical approaches.
4. Analyze supervised and unsupervised algorithms.

UNIT - I

Linear Methods for Regression and Classification: Overview of supervised learning, Linear regression models and least squares, Multiple regression, Multiple outputs, Subset selection, Ridge regression, Lasso regression, Linear Discriminant Analysis, Logistic regression, Perceptron learning algorithm.

UNIT - II

Model Assessment and Selection: Bias, Variance, and model complexity, Bias-variance trade off, Optimism of the training error rate, Estimate of In-sample prediction error, Effective number of parameters, Bayesian approach and BIC, Cross- validation, Boot strap methods, conditional or expected test error.

UNIT - III

Additive Models, Trees, and Boosting: Generalized additive models, Regression and classification trees, Boosting methods-exponential loss and AdaBoost, Numerical Optimization via gradient boosting, Examples (Spam data, California housing, New Zealand fish, Demographic data).

UNIT - IV

Neural Networks (NN), Support Vector Machines (SVM), and K-nearest Neighbor: Fitting neural networks, Back propagation, Issues in training NN, SVM for classification, Reproducing Kernels, SVM for regression, K-nearest – Neighbour classifiers (Image Scene Classification).

UNIT - V

Unsupervised Learning and Random forests: Association rules, Cluster analysis, Principal Components, Random forests and analysis.

TEXT BOOK:

1. Trevor Hastie, Robert Tibshirani, Jerome Friedman, The Elements of Statistical Learning-Data Mining, Inference, and Prediction, Second Edition, Springer Verlag, 2009.

REFERENCE BOOKS:

1. C.M.Bishop –Pattern Recognition and Machine Learning, Springer, 2006.
2. L. Wasserman-All of statistics.
3. Gareth James. Daniela Witten. Trevor Hastie Robert Tibshirani. An Introduction to Statistical Learning with Applications in R.

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. VII Semester		
Code: C0546	CLOUD COMPUTING (Common for CE, EEE, ME, ECE, CSE, CSE (AIML), CSE (DS), CSE (CS), CSE(IOT), IT and Min.E)	L	T	P
Credits: 3		3	0	0

Pre-requisites: Courses on Computer Networks, Operating Systems, Distributed Systems.

Course Objectives:

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

Course Outcomes:

1. Ability to understand various service delivery models of a cloud computing architecture.
2. Ability to understand the ways in which the cloud can be programmed and deployed.
3. Understanding cloud service providers.

UNIT - I

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

UNIT - II

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

UNIT - III

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

UNIT - IV

Cloud Service Models: Infrastructure as a Service, Characteristics of IaaS. Suitability of IaaS, Pros and

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

UNIT V

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

TEXT BOOK:

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

REFERENCE BOOKS:

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

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. VII Semester		
Code: C0523	QUANTUM COMPUTING (Professional Elective – IV) (Common for CE, EEE, ME, ECE, CSE, CSE (AIML), CSE (DS), CSE (CS), CSE(IOT), IT and Min.E)	L	T	P
Credits: 3		3	0	0

Course Objectives:

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

Course Outcomes:

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

UNIT - I

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

UNIT - II

Basic Physics for Quantum Computing: The Journey to Quantum, Quantum Physics Essentials, Basic Atomic Structure, Hilbert Spaces, Uncertainty, Quantum States, Entanglement.

Basic Quantum Theory: Further with Quantum Mechanics, Quantum Decoherence, Quantum Electrodynamics, Quantum Chromodynamics, Feynman Diagram Quantum Entanglement and QKD, Quantum Entanglement, Interpretation, QKE.

UNIT - III

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

UNIT - IV

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

UNIT - V

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

TEXT BOOKS:

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

REFERENCE BOOKS:

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

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. VII Semester		
Code: C6713	WEB AND SOCIAL MEDIA ANALYTICS	L	T	P
Credits: 3	(Professional Elective – IV) (Common for CE, EEE, ME, ECE, CSE, CSE (AIML), CSE (DS), CSE (CS), CSE(IOT), IT and Min.E)	3	0	0

Course Objectives: Exposure to various web and social media analytic techniques.

Course Outcomes:

1. Knowledge on decision support systems.
2. Apply natural language processing concepts on text analytics.
3. Understand sentiment analysis.
4. Knowledge on search engine optimization and web analytics.

UNIT - I

An Overview of Business Intelligence, Analytics, and Decision Support: Analytics to Manage a Vaccine Supply Chain Effectively and Safely, Changing Business Environments and Computerized Decision Support, Information Systems Support for Decision Making, The Concept of Decision Support Systems (DSS), Business Analytics Overview, Brief Introduction to Big Data Analytics.

UNIT - II

Text Analytics and Text Mining: Machine Versus Men on Jeopardy!: The Story of Watson, Text Analytics and Text Mining Concepts and Definitions, Natural Language Processing, Text Mining Applications, Text Mining Process, Text Mining Tools.

UNIT - III

Sentiment Analysis: Sentiment Analysis Overview, Sentiment Analysis Applications, Sentiment Analysis Process, Sentiment Analysis and Speech Analytics.

UNIT - IV

Web Analytics, Web Mining: Security First Insurance Deepens Connection with Policyholders, Web Mining Overview, Web Content and Web Structure Mining, Search Engines, Search Engine Optimization, Web Usage Mining (Web Analytics), Web Analytics Maturity Model and Web Analytics Tools.

UNIT - V

Social Analytics and Social Network Analysis: Social Analytics and Social Network Analysis, Social Media Definitions and Concepts, Social Media Analytics.

Prescriptive Analytics - Optimization and Multi-Criteria Systems: Multiple Goals, Sensitivity Analysis, What-If Analysis, and Goal Seeking.

TEXT BOOK:

1. Ramesh Sharda, Dursun Delen, Efraim Turban, BUSINESS INTELLIGENCE AND ANALYTICS: SYSTEMS FOR DECISION SUPPORT, Pearson Education.

