COURSE STRUCTURE AND DETAILED SYLLABUS

B.Tech-Four Year Degree Programme
(MR21 Regulations)

Effective from the Academic Year 2021-22 onwards

Department of Information Technology
Malla Reddy Engineering College

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

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Department of Information Technology

INSTITUTION VISION

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

INSTITUTION MISSION

- To impart knowledge of advanced technologies using state-of-the-art infrastructural facilities.

- To inculcate innovation and best practices in education, training and research.

- To meet changing socio-economic needs in an ethical ambience.

DEPARTMENT VISION

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

DEPARTMENT MISSION

- To impart quality education and research to undergraduate and postgraduate students in Information Technology (IT).

- To train students in advanced technologies using state-of-the-art facilities.

- To develop knowledge, skills and aptitude to function in the IT domain based on ethical values and social relevance.

Department of Information Technology

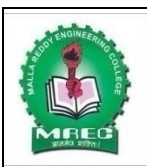### PROGRAMME EDUCATIONAL OBJECTIVES (PEO's)

1. To outshine in professional career with sound problem solving ability for providing IT solutions by proper plan, analysis, design, implementation and validation.

2. To pursue training, advance study and research using scientific, technical and communication base to cope with the evolution in the technology.

3. To utilize the acquired technical skills and knowledge for the benefit of society

PROGRAMME SPECIFIC OUTCOMES (PSO's)

1. Identify the mathematical abstractions and algorithm design techniques together with emerging Software Tools to solve complexities indulged in efficient programming.

2. Apply the core concepts of current technologies in the hardware, software mains in accomplishing IT enabled services to meet out societal needs.

3. Practice modern computing techniques by continual learning process with ethical concerns in establishing innovative career path

PROGRAMME OUTCOMES (POs)

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

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Course Structure

(MR21 Regulations-Effective from the Academic Year 2021–22 Onwards)

S.No	Category	Course Code	Name of the Subject	Contact Hours/Week L	T	P	Credits
**I Year I Semester**
1.	BSC	B0B01	Linear Algebra and Numerical Methods	3	1	-	4
2.	HSMC	B0H01	English	3	-	-	3
3.	ESC	B0201	Basic Electrical and Electronics Engineering	3	-	-	3
4.	ESC	B0501	Programming for Problem Solving	3	-	-	3
5.	HSMC	B0H02	English Language and Communication Skills Lab	-	-	2	1
6.	ESC	B0202	Basic Electrical and Electronics Engineering Lab	-	-	2	1
7.	ESC	B0502	Programming for Problem Solving Lab	-	-	2	1
8.	ESC	B1201	Engineering and IT Workshop	-	1	2	2
			Total	12	2	8	**18**
			Total Contact Hours		22		

S.No	Category	Course Code	Name of the Subject	Contact Hours/Week L	T	P	Credits
**I Year II Semester**
1.	BSC	B0B02	Probability and Statistics	3	-	-	3
2.	BSC	B0B09	Semiconductor Physics	3	1	-	4
3.	BSC	B0B17	Engineering Chemistry	3	1	-	4
4.	ESC	B0305	Engineering Drawing	2	-	2	3
5.	ESC	B0504	Python Programming	3	1	-	4
6.	BSC	B0B11	Applied Physics Lab	-	-	2	1
7.	BSC	B0B18	Engineering Chemistry Lab	-	-	2	1
8.	ESC	B0506	Python Programming Lab	-	1	2	2
			Total	14	4	8	**22**
			Total Contact Hours		26		

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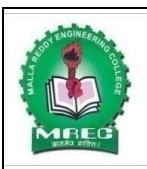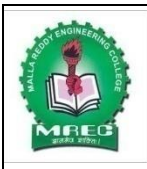
Department of Information Technology

Course Structure

(MR21 Regulations-Effective from the Academic Year 2021–22 Onwards)

S.No	Category	Course Code	Name of the Course	L	T	P	Credits
			II Year I Semester				
1	PCC	B0507	Discrete Mathematics	3	-	-	3
2	PCC	B0508	Computer Organization and Architecture	3	-	-	3
3	PCC	B0509	Data Structures	3	-	-	3
4	PCC	B0510	Object Oriented Programming	3	-	-	3
5	PCC	B0511	Operating Systems	3	-	-	3
6	PCC	B0512	Data Structures Lab	-	-	3	1.5
7	PCC	B0513	Object Oriented Programming	-	-	3	1.5
8	PCC	B0514	Operating Systems Lab	-	1	2	2
9	MC	B00M1	Gender Sensitization	-	-	2	-
			Total	15	1	10	20
			Total Contact Hours		26		