REFERENCE BOOKS:

1. Rajiv Sabherwal, Irma Becerra-Fernandez," Business Intelligence – Practice, Technologies and Management", John Wiley 2011.
2. Lariss T. Moss, ShakuAtre, "Business Intelligence Roadmap", Addison-Wesley It Service.
3. Yuli Vasiliev, "Oracle Business Intelligence: The Condensed Guide to Analysis and Reporting", SPD Shroff, 2012.

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. VII Semester		
Code: C6608	NATURAL LANGUAGE PROCESSING (Professional Elective – IV) (Common for CE, EEE, ME, ECE, CSE, CSE (AIML), CSE (DS), CSE (CS), CSE(IOT), IT and Min.E)	L	T	P
Credits: 3		3	0	0

Prerequisites: Data structures, finite automata and probability theory

Course Objectives:

1. Introduce to some of the problems and solutions of NLP and their relation to linguistics and statistics.

Course Outcomes:

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

UNIT - I

Finding the Structure of Words: Words and Their Components, Issues and Challenges, Morphological Models

Finding the Structure of Documents: Introduction, Methods, Complexity of the Approaches, Performances of the Approaches

UNIT - II

Syntax Analysis: Parsing Natural Language, Treebanks: A Data-Driven Approach to Syntax, Representation of Syntactic Structure, Parsing Algorithms, Models for Ambiguity Resolution in Parsing, Multilingual Issues

UNIT - III

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

UNIT - IV

Predicate-Argument Structure, Meaning Representation Systems, Software.

UNIT - V

Discourse Processing: Cohension, Reference Resolution, Discourse Cohension and Structure **Language Modeling:** Introduction, N-Gram Models, Language Model Evaluation, Parameter Estimation, Language Model Adaptation, Types of Language Models, Language-Specific Modeling Problems, Multilingual and Cross lingual Language Modeling

TEXT BOOKS:

1. Multilingual natural Language Processing Applications: From Theory to Practice – Daniel M. Bikel and Imed Zitouni, Pearson Publication.
2. Natural Language Processing and Information Retrieval: Tanvier Siddiqui, U.S. Tiwary.

REFERENCE BOOK:

1. Speech and Natural Language Processing - Daniel Jurafsky & James H Martin, Pearson Publications.

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. VII Semester		
Code: C0551	ROBOTIC PROCESS AUTOMATION	L	T	P
Credits: 3	(Professional Elective – IV) (Common for CE, EEE, ME, ECE, CSE, CSE (AIML), CSE (DS), CSE (CS), CSE(IOT), IT and Min.E)	3	0	0

Course Objectives:

- Introduce robotic process automation, techniques of automation using UI Path RPA tool.

Course Outcomes:

- Understand the concepts of Robotic Process Automation.
- Apply the flow chart mechanism in various calculations.
- Applying UI Path tool for debugging process
- Design system managing techniques.
- Create application for process automation using UI Path tool.

MODULE – I **[9 Periods]**

Robotic Process Automation: Introduction, Scope and techniques of automation, Robotic process automation, Components of RPA, RPA platforms, About UiPath

UIPath Stack Uipath Studio, Uipath Robot, Types of Robots, UiPath Orchestrator

UIPath Studio Projects, User interface

The User Interface: Task recorder, Advanced UI interactions: Input methods, Output methods

MODULE – II **[10 Periods]**

Sequence, Flowchart, and Control Flow: Sequencing the workflow, Activities, Control Flow, various types of loops and decision making.

Data Manipulation: Variables and scope, Collections, Arguments – Purpose and use, Data table usage with examples, File operation with step-by-step example, CSV/Excel to data table and vice versa

MODULE – III **[10 Periods]**

Taking Control of the Controls: Finding and attaching windows, Finding the control, Techniques for waiting for a control, Act on controls – mouse and keyboard activities, Handling events, revisit recorder, When to use OCR, Types of OCR available, How to use OCR

Plugins and Extensions: Terminal Plugin, SAP Automation, Citrix automation and Credential management

MODULE – IV **[9 Periods]**

Handling User Events and Assistant Bots: Assistant bots, Monitoring system event triggers, Monitoring image and element triggers, Launching an assistant bot on a keyboard event.

Exception Handling, Debugging, and Logging: Exception handling, Common exceptions and ways to handle them, Logging and taking screenshots, Debugging techniques, Collecting crash dumps, Error reporting

MODULE – V [10 Periods]

Managing and Maintaining the Code: Project organization, nesting workflows, Reusability of workflows, Commenting techniques, State Machine, When to use Flowcharts, State Machines, or Sequences, Using config files

Deploying and Maintaining the Bot: Publishing using publish utility, using Orchestration Server to control bots, deploy bots, License Management, Publishing and Managing updates

TEXT BOOK:

1. Learning Robotic Process Automation: Create Software robots and automate business processes with the leading RPA tool - UiPath: Create Software robots. with the leading RPA tool – UiPath Kindle Edition

REFERENCE BOOK:

1. Robotic Process Automation A Complete Guide - 2020 Edition Kindle Edition

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. VII Semester		
Code: C6917	INTERNET OF THINGS (Professional Elective – IV) (Common for CE, EEE, ME, ECE, CSE, CSE (AIML), CSE (DS), CSE (CS), CSE(IOT), IT and Min.E)	L	T	P
Credits: 3		3	0	0

Course Objectives:

1. To introduce the terminology, technology and its applications
2. To introduce the concept of M2M (machine to machine) with necessary protocols
3. To introduce the Python Scripting Language which is used in many IoT devices
4. To introduce the Raspberry PI platform, that is widely used in IoT applications
5. To introduce the implementation of web-based services on IoT devices

Course Outcomes:

1. Interpret the impact and challenges posed by IoT networks leading to new architectural models.
2. Compare and contrast the deployment of smart objects and the technologies to connect them to the network.
3. Appraise the role of IoT protocols for efficient network communication.
4. Elaborate the need for Data Analytics and Security in IoT.
5. Illustrate different sensor technologies for sensing real world entities and identify the applications of IoT in Industry.