No	Category	Course Code	Name of the Course	L	T	P	Credits
			II Year II Semester				
1	BSC	B0B07	Applied Statistics and Optimization Techniques	3	-	-	3
2	PCC	B0515	Database Management Systems	3	-	-	3
3	PCC	B0516	Design and Analysis of Algorithms	3	-	-	3
4	PCC	B1202	Web Technologies	3	-	-	3
			Professional Elective –I				
5	PEC-I	B0522	Computer Graphics	3	-	-	3
		B1203	Neural Network				
		B1204	Android Application Development				
		B0547	Principles of Programming Languages				
		B0518	Free & Open-Source Software's				
6	PCC	B0520	Database Management Systems Lab	-	1	2	2
7	PCC	B0521	Design and Analysis of Algorithms Lab	-	-	3	1.5
8	PCC	B1206	Web Technologies Lab	-	-	3	1.5
9	MC	B00M2	Environmental Science	2	-	-	-
			Total	17	1	8	20
			Total Contact Hours		26		

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Course Structure
(MR21 Regulations-Effective from the Academic Year 2021–22 Onwards)

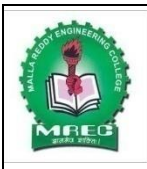| S.No	Category	Course Code	Name of the Course	Contact Hours /Week			Credits
				L	T	P	
III Year I Semester							
1	PCC	B0525	Software Engineering and Modeling	3	-	-	3
2	PCC	B1207	Theory of Automata	3	-	-	3
3	PCC	B6201	Computer Networks	3	-	-	3
4	PCC	B7301	Artificial Intelligence-I	3	-	-	3
Professional Elective –II							
5	PEC-II	B7307	Optimization Techniques	3	-	-	3
		B1209	Data Analysis and Viualization				
		B6706	R Programming				
		B1208	Information Retrieval				
		B0535	Multimedia and Rich Internet Applications				
6	OEC-I	B0159	Green Buildings	3	-	-	3
7	PCC	B0535	Software Engineering and Modeling Lab	-	-	3	1.5
8	PCC	B6202	Computer Networks Lab	-	-	3	1.5
9	MC	B00M3	Quantitative Aptitude &Verbal Reasoning-I	2	-	-	-
			Total	20	-	6	**21**
			Total Contact Hours		26		

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S.No	Category	Course Code	Name of the Course	Contact Hours / Week			Credits
			III Year II Semester	L	T	P	
1	HMSC	B0H08	Engineering Economics and Accountancy	3	-	-	3
2	PCC	B0532	Compiler Design	4	-	-	4
3	PCC	B1210	Machine Learning	3	-	-	3
			Professional Elective –III				
4	PEC-III	B0533	Distributed Systems	3	-	-	3
		B1211	Soft Computing				
		B6203	Cryptography and Network Security				
		B6217	Cyber Security				
		B6705	Advanced Python Programming				
5	OEC-II	B0120	Disaster Management & Mitigation	3	-	-	3
6	HSMC	B0H03	English Communication and Presentation Skills Lab	-	-	2	1
7	PCC	B0543	Compiler Design Lab	-	1	2	2
8	PCC	B1212	Machine Learning Lab	-	-	2	1
9	MC	B00M4	Quantitative Aptitude &Verbal Reasoning-II	2	-	-	-
			Total	**18**	**1**	**6**	**20**
			Total Contact Hours	**25**			

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Course Structure
(MR21 Regulations-Effective from the Academic Year 2021–22 Onwards)

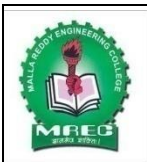| S.No	Category	Course Code	Name of the Course	Contact Hours/ Week			Credits
				L	T	P	
			IV Year I Semester				
1	HSMC	B0H09	Management Fundamentals	3	-	-	3
2	PCC	B0536	Data Mining	3	-	-	3
3	PCC	B1213	DevOps	3	-	-	3
			Professional Elective –IV				
5	PEC-IV	B0529	Advanced Computer Architecture	3	-	-	3
		B0541	Image Processing				
		B1214	Social Media Analytics				
		B1215	UI/UX Designing				
		B0527	**Cloud Computing**				
			Professional Elective –V				
6	PEC-V	B0545	Block chain Technologies	3	-	-	3
		B1217	Augmented Reality and Virtual Reality				
		B1218	Software Project Management				
		B1219	Mobile Communication				
		B6917	**Internet of Things**				
8	PCC	B0544	Data Mining Lab	-	1	2	2
9	PCC	B1220	DevOps Lab	-	-	2	1
10	PROJ	B00P1	Internship/Mini Project	-	-	4	2
			Total	15	1	8	20
			Total Contact Hours	24			

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S.No	Category	Course Code	Name of the Course	Contact Hours/Week			Credits
				L	T	P	
IV Year II Semester							
Professional Elective –VI							
1	PEC-VI	B0548	Software Testing Methodologies	3	-	-	3
		B0550	Deep Learning				
		B7313	AI for Robotics				
		B0537	Natural Language Processing				
		B0552	Human Computer Interaction				
2	OEC-III		**Open Elective-III**	3	-	-	3
3	PROJ	B00P2	Major Project	-	-	24	12
4	TSEM	B00P3	Seminar	-	-	2	1
			Total	**6**	**-**	**26**	**19**
			Total Contact Hours				

Total Credits:

SEM	SEM-I	SEM-II	SEM-III	SEM-IV	SEM-V	SEM-VI	SEM-VII	SEM-VIII	Total
CREDITS	18	22	20	20	21	20	20	19	160

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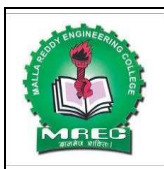
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List of Open Electives

S.No	Course Code	Name of the Course	Credits
1	B1221	Information Theory & Coding	3
2	B1222	Software Project Management	3
3	B1223	Distributed Databases	3
4	B1224	Concurrent Programming	3
5	B1225	Network Programming	3
6	B1226	Scripting Languages	3

2021-22 Onwards (MR21)	Malla Reddy Engineering College (Autonomous)		B.Tech. I Semester	
Code: B0B01	**Linear Algebra and Numerical Methods** (Common For CSE, IT, CSE (AI&ML, DS, CS, IOT), B.Tech (AI&ML)	L	T	P
Credits: 4		3	1	-

Prerequisites: NIL

Course Objectives:

1.To learn types of matrices, Concept of rank of a matrix and applying the concept of rank to know the consistency of linear equations and to find all possible solutions, if exist.

2.To learn concept of Eigen values and Eigen vectors of a matrix, diagonalization of a matrix, Cayley Hamilton theorem and reduce a quadratic form into a canonical form through a linear transformation.

3.To learn various methods to find roots of an equation.

4.To learn Concept of finite differences and to estimate the value for the given data using interpolation.

5.To learn Solving ordinary differential equations and evaluation of integrals using numerical techniques.

MODULE I: Matrix Algebra   **[12 Periods]**

Vector Space, Basis, Linear Dependence And Independence (Only Definitions)

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

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

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

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

MODULE III: : Algebraic &Transcendental equations   **[12 Periods]**

(A)   Solution of Algebraic and Transcendental Equations: Introduction-Errors, types of errors. Bisection Method, Method of False Position, Newton-Raphson Method.

(B)   The Iteration Method ,Ramanujan's method to find smallest root of Equation. Jacobi's Iteration method for solving system of linear equations. Gauss seidel Iteration method for solving system of linear equations.

MODULE IV: Interpolation   **[12 Periods]**

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

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

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

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

TEXT BOOKS

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.

2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.

3. D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005.

4. M . K Jain, S R K Iyengar, R.K Jain, Numerical Methods for Scientific and Engineering Computation, New age International publishers.

5. S.S.Sastry, Introductory Methods of Numerical Analysis,5th Edition,PHI Learning Private Limited.

6. Richard Bellman, Introduction to matrix Analysis, Siam, second Edition.

REFERENCES

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint,2002.

2. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.

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

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

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)

Course Outcomes:

CO	Statement	Blooms Taxonomy Level
CO1	The student will be able to find rank of a matrix and analyze solutions of system of linear equations.	Understand
CO2	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.	Understand
CO3	The student will be able to find the root of a given equation by various methods.	Understand
CO4	The student will be able to estimate the value for the given data using interpolation.	Apply
CO5	The student will be able to find the numerical solutions for a given ODE's and evaluations of integrals using numerical techniques.	Analyze

CO- PO Mapping

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

2021-22 Onwards (MR21)	**Malla Reddy Engineering College** (Autonomous)	**B.Tech. I Semester**		
Code: B0H01	**English**	**L**	**T**	**P**
Credits: 3	(Common for CE, EEE, ME, ECE, CSE, CSE (Cyber Security), CSE (AI and ML), CSE (DS), CSE (IOT), AI, IT and Mi.E)	**3**	**-**	**-**