UNIT - I

Introduction to Internet of Things –Definition and Characteristics of IoT, Physical Design of IoT – IoT Protocols, IoT communication models, Iot Communication APIs IoT enabaled Technologies – Wireless Sensor Networks, Cloud Computing, Big data analytics, Communication protocols, Embedded Systems, IoT Levels and Templates Domain Specific IoTs – Home, City, Environment, Energy, Retail, Logistics, Agriculture, Industry, health and Lifestyle

UNIT - II

IoT and M2M – Software defined networks, network function virtualization, difference between SDN and NFV for IoT Basics of IoT System Management with NETCOZF, YANG- NETCONF, YANG, SNMP NETOPEER

UNIT - III

Introduction to Python - Language features of Python, Data types, data structures, Control of flow, functions, modules, packaging, file handling, data/time operations, classes, Exception handling Python packages - JSON, XML, HTTPLib, URLLib, SMTPLib

UNIT - IV

IoT Physical Devices and Endpoints - Introduction to Raspberry PI-Interfaces (serial, SPI, I2C) Programming – Python program with Raspberry PI with focus of interfacing external gadgets, controlling output, reading input from pins.

UNIT - V

IoT Physical Servers and Cloud Offerings – Introduction to Cloud Storage models and communication APIs Webserver – Web server for IoT, Cloud for IoT, Python web application framework Designing a RESTful web API

TEXT BOOKS:

1. Internet of Things - A Hands-on Approach, Arshdeep Bahga and Vijay Madisetti, Universities Press, 2015, ISBN: 9788173719547.
2. Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014, ISBN: 9789350239759.

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. VII Semester		
Code: C7322	COGNITIVE (Professional Elective – V) (Common for CE, EEE, ME, ECE, CSE, CSE (AIML), CSE (DS), CSE (CS), CSE(IOT), IT and Min.E)	L	T	P
Credits: 3		3	0	0

Prerequisites: Probability theory

Course Objectives:

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

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Module–I Introduction to Cognitive Science**:**

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

Module–II

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

Module–III Cognitive Modeling**:**

Modeling the interaction of language, memory and learning, Modeling select aspects of cognition classical models of rationality, symbolic reasoning and decision making.

Module–IV

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

Module–V

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

Text Book:

1. The Cambridge Handbook of Computational Psychology by Ron Sun (ed.), Cambridge

University Press.

Reference Books:

1. Judith S. Hurwitz, Marcia Kaufman, Adrian Bowles Cognitive Computing and Big Data Analytics, Wiley

2. Vijay V Raghavan, Venkat N. Gudivada, Venu Govindaraju, Cognitive Computing: Theory and Applications: Volume 35 (Handbook of Statistics), North Hollan.

COURSE OUTCOMES:

CO	Statement	Blooms Taxonomy Level
CO1	Understand cognitive computing	Understand
CO2	Plan and use the primary tools associated with cognitive computing	Apply
CO3	Plan and execute a project that leverages cognitive computing	Understand
CO4	Understand and develop the business implications of cognitive computing	Understand
CO5	Differentiate structured and unstructured Information	Analyze

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

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

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. VII Semester		
Code: C6714	DATABASE SECURITY (Professional Elective – V) (Common for CE, EEE, ME, ECE, CSE, CSE (AIML), CSE (DS), CSE (CS), CSE(IOT), IT and Min.E)	L	T	P
Credits: 3		3	0	0

Course Objectives:

- To learn the security of databases
- To learn the design techniques of database security
- To learn the secure software design

Course Outcomes:

- Ability to carry out a risk analysis for large database.
- Ability to set up, and maintain the accounts with privileges and roles.

UNIT - I

Introduction: Introduction to Databases Security Problems in Databases Security Controls Conclusions.

Security Models -1: Introduction Access Matrix Model Take-Grant Model Acten Model PN Model Hartson and Hsiao's Model Fernandez's Model Bussolati and Martella's Model for Distributed databases.

UNIT - II

Security Models -2: Bell and LaPadula's Model Biba's Model Dion's Model Sea View Model Jajodia and Sandhu's Model The Lattice Model for the Flow Control conclusion.

Security Mechanisms: Introduction User Identification/Authentication Memory Protection Resource Protection Control Flow Mechanisms Isolation Security Functionalities in Some Operating Systems Trusted Computer System Evaluation Criteria.

UNIT - III

Security Software Design: Introduction A Methodological Approach to Security Software Design, Secure Operating System Design, Secure DBMS Design Security Packages Database Security Design

Statistical Database Protection & Intrusion Detection Systems: Introduction Statistics Concepts and Definitions, Types of Attacks, Inference Controls, Evaluation Criteria for Control Comparison. Introduction IDES System RETISS System ASES System Discovery.

UNIT - IV

Models for the Protection of New Generation Database Systems -1: Introduction A Model for the Protection of Frame Based Systems A Model for the Protection of Object-Oriented Systems SORION Model for the Protection of Object-Oriented Databases.

UNIT - V

Models for the Protection of New Generation Database Systems -2: A Model for the Protection of New Generation Database Systems: the Orion Model ajodia and Kogan's Model A Model for the Protection of Active Databases Conclusions.

TEXT BOOKS:

1. Database Security by Castano, Pearson Edition
2. Database Security and Auditing: Protecting Data Integrity and Accessibility, 1st Edition, Hassan Afyouni, THOMSON Edition.

REFERENCE BOOK:

1. Database security by Alfred basta, melissazgola, CENGAGE learning.

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. VII Semester		
Code: C6708	DATA SCIENCE APPLICATIONS (Professional Elective – V) (Common for CE, EEE, ME, ECE, CSE, CSE (AIML), CSE (DS), CSE (CS), CSE(IOT), IT and Min.E)	L	T	P
Credits: 3		3	0	0

Course Objective: To give deep knowledge of data science and how it can be applied in various fields to make life easy.

Course Outcomes: After completion of course, students would:

1. To correlate data science and solutions to modern problems.
2. To decide when to use which type of technique in data science.

UNIT - I

Data Science Applications in various domains, Challenges and opportunities, tools for data scientists, Recommender systems – Introduction, methods, application, challenges.

UNIT - II

Time series data – stock market index movement forecasting. Supply Chain Management – Real world case study in logistics.

UNIT – III

Data Science in Education, Social media.

UNIT - IV

Data Science in Healthcare, Bioinformatics.

UNIT - V

Case studies in data optimization using Python.

TEXT BOOKS:

1. Aakanksha Sharaff, G.K.Sinha , “Data Science and its applications “, CRC Press, 2021.
2. Q. A. Menon, S. A. Khoja, “Data Science: Theory, Analysis and Applications”, CRC Press, 2020.

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. VII Semester		
Code: C0560	Human Computer Interaction (Professional Elective – V) (Common for CE, EEE, ME, ECE, CSE, CSE (AIML), CSE (DS), CSE (CS), CSE(IOT), IT and Min.E)	L	T	P
Credits: 3		3	0	0

Course Objectives:

- To gain an overview of Human-Computer Interaction (HCI)
- Understanding the alternatives to traditional "keyboard and mouse" computing.
- Getting familiarity with the vocabulary associated with sensory and cognitive systems
- Be able to apply models from cognitive psychology to predicting user performance
- Working in small groups on a product design with invaluable team-work experience.

Course Outcomes:

- Apply HCI and principles to interaction design.
- Design certain tools for blind or PH people
- Understand the social implications of technology and ethical responsibilities as engineers.
- Understand the importance of a design and evaluation methodology

MODULE – I [10 Periods]

Introduction: Importance of user Interface – definition, importance of good design. Benefits of good design, A brief history of Screen design.

The graphical user interface – popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user – Interface popularity, characteristics- Principles of user interface.

MODULE – II [10 Periods]

Design process – Human interaction with computers, importance of human characteristics, human consideration, Human interaction speeds, understanding business junctions.

Screen Designing: Design goals – Screen planning and purpose, organizing screen elements, ordering of screen data and content – screen navigation and flow – Visually pleasing composition – amount of information – focus and emphasis – presentation information simply and meaningfully – information retrieval on web – statistical graphics – Technological consideration in interface design.

MODULE- III [9 Periods]

Windows – New and Navigation schemes selection of window, selection of devices based and screen- based controls. Components – text and messages, Icons and increases – Multimedia, colors, uses problems, choosing colors.

MODULE- IV [9 Periods]

HCI in the software process- The software life cycle, Usability engineering, Iterative design and prototyping, Design Focus: Prototyping in practice, Design rationale, Design rules, Principles to support usability Standards, Golden rules and heuristics, HCI patterns, Evaluation techniques, Goals of evaluation, Evaluation through expert analysis, Evaluation through user participation, Choosing an evaluation method, Universal design, Universal design principles Multimodal interaction

MODULE- V [10 Periods]

Cognitive models Goal and task hierarchies Design Focus: GOMS saves money, Linguistic models, The challenge of display-based systems, Physical and device models, Cognitive architectures, Ubiquitous computing and augmented realities, Ubiquitous computing applications research, Design Focus: Ambient Wood – augmenting the physical, Virtual and augmented reality, Design Focus: Shared experience Design Focus: Applications of augmented reality Information and data visualization

TEXT BOOKS:

1. The essential guide to user interface design, Wilbert O Galitz, Wiley Dream Tech.
2. Human – Computer Interaction. Alan Dix, Janet Fincay, Gregory's, Abowd, Russell Bealg, Pearson Education.

REFERENCE BOOKS:

1. Designing the user interface. 3rd Edition Ben Shneidermann, Pearson Education Asia.
2. Interaction Design Prece, Rogers, Sharps. Wiley Dreamtech.
3. User Interface Design, Soren Lauesen, Pearson Education.
4. Human –Computer Interaction, D. R. Olsen, Cengage Learning.

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. VII Semester		
Code: C6715	EXPLORATORY DATA ANALYSIS (Professional Elective – V) (Common for CE, EEE, ME, ECE, CSE, CSE (AIML), CSE (DS), CSE (CS), CSE(IOT), IT and Min.E)	L	T	P
Credits: 3		3	0	0

Course Objectives:

1. This course introduces the methods for data preparation and data understanding.
2. It covers essential exploratory techniques for understanding multivariate data by summarizing it through statistical methods and graphical methods.
3. Supports to Summarize the insurers use of predictive analytics, data science and Data Visualization.

Course Outcomes:

1. Handle missing data in the real-world data sets by choosing appropriate methods.
2. Summarize the data using basic statistics. Visualize the data using basic graphs and plots.
3. Identify the outliers if any in the data set.
4. Choose appropriate feature selection and dimensionality reduction.
5. Techniques for handling multi-dimensional data.

UNIT - I:

Introduction to Exploratory Data Analysis: Data Analytics lifecycle, Exploratory Data Analysis (EDA)– Definition, Motivation, Steps in data exploration, The basic data types Data Type Portability.

UNIT - II:

Preprocessing - Traditional Methods and Maximum Likelihood Estimation: Introduction to Missing data, Traditional methods for dealing with missing data, Maximum Likelihood Estimation – Basics, Missing data handling, Improving the accuracy of analysis. **Preprocessing Bayesian Estimation:** Introduction to Bayesian Estimation, Multiple Imputation-Imputation Phase, Analysis and Pooling Phase, Practical Issues in Multiple Imputation, Models for Missing Notation Random Data.