Course Objectives:

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

Module – I
Speech: "Go Kiss the World" by Subroto Bagchi
Poem : "Leisure" by W. H. Davies
Vocabulary   : Formation of Words, Roots, Prefixes, Suffixes
Grammar   : Articles and Prepositions
Reading   : Skimming and Scanning
Writing   : Introduction to Writing Skills, Characteristics of Effective Writing
Module – II
Short story   : "Gift of Magi" by O' Henry
Poem : "No Man is an Island" by John Donne **Vocabulary   :** One Word Substitutions; Synonyms and Antonyms **Grammar :** Degrees of Comparison, Active and Passive Voice
Reading   : Intensive Reading and Extensive Reading
Writing   : Paragraph Writing- Cohesive devices; Jumbled Sentences; Punctuation
Module – III
Essay : "Lucidity, Simplicity, Euphony" by W. Somerset Maugham
Poem : "We wear the Mask" by Paul Laurence Dunbar
Grammar   : Tense and Aspect
Vocabulary   : Homonyms, Homophones, Homographs
Reading   : Reading for Topic and Theme
Writing   : Letter Writing
Module – IV
Short story   : "The Night Train at Deoli" by Ruskin Bond **Poem : "**Gift of India" by Sarojini Naidu **Grammar   :** Question Tags; Concord
Vocabulary   : Idiomatic Expressions; Phrasal Verbs
Reading   : Reading for Interpretation
Writing   : Essay Writing, Describing, Defining and Classifying
Module – V
Essay : "Toasted English" by R. K. Narayan
Poem : "If" by Rudyard Kipling

Grammar : Direct and Indirect Speech, Misplaced Modifiers
Vocabulary : Redundancies and Clichés
Reading : Reading for Specific Purposes, Reading Comprehension practice
Writing : Paraphrasing & Summarizing,

Prescribed Textbook:

Reference Books:

1. Azar, Betty and Stacy A, Hagen. Understanding and Using English Grammar. 4th edition, Foundation Books, 2009.

2. Chaudhuri, Santanu S. Learn English: A Fun Book of Functional Language, Grammar and Vocabulary. Tata McGraw Hill Education, New Delhi, 2013.

3. Eastwod, John. Oxford Guide to English Grammar. 4th edition, Oxford University Press, 1994.

4. Field, Marion. Improve Your Written English. 5th Edition. How to Books, UK, 2009.
Leech, Geoffrey and Svartvik, J. A Communicative Grammar of English. 3rd edition, Routledge, 2013.

Related Websites:

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

Course Outcomes:

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

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

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

2021-22 Onwards (MR21)	**Malla Reddy Engineering College** (Autonomous)	**B.Tech.** **I Semester**		
Code: B0201	**Basic Electrical and Electronics Engineering** (Common for all branches)	**L**	**T**	**P**
Credits: 3		**3**	**-**	**-**

Prerequisites: Nil

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

MODULE I: DC Circuits [9 Periods]

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

MODULE II: AC Circuits [9 Periods]

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

MODULE III: Introduction to Electrical Machines [10 Periods]

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

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

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

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

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

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

MODULE V: Bipolar Junction Transistor (BJT): [10 Periods]

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

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

Text Books:

1. M.Surya Kalavathi, Ramana Pilla, Ch. Srinivasa Rao, Gulinindala Suresh, " Basic Electrical and Electronics Engineering", S.Chand and Company Limited, New Delhi, 1st Edition, 2017.

2. R.L.Boylestad and Louis Nashlesky, "Electronic Devices & Circuit Theory", Pearson Education, 2007.

References

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

2. Jacob Milliman, Christos C .Halkias, Satyabrata Jit (2011), "Electronic Devices and Circuits", 3 rd

edition, Tata McGraw Hill, New Delhi.

3. Thomas L. Floyd and R. P. Jain, "Digital Fundamentals", Pearson Education, 2009.

4. David A. Bell, "Electronic Devices and Circuits", Oxford University Press, 2008.

5. Nagrath I.J. and D. P. Kothari, "Basic Electrical Engineering", Tata McGraw Hill, 2001.

6. Mittle N., "Basic Electrical Engineering", Tata McGraw Hill Education, New Delhi, 2nd Edition, 2005.

E – Resources

1. https://www.electrical4u.com/ohms-law-equation-formula-and-limitation-of-ohms-law/

2. https://www.eeweb.com/passives

3. http://nptel.ac.in/courses/108108076/

4. http://nptel.ac.in/downloads/108105053/

Course Outcomes:

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

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

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

2021-22 Onwards (MR21)	**Malla Reddy Engineering College** (Autonomous)	**B.Tech. I Semester**		
Code: B0501	**Programming for Problem Solving**	**L**	**T**	**P**
Credits: 3	(Common for CE, EEE, ME, ECE, CSE, CSE (Cyber Security), CSE (AI and ML), CSE (DS), CSE (IOT), AI, IT and Mi.E)	**3**	**-**	**-**

Prerequisites: NIL

Course Objectives:

Understand the basic terminology, write, compile and debug programs in computer programming. Implement different control statements for solving problems. Understand the concept of structured program and arrays. Implement the idea of strings and pointers.

Analyses the usage of structures and different file operations.

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

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

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

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

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

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

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

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

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

MODULE IV: Strings and Pointers   [09 Periods]

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

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

MODULE V: Structures and File Handling   [10 Periods]

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

Files – Basic Concept of a file, file input / output operations, text files and binary files,

file status functions (error handling), Random file access functions, command –line arguments , C program examples.

Textbooks :

1. Computer Fundamentals and Programming in C, P. Dey, M Ghosh, Second edition, Oxford University Press.

2. Problem Solving and Program Design in C, J.R. Hanly and E.B. Koffman, Eighth Edition, Pearson Education.

3. The C Programming Language, B.W. Kernighan and Dennis M. Ritchie, PHI/Pearson Education

References

1. C Programming & Data Structures, B.A. Forouzan and R.F. Gilberg, Third Edition, Cengage Learning

2. C for Engineers and Scientists, H. Cheng, Mc. Graw-Hill International Edition

3. C Programming & Data Structures, P. Dey, M Ghosh R Thereja, Oxford University Press

E–RESOURCES

1. http://oxford university press.ac.in/eBooks/ Programming in C.

2. https://www.journals.elsevier.com/science-of-computer-programming

3. http://www.ejournalofsciences.org

4. http://onlinecourses.nptel.ac.in/iiitk_cs-101

5. http://onlinevideolecture.com/ebooks/?subject=C-Programming

Course Outcomes:

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

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

.

CO- PO, PSO Mapping **(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak**															
COs	**Programme Outcomes (POs)**												**PSOs**		
	P01	**P02**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	2										1	3	2	2
CO2	3	2	1									1	3	2	1
CO3	3	3	1									1	3	2	1
CO4	3	1										2	3	2	1
CO5	3	3	1									2	3	2	1

2021-22 Onwards (MR21)	Malla Reddy Engineering College (Autonomous)		B.Tech. I Semester	
Code: B0H02	**English Language and Communication Skills Lab**	**L**	**T**	**P**
Credits: 1	**(Common for CE, EEE, ME, ECE, CSE, CSE(CS), CSE (AI and ML), CSE (DS), CSE (IOT), AI, IT and Min.E)**	**-**	**-**	**2**

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

Course Objectives:

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

Objectives:

1. To enable students to develop their listening skill so that they may appreciate its role in the LSRW skills approach to language and improve their pronunciation

2. To equip students with necessary training in listening so that they can comprehend the speech of people of different backgrounds and regions

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

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

Speaking Skills:

Objectives:

1. To make students aware of the role of speaking in English and its contribution to their success.

2. To enable students to express themselves fluently and appropriately in social and professional contexts.

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

Syllabus: English Language and Communication Skills Lab has two parts:

   a. **Computer Assisted Language Learning (CALL) Lab**
   b. **Interactive Communication Skills (ICS) Lab**

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

Module - I:

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

Module - II:

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

ICS Lab: Situational Dialogues – Role-Play- Expressions in Various Situations – Self-introduction and Introducing others – Greetings – Apologies – Requests – Social and Professional Etiquette - Telephone Etiquette; Listening: listening for specific purposes, for details; Speaking: speaking in the above situations with clarity, connectivity, maintaining voice characters.

Module - III:

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

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

Module - IV:

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

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

Module - V:

CALL Lab: Reduction of Mother Tongue Interference and Conversation Practice

ICS Lab: Information Transfer, Debate

Minimum requirement of infrastructural facilities for EL Lab:

1. Computer Assisted Language Learning (CALL) Lab:

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

System Requirement (Hardware component):

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

a) P – IV Processor   b) Speed – 2.8 GHZ   c) RAM – 512 MB Minimum

d) Hard Disk – 80 GB e) Headphones of High quality

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

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

Prescribed Lab Manual:

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

Reference Books:

Roach, Peter. English Phonetics and Phonology. 4th edition, Cambridge University Press, 2009.