UNIT - III:

Data Summarization & Visualization: Statistical data elaboration, 1-D Statistical data analysis, 2-D Statistical data Analysis, N-D Statistical data analysis.

UNIT - IV:

Outlier Analysis: Introduction, Extreme Value Analysis, Clustering based, Distance Based and Density Based outlier analysis, Outlier Detection in Categorical Data. **Feature Subset Selection:** Feature selection algorithms: filter methods, wrapper methods and embedded methods, Forward selection backward elimination, Relief, greedy selection, genetic algorithms for features selection.

UNIT - V

Dimensionality Reduction: Introduction, Principal Component Analysis (PCA), Kernel PCA, Canonical Correlation Analysis, Factor Analysis, Multidimensional scaling, Correspondence Analysis.

TEXT BOOKS:

1. Making sense of Data: A practical Guide to Exploratory Data Analysis and Data Mining, by Glenn J. Myatt.

REFERENCE BOOKS:

1. Charu C. Aggarwal, “Data Mining The Text book”, Springer, 2015.
2. Craig K. Enders, “Applied Missing Data Analysis”, The Guilford Press, 2010.
3. Inge Koch, “Analysis of Multivariate and High dimensional data”, Cambridge University Press, 2014.
4. Michael Jambu, “Exploratory and multivariate data analysis”, Academic Press Inc., 1990.
5. Charu C. Aggarwal, “Data Classification Algorithms and Applications”, CRC press, 2015.

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. VII Semester		
Code:	(Open Elective – II) (Common for CE, EEE, ME, ECE, CSE, CSE (AIML), CSE (DS), CSE (CS), CSE(IOT), IT and Min.E)	L	T	P
Credits: 3		3	0	0

2022-23 Onwards (MR-22)	MALLAREDDYENGINEERING COLLEGE (Autonomous)	B.Tech. VII SEMESTER		
Code: C0562	Cloud Computing Lab (Common for CSE, IT, CSE (AIML), CSE (CS), CSE (DS)	L	T	P
Credits: 1		0	0	2

Course Objectives:

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

List of Experiments:

1. Install Virtualbox/VMware Workstation with different flavors of Linux or windows OS on top of windows7 or 8.
2. Install a C compiler in the virtual machine created using virtual box and execute Simple Programs
3. Create an Amazon EC2 instance and set up a web-server on the instance and associate an IP address with the instance.
4. Install Google App Engine. Create a hello world app and other simple web applications using python/java.
5. Simulate a cloud scenario using CloudSim and run a scheduling algorithm that is not present in CloudSim.
6. Find a procedure to transfer the files from one virtual machine to another virtual machine.
7. Find a procedure to launch virtual machine using trystack (Online Openstack Demo Version).
8. Install Hadoop single node cluster and run simple applications like word count.
9. Create a database instance in the cloud using Amazon RDS.
10. Create a database instance in the cloud using Google Cloud SQL.

Course Outcomes:

1. Understand various service types, delivery models and technologies of a cloud computing environment.
2. Understand the ways in which the cloud can be programmed and deployed.
3. Understand cloud service providers like Cloudsim, Globus Toolkit etc.
4. Examine various programming paradigms suitable to solve real world and scientific problems using cloud services.

TEXT BOOK:

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

REFERENCE BOOKS:

1. Cloud Computing: Principles and Paradigms by Rajkumar Buyya, James Broberg and Andrzej M. Goscinski, Wiley, 2011.
2. Distributed and Cloud Computing, Kai Hwang, Geoffery C. Fox, Jack J. Dongarra, Elsevier, 2012.
3. Cloud Computing Bible, Barrie Sosinsky, Wiley-India, 2010.

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

2022-23 Onwards (MR-22)	MALLAREDDYENGINEERING COLLEGE (Autonomous)	B.Tech. VII SEMESTER		
Code: C6710	Predictive Analytics Lab (Common for CSE, IT, CSE (AIML), CSE (CS), CSE (DS), CSE (IOT), AI and CSIT)	L	T	P
Credits: 1		-	-	2

Course Objective:

To develop the fundamental understanding and application of Mathematics and Statistics in business organizations.

Course Outcome:

1. Students will be able to initiate effective use of SPSS in business problem
2. Student will learn to evaluate and solve the business problems logically
3. Students will be able to avoid risks and spot opportunities

List of Experiments:

1. Lab Experiment 1: Linear Regression Analysis with Regularization Techniques
2. Lab Experiment 2: Classification using Linear Discriminant Analysis and Logistic Regression
3. Lab Experiment 3: Bias-Variance Tradeoff Analysis with Cross-Validation
4. Lab Experiment 4: Model Selection using Bootstrap Methods and Information Criteria
5. Lab Experiment 5: Generalized Additive Models (GAM) and Decision Trees on California Housing Data
6. Lab Experiment 6: Boosting Methods - AdaBoost and Gradient Boosting on Spam Detection
7. Lab Experiment 7: Neural Network Implementation with Backpropagation
8. Lab Experiment 8: Support Vector Machine and K-Nearest Neighbor for Image Scene Classification
9. Lab Experiment 9: Customer Segmentation using K-Means Clustering and Association Rules
10. Lab Experiment 10: Dimensionality Reduction with PCA and Random Forest Classification

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

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2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. VII Semester		
Code: C00P2	(Project Stage – I) (Common for CE, EEE, ME, ECE, CSE, CSE (AIML), CSE (DS), CSE (CS), CSE(IOT), IT and Min.E)	L	T	P
Credits: 3		0	0	6

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. VIII Semester		
Code: C0H09	Organizational Behavior (Common for CE, EEE, ME, ECE, CSE, CSE (AIML), CSE (DS), CSE (CS), CSE(IOT), IT and Min.E)	L	T	P
Credits: 3		3	0	0

Course Objectives:

- This course demonstrates individual, group behavior aspects: The dynamics of organizational climate, structure and its impact on Organizations.