1. Hughes, John and Mallett, Andrew. Successful Presentations DVD and Student's Book Pack. Oxford University Press, 2013.

2. Hancock, Mark. English Pronunciation in Use (Intermediate). 2nd edition, Cambridge University Press, 2009.

3. Karia, Akash. Public Speaking Mastery: Speak Like a Winner. Kindle edition, 2013.

4. Lucas, Stephen. The Art of Public Speaking. 11th edition, Tata McGraw Hill, 2011.

Websites:

1. http://www.mindtools.com/CommSkll/ActiveListening.htm
2. http://www.slideshare.net/alisonkis/dialogue-and-roleplay-activity
3. http://www.hse.ru/pubs/lib/data/access/ram/ticket/2/14309868938d576a532b71360b73542 68380727a22/A n%20article%20for%20Monika%20(2010).pdf

Course Outcomes:

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

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

| COS | CO-PO 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	PO12	PSO1	PSO2	PSO3
CO1		1				1		1	2	2		1			
CO2										1		1			
CO3							1		1	2		2			
CO4								1	1	2		2			
CO5										2		2			

2021-22 Onwards (MR21)	**Malla Reddy Engineering College** (Autonomous)	**B.Tech.** I Semester		
Code: B0202	**BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LAB** (Common for all branches)	**L**	**T**	**P**
Credits: 1		-	-	2

Course Objectives:

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

List of Experiments:

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

Course Outcomes:

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

CO	Statement	Blooms Taxanomy Level
CO1	Experimentally verify the basic circuit theorems, KCL and KVL	Understand
CO2	Measure power, power factor and phase angle in RC circuits experimentally.	Apply
CO3	Acquire hands on experience of conducting various tests on dc shunt motor, single phase transformers and three phase induction motors and obtaining their performance indices using standard analytical as well as graphical methods	Analyze
CO4	Draw the characteristics of different semiconductor devices like PN junction Diode, Zener Diode, BJT and JFET by conducting suitable experiments	Understand
CO5	Experimentally verify the working of half and full wave rectifier by using PN Junction diodes	Apply

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

2021-22 Onwards (MR21)	Malla Reddy Engineering College (Autonomous)	B.Tech. I Semester		
Code: B0502	**Programming for Problem Solving Lab** (Common for CE, EEE, ME, ECE, CSE, CSE (CS), CSE (AIML), CSE (DS), CSE (IOT), AIML, IT and Mi.E)	**L**	**T**	**P**
Credits: 1		-	1	2

Prerequisites: NIL

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

Software Requirements: C

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

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

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

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

TEXT BOOKS:

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

REFERENCES:

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

Course Outcomes:

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

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

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

2021-22 Onwards (MR21)	**Malla Reddy Engineering College** (Autonomous)	**B.Tech. I Semester**		
Code: B1201	**Engineering and IT Workshop** (Common for CSE and IT)	**L**	**T**	**P**
Credits: 2		**-**	**1**	**2**

Pre requisites: NIL

Course Objectives:

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

Engineering Workshop:

Problem 1: Trades for Exercises

At least two exercises from each trade

1. House-wiring
2. Soldering

Problem 2: Trades for Demonstration & Exposure

1. Carpentry
2. Wood working lathe

PC Hardware:

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

Problem 3:

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

Problem 4:

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

Problem 5:

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

Problem 6:

Software Troubleshooting: Students have to be given a malfunctioning CPU due to system

software problems. They should identify the problem and fix it to get the computer back to working condition. Internet & World Wide Web.

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

Problem 7:

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

Problem 8:

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

Problem 9:

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

Problem 10:

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

Problem 11:

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

Problem 12:

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

Reference Books:

1. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
2. LaTeX Companion –Leslie Lamport, PHI/Pearson.
3. Comdex Information Technology course tool kit Vikas Gupta, WILEY Dreamtech
4. IT Essentials PC Hardware and Software Companion Guide Third Edition by David Anfinson and Ken Quamme.–CISCO Press, Pearson Education.