MODULE - I Organizational Behaviour **[9 Periods]**

Definition, need and importance of organizational behaviour – Nature and scope – Frame work – Organizational behaviour models.

MODULE - II Individual Behaviour **[10 Periods]**

Personality – types – Factors influencing personality – Theories – Learning – Types of learners – The learning process – Learning theories – Organizational behaviour modification, Misbehaviour – Types – Management Intervention. Emotions - Emotional Labour – Emotional Intelligence –Theories. Attitudes– Characteristics – Components – Formation – Measurement- Values. Perceptions – Importance – Factors influencing perception – Interpersonal perception- Impression Management. Motivation – importance – Types – Effects on work behavior.

MODULE - III Group Behaviour **[10 Periods]**

Organization structure – Formation – Groups in organizations – Influence – Group dynamics – Emergence of informal leaders and working norms – Group decision making techniques – Team building - Interpersonal relations – Communication – Control.

MODULE - IV Leadership and Power [9 **Periods**]

Meaning – Importance – Leadership styles – Theories of leadership – Leaders Vs Managers – Sources of power – Power centers – Power and Politics.

MODULE - V Dynamics of Organizational Behaviour **[10 Periods]**

Organizational culture and climate – Factors affecting organizational climate – Importance. Job satisfaction – Determinants – Measurements – Influence on behavior. Organizational change – Importance – Stability Vs Change – Proactive Vs Reaction change – the change process – Resistance to change – Managing change. Stress – Work Stressors – Prevention and Management of stress – Balancing work and Life. Organizational development – Characteristics – objectives –. Organizational effectiveness

Course Outcomes:

- Students understand their personality, perception and attitudes for overall development and further learn the importance of group behavior in the organizations.

TEXT BOOKS:

1. Stephen P. Robins, Organisational Behavior, PHI Learning / Pearson Education, 11th edition, 2008.
2. Fred Luthans, Organisational Behavior, McGraw Hill, 11th Edition, 2001.

REFERENCE BOOKS:

1. Schermerhorn, Hunt and Osborn, Organisational behavior, John Wiley, 9th Edition, 2008.
2. Udai Pareek, Understanding Organisational Behaviour, 2nd Edition, Oxford Higher Education, 2004.

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

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. VIII Semester		
Code: C0533	FULL STACK DEVELOPMENT (Professional Elective – VI) (Common for CE, EEE, ME, ECE, CSE, CSE (AIML), CSE (DS), CSE (CS), CSE(IOT), IT and Min.E)	L	T	P
Credits: 3		3	0	0

Pre-Requisites:

1. Object Oriented Programming
2. Web Technologies

Course Objectives:

- Students will become familiar to implement fast, efficient, interactive and scalable webapplications using run time environment provided by the full stack components.

MODULE-I Introduction to Full Stack Development: [9 Periods]

Understanding the Basic Web Development Framework- User, Browser, Webserver, Backend Services, Full Stack Components - Node.js, MongoDB, Express, React, Angular. Java Script Fundamentals, NodeJS- Understanding Node.js, Installing Node.js, Working with Node Packages, creating a Node.js Application, Understanding the Node.js Event Model, Adding Work to the Event Queue, Implementing Callbacks

MODULE-II Node.js: [10 Periods]

Working with JSON, Using the Buffer Module to Buffer Data, Using the Stream Module to Stream Data, Accessing the File System from Node.js- Opening, Closing, Writing, Reading Files and other File System Tasks. Implementing HTTP Services in Node.js- Processing URLs, Processing Query Stringsand Form Parameters, Understanding Request, Response, and Server Objects, Implementing HTTP Clients and Servers in Node.js, Implementing HTTPS Servers and Clients. Using Additional Node.js Modules-Using the os Module, Using the util Module, Using the dns Module, Using the crypto Module.

MODULE-III MongoDB: [10 Periods]

Need of NoSQL, Understanding MongoDB, MongoDB Data Types, Planning Your Data Model, Building the MongoDB Environment, Administering User Accounts, Configuring Access Control, Administering Databases, Managing Collections, Adding the MongoDB Driver to Node.js, Connecting to MongoDB from Node.js, Understanding the Objects Used in the MongoDB Node.js Driver, Accessing and Manipulating Databases, Accessing and Manipulating Collections

MODULE-IV Express and Angular: [10 Periods]

Getting Started with Express, Configuring Routes, Using Requests Objects, Using Response Objects. Angular: importance of Angular, Understanding Angular, creating a Basic Angular Application, Angular Components, Expressions, Data Binding, Built-in Directives, Custom Directives, Implementing AngularServices in Web Applications.

MODULE-V React: [9 Periods]

Need of React, Simple React Structure, The Virtual DOM, React Components, Introducing React

Components, Creating Components in React, Data and Data Flow in React, Rendering and Life Cycle Methods in React, Working with forms in React, integrating third party libraries, Routing in React.

Course Outcomes:

- Understand Full stack components for developing web application.
- Apply packages of NodeJS to work with Data, Files, Http Requests and Responses.
- Use MongoDB data base for storing and processing huge data and connects with NodeJS application.
- Design faster and effective single page applications using Express and Angular.
- Create interactive user interfaces with react components.

TEXT BOOKS:

1. Brad Dayley, Brendan Dayley, Caleb Dayley., Node.js, MongoDB and Angular Web Development, 2nd Edition, Addison-Wesley, 2019.

2. Mark Tielens Thomas, React in Action, 1st Edition, Manning Publications.

REFERENCE BOOKS:

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

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

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

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

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. VIII Semester		
Code: C1211	PATTERN RECOGNITION (Professional Elective – VI) (Common for CE, EEE, ME, ECE, CSE, CSE (AIML), CSE (DS), CSE (CS), CSE(IOT), IT and Min.E)	L	T	P
Credits: 3		3	0	0

Prerequisites:

- Programming for problem solving
- Computer Oriented Statistical Methods

Course Objectives:

- Introducing fundamental concepts, theories, and algorithms for pattern recognition and machine learning.

Module–I: Introduction: [09 Periods]
Pattern Recognition, Data Sets for Pattern Recognition, Different Paradigms for Pattern Recognition. Representation: Data Structures for Pattern Representation, Representation of Clusters, Proximity Measures, Size of Patterns, Abstractions of the Data Set, Feature Extraction, Feature Selection, Evaluation of Classifier, Evaluation of Clustering.

Module–II: Nearest Neighbor Based Classifier: [09 Periods]
Nearest Neighbor Algorithm, Variants of the NN Algorithm, use of the Nearest Neighbor Algorithm for Transaction Databases, Efficient Algorithms, Data Reduction, Prototype Selection. Bayes Classifier: Bayes Theorem, Minimum Error Rate Classifier, Estimation of Probabilities, Comparison with the NNC, Naïve Bayes Classifier, Bayesian Belief Network.

Module–III: Hidden Markov Models: **[09 Periods]**
Markov Models for Classification, Hidden Morkov Models, Classification using HMMs. Decision Trees: Introduction, Decision Tree for Pattern Classification, Construction of Decision Trees, Splitting at the Nodes, Overfitting and Pruning, Examples of Decision Tree Induction.

Module–IV: Support Vector Machines: [09 Periods]
Introduction, Learning the Linear Discriminant Functions, Neural Networks, SVM for Classification. Combination of Classifiers: Introduction, Methods for Constructing Ensembles of Classifiers, Methods for Combining Classifiers.

Module–V: Clustering: [09 Periods]
Importance of clustering, Hierarchical Algorithms, Partitional Clustering, Clustering Large Data Sets. An Application-Hand Written Digit Recognition: Description of the Digit Data, Preprocessing of Data, Classification Algorithms, Selection of Representative Patterns, Results.

Text Book:

1. Pattern Recognition: An Algorithmic Approach: Murty, M. Narasimha, Devi, V. Susheela, Spinger Pub, 1st Ed.

Reference Books:

1. Machine Learning - Mc Graw Hill, Tom M. Mitchell.
2. Fundamentals Of Speech Recognition: Lawrence Rabiner and Biing- Hwang Juang. Prentice Hall Pub.

COURSE OUTCOMES:

CO	Statement	Blooms Taxonomy Level
CO1	Understand the importance of pattern recognition and its representation	Understand
CO2	Analyze the variants of NN algorithm	Analyze
CO3	Understand the necessity of Hidden markov models, decision tree and SVM for classification	Understand
CO4	Understand different types of clustering algorithms	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										1			
CO2								2							
CO3			3									2			2
CO4		3													

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. VIII Semester		
Code: C6716	VIDEO ANALYTICS (Professional Elective – VI) (Common for CE, EEE, ME, ECE, CSE, CSE (AIML), CSE (DS), CSE (CS), CSE(IOT), IT and Min.E)	L	T	P
Credits: 3		3	0	0

(Professional Elective – VI)

Course Objectives: To acquire the knowledge of extracting information from surveillance videos, understand the models used for recognition of objects, humans in videos and perform gait analysis.

Course Outcomes:

1. Understand the basics of video- signals and systems.
2. Able to estimate motion in a video.
3. Able to detect the objects and track them.
4. Recognize activity and analyze behaviour.
5. Evaluate face recognition technologies.

UNIT - I

INTRODUCTION Multidimensional signals and systems: signals, transforms, systems, sampling theorem. Digital Images and Video: human visual system and color, digital video, 3D video, digital-video applications, image and video quality.

UNIT - II

MOTION ESTIMATION Image formation, motion models, 2D apparent motion estimation, differential methods, matching methods, non-linear optimization methods, transform domain methods, 3D motion and structure estimation.

UNIT - III

VIDEO ANALYTICS Introduction- Video Basics - Fundamentals for Video Surveillance- Scene Artifacts- Object Detection and Tracking: Adaptive Background Modelling and Subtraction- Pedestrian Detection and Tracking Vehicle Detection and Tracking- Articulated Human Motion Tracking in Low- Dimensional Latent Spaces.

UNIT - IV

BEHAVIORAL ANALYSIS & ACTIVITY RECOGNITION Event Modelling- Behavioral Analysis- Human Activity Recognition-Complex Activity Recognition Activity modelling using 3D shape, Video summarization, shape-based activity models- Suspicious Activity Detection.

UNIT - V

HUMAN FACE RECOGNITION & GAIT ANALYSIS Introduction: Overview of Recognition algorithms – Human Recognition using Face: Face Recognition from still images, Face Recognition from video, Evaluation of Face Recognition Technologies- Human Recognition using gait: HMM Framework for Gait Recognition, View Invariant Gait Recognition, Role of Shape and Dynamics in Gait Recognition.

TEXT BOOKS:

1. Murat Tekalp, “Digital Video Processing”, second edition, Pearson, 2015
2. Rama Chellappa, Amit K. Roy-Chowdhury, Kevin Zhou. S, “Recognition of Humans and their Activities using Video”, Morgan & Claypool Publishers, 2005.
3. Yunqian Ma, Gang Qian, “Intelligent Video Surveillance: Systems and Technology”, CRC Press (Taylor and Francis Group), 2009.

REFERENCE BOOKS:

1. Richard Szeliski, “Computer Vision: Algorithms and Applications”, Springer, 2011.
2. Yao Wang, JornOstermann and Ya-Qin Zhang, “Video Processing and Communications”, Prentice Hall, 2001.
3. Thierry Bouwmans, FatihPorikli, Benjamin Höferlin and Antoine Vacavant, “Background Modeling and Foreground Detection for Video Surveillance: Traditional and Recent Approaches, Implementations, Benchmarking and Evaluation”, CRC Press, Taylor and Francis Group, 2014.
4. Md. Atiqur Rahman Ahad, “Computer Vision and Action Recognition-A Guide for Image Processing and Computer Vision Community for Action Understanding”, Atlantis Press, 2011.