Course Outcomes:

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

<table>
<tr><td colspan="16" align="center">CO- PO, PSO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak</td></tr>
<tr><td rowspan="2">COs</td><td colspan="12" align="center">Programme Outcomes (POs)</td><td colspan="3" align="center">PSOs</td></tr>
<tr><td>PO1</td><td>PO2</td><td>PO3</td><td>PO4</td><td>PO5</td><td>PO6</td><td>PO7</td><td>PO8</td><td>PO9</td><td>PO10</td><td>PO11</td><td>PO12</td><td>PSO1</td><td>PSO2</td><td>PSO3</td></tr>
<tr><td>CO1</td><td>3</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>2</td><td>2</td><td>1</td><td></td></tr>
<tr><td>CO2</td><td>3</td><td>2</td><td>2</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>3</td><td>3</td><td>2</td><td>1</td></tr>
<tr><td>CO3</td><td>3</td><td>2</td><td>2</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>2</td><td>3</td><td>2</td><td>1</td></tr>
<tr><td>CO4</td><td></td><td>2</td><td></td><td></td><td></td><td></td><td>3</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
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2021-22 Onwards (MR21)	**Malla Reddy Engineering College** (Autonomous)	**B.Tech II Semester**		
Code:B0B02	**Probability and Statistics** (Common For CSE, IT, CSE(AI&ML,DS,CS,IOT), B.Tech(AI&ML)	L	T	P
Credits: 3		3	-	-

Prerequisites: NIL

Course Objectives:

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

MODULE I: Probability: [10 Periods]

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

MODULE II: Random variables: [14 Periods]

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

MODULE III: Sampling Distributions: [14 Periods]

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

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

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

MODULE IV: Small sample tests: [12 Periods]

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

MODULE V: Correlation, Regression: **[10 Periods]**

Scatterplot, Correlation, Coefficient of correlation, the rank correlation. Regression, Regression Coefficient, The lines of regression: simple regression. Multiple regression for three variables.

TEXT BOOKS

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

REFERENCES

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

E – RESOURCES

   a) **Concerned Website links:**
      1. http://www.csie.ntu.edu.tw/~sdlin/download/Probability%20&%20Statistics.pdf(Probability& Statistics for Engineers & Scientists text book)
      2. http://www.stat.pitt.edu/stoffer/tsa4/intro_prob.pdf (Random variables and its distributions)
      3. http://users.wfu.edu/Cottrell/ecn215/sampling.pdf (Notes on Sampling and hypothesis testing)

   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:

CO	Statement	Blooms Taxonomy Level
CO1	The students will understand and appreciate the role of P&S in data analytics and big data analysis.	Understand
CO2	Students would be able to find the Probability in certain realistic situation	Understand
CO3	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 for all branches of engineering.	Apply
CO4	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.	Understand
CO5	Students will understand how to forecast the future observations.	Apply

CO- PO Mapping

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

2021-22 Onwards (MR21)	**Malla Reddy Engineering College** (Autonomous)		**B.Tech II Semester**	
Code: B0B09	**Semiconductor Physics**	**L**	**T**	**P**
Credits: 4	**Common for** Sem-I :- AI & ML, CSE (AI & ML), CSE (CS), CSE (IoT) and CSE (DS). Sem-II :- CSE and IT	3	1	-

Prerequisites: Fundamentals of Physics

Course Objectives:

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

Module–I: Quantum Mechanics   **[8 Periods]**

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

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

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

Module –III: Semiconductor Physics   **[13 Periods]**

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

B: Direct and indirect bandgap semiconductors; Carrier generation and Recombination; Drift and Diffusion mechanisms; Equation of Continuity; P-N Junction diode, Energy band diagram, V-I 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.

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

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

E-RESOURCES
1. https://www.researchgate.net/publication/259574083_Lecture_Notes_on_Engineering_Physi si cs
2. https://www.researchgate.net/publication/292607115_Applied_Physics
3. https://www.livescience.com/33816-quantum-mechanics-explanation.html

Journals :
1. http://www.springer.com/physics/theoretical%2C+mathematical+%26+computational+physi si cs/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=PLzJaFd3A7DZse2tQ2qUFChSi Cj 7jBidO0&index=29
3. https://www.youtube.com/watch?v=4a0FbQdH3dY

Course Outcomes:

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

CO	Statement	Blooms Taxonomy Level
CO1	Explain the dual nature of the matter and evaluate the energy of a particle trapped in 1D infinite potential well.	Understand
CO2	Classify the materials into conductors, semiconductors and insulators based on the outcomes of Kronig - Penney model.	Analyze
CO3	Analyze the working of semiconductor devices like PN junction diode, Photodiode, LED and Solar cell.	Apply
CO4	Compare and contrast Ruby, He-Ne, Semiconductor Lasers and discover the working principle of optical fibers besides and elucidating their applications.	Analyze
CO5	Describe the Boolean algebra and examine various logic gates.	Analyze