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. VIII Semester		
Code: C0550	BLOCKCHAIN TECHNOLOGY (Professional Elective – VI) (Common for CE, EEE, ME, ECE, CSE, CSE (AIML), CSE (DS), CSE (CS), CSE(IOT), IT and Min.E)	L	T	P
Credits: 3		3	0	0

Prerequisites:

1. Knowledge in security and applied cryptography.
2. Knowledge in distributed databases.

Course Objectives: To Introduce block chain technology and Cryptocurrency.

Course Outcomes:

1. Learn about research advances related to one of the most popular technological areas today.
2. Understand Extensibility of Blockchain concepts.
3. Understand and Analyze Blockchain Science.
4. Understand Technical challenges, Business model challenges.

UNIT - I

Introduction: Block chain or distributed trust, Protocol, Currency, Cryptocurrency, How a Cryptocurrency works, Crowdfunding.

UNIT - II

Extensibility of Blockchain concepts, Digital Identity verification, Block chain Neutrality, Digital art, Blockchain Environment.

UNIT - III

Blockchain Science: Gridcoin, Folding coin, Blockchain Genomics, Bitcoin MOOCs.

UNIT - IV

Currency, Token, Tokenizing, Campuscoin, Coindrop as a strategy for Public adoption, Currency Multiplicity, Demurrage currency.

UNIT - V

Technical challenges, Business model challenges, Scandals and Public perception, Government Regulations.

TEXT BOOK:

1. Melanie Swan, Blockchain Blueprint for Economy, O'reilly.

REFERENCE BOOKS:

1. Building Blockchain Apps, Michael Juntao Yuan, Pearson Education
2. Daniel Drescher, Blockchain Basics: A Non-Technical Introduction in 25 Steps 1st Edition
3. Bradley Lakeman, Blockchain Revolution: Understanding the Crypto Economy of the Future. A Non-Technical Guide to the Basics of Cryptocurrency Trading and Investing, ISBN: 1393889158.

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. VIII Semester		
Code: C0559	Cyber Forensics (Professional Elective – VI) (Common for CE, EEE, ME, ECE, CSE, CSE (AIML), CSE (DS), CSE (CS), CSE(IOT), IT and Min.E)	L	T	P
Credits: 3		3	0	0

Course Objectives:

- A brief explanation of the objective is to provide digital evidence which is obtained from digital media.
- In order to understand the objectives of computer forensics, first of all, people have to recognize the different roles computers play in a certain crime.
- According to a snippet from the Module and States Security Service, the computer functions indifferent kinds of crimes.

MODULE- I [9 Periods]

Introduction of Cybercrime: Types, The Internet spawns crime, Worms versus viruses, Computers' roles in crimes, Introduction to digital forensics, Introduction to Incident - Incident Response Methodology – Steps - Activities in Initial Response, Phase after detection of an incident

MODULE- II [10 Periods]

Initial Response and forensic duplication, Initial Response & Volatile Data Collection from Windows system -Initial Response & Volatile Data Collection from Unix system – **Forensic Duplication:** Forensic duplication: Forensic Duplicates as Admissible Evidence, Forensic Duplication Tool Requirements, Creating a Forensic. Duplicate/Qualified Forensic Duplicate of a Hard Drive

MODULE- III 10 Periods]

Forensics analysis and validation: Determining what data to collect and analyze, validating forensic data, addressing data-hiding techniques, performing remote acquisitions

Network Forensics: Network forensics overview, performing live acquisitions, developing standard procedures for network forensics, using network tools, examining the honeynet project.

MODULE- IV [10 Periods]

Current Forensic tools: evaluating computer forensic tool needs, computer forensics software tools, computer forensics hardware tools, validating and testing forensics software E-Mail Investigations: Exploring the role of e-mail in investigation, exploring the roles of the client and server in e-mail, investigating e-mail crimes and violations, understanding e-mail servers, using specialized e-mail forensic tools.

Cell phone and mobile device forensics: Understanding mobile device forensics, understanding acquisition procedures for cell phones and mobile devices.

MODULE- V [10 Periods]

Working with Windows and DOS Systems: understanding file systems, exploring Microsoft File Structures, Examining NTFS disks, Understanding whole disk encryption, windows registry, Microsoft startup tasks, MS-DOS startup tasks, virtual machines.

Course Outcomes:

- Students will understand the usage of computers in forensic, and how to use various forensic tools for a wide variety of investigations.
- It gives an opport Moduley to students to continue their zeal in research in computer forensics

TEXT BOOKS:

1. Kevin Mandia, Chris Prosise, "Incident Response and computer forensics", Tata McGraw Hill, 2006.
2. Computer Forensics, Computer Crime Investigation by John R. Vacca, Firewall Media, New Delhi.
3. Computer Forensics and Investigations by Nelson, Phillips Enfinger, Steuart, CENGAGE Learning

REFERENCE BOOKS:

1. Real Digital Forensics by Keith J. Jones, Richard Bejtiich, Curtis W. Rose, Addison- Wesley Pearson Education
2. Forensic Compiling, A Tractitioneris Guide by Tony Sammes and Brian Jenkinson, Springer International edition.

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. VIII Semester		
Code: C0161	Disaster Preparedness and Planning Management	L	T	P
Credits: 3	Open Elective - III (Common for CE, EEE, ME, ECE, CSE, CSE (AIML), CSE (DS), CSE (CS), CSE(IOT), IT and Min.E)	0	0	3

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. VIII Semester		
Code: C00P3	Project Stage – II (Common for CE, EEE, ME, ECE, CSE, CSE (AIML), CSE (DS), CSE (CS), CSE(IOT), IT and Min.E)	L	T	P
Credits: 11		0	0	22