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

2021-22 Onwards (MR21)	Malla Reddy Engineering College (Autonomous)	B.Tech II Semester		
Code: B0B17	Engineering Chemistry (Common for ALL)	L	T	P
Credits: 4		3	1	-

Course objectives:

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

Module I: Water and its treatment [10 Periods]
Introduction to water, hardness of water, causes of hardness, expression of hardness, units and types of hardness-Numerical Problems. Alkalinity of water, specifications of potable water (BIS);
Estimation of temporary & permanent hardness of water by EDTA method. Boiler troubles - Scale &Sludge, Priming and foaming, caustic embrittlement and boiler corrosion; Treatment of boiler feed water - Internal treatment (colloidal, phosphate, carbonate and calgon conditioning). External treatment - Lime Soda process (cold & hot) and ion exchange process, Numerical Problems. Disinfection of water by chlorination and ozonization. Desalination by Reverse osmosis and its significance.

Module II: Molecular structure and Theories of Bonding: [10 Periods]
Introduction to Molecular orbital Theory. Linear Combination of Atomic Orbital's (LCAO), significance of bonding and anti-bonding molecular orbital, Conditions for the formation of molecular orbital's. Molecular orbital energy level diagrams of diatomic molecules -, N_2, O_2 and F_2. Introduction to coordination compounds-ligand-coordination number (CN) - spectrochemical series. Salient features of crystal field theory, Crystal field splitting of transition metal complexes in octahedral ($[CoF_6]^{3-}$ and $[Co(CN)_6]^{3-}$) and tetrahedral ($[NiCl_4]^{2-}$ and $[Ni (CO)_4]$) fields - magnetic properties of complexes. Band structure of solids and effect of doping on conductance.

Module III: Electrochemistry and Corrosion [17 Periods]
A.Electrochemistry:
Introduction to Electrochemistry-Conductance(Specific and Equivalent) and units. Types of cells- electrolytic & electrochemical cells (Galvanic Cells)-Electrode potential-cell potential (EMF).Electrochemical series and its applications,Nernst equation its applications and numerical problems. Reference electrodes - Calomel Electrode and Glass electrode-determination of pH using glass electrode. Batteries: Primary (dry cells) and secondary (Lead-Acid cell, Ni-Cd cell) - applications of batteries. Fuel cells: Hydrogen - Oxygen fuel cell and its applications.

B.Corrosion: [7 Periods]
Causes and effects of corrosion: Theories of corrosion - Chemical & Electrochemical corrosion, Pilling-Bedworth rule,Types of corrosion: Galvanic and Water-line corrosion. Factors affecting rate of corrosion-Nature of metal and Nature of Environment, Corrosion

control methods - Cathodic protection (Sacrificial anodic and impressed current cathodic methods). Surface coatings: Methods of metallic coatings - hot dipping (Galvanization),Electroplating (Copper) and Electroless plating (Nickel).

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

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

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

Module V: Fuels And Combustion [08 PERIODS]

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

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

Text Books:
1. P.C.Jain and Monica Jain, "**A Text Book of Engineering Chemistry**", DhanpatRai Publications, New Delhi, 16th Edition 2014.
2. S.S. Dara and S.S. Umare, "**A Text Book of Engineering Chemistry**", S Chand Publications, New Delhi, 12th Edition 2010.
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**", 5thEdition, 2006.

Course Outcomes :

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

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

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

2021-22 Onwards (MR21)	Malla Reddy Engineering College (Autonomous)	B.Tech II Semester		
Code: B0305	ENGINEERING DRAWING (Common for All)	L	T	P
Credits: 3		2	-	2

Prerequisites: NIL

Course Objectives:

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

MODULE I:

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

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

Scales: Plane Scale, Diagonal scale, Vernier Scale.

MODULE II:

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

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

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

MODULE III:

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

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

MODULE IV:

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

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

MODULE V:

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

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

TEXT BOOKS

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

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

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

E - RESOURCES
1. http://nptel.ac.in/courses/112103019/
2. https://www.slideshare.net/search/slideshow?searchfrom=header&q=engineering+drawing
3. https://www.wiziq.com/tutorials/engineering-drawing
4. http://freevideolectures.com/Course/3420/Engineering-Drawing
5. http://www.worldcat.org/title/journal-of-engineering-graphics/oclc/1781711
6. http://road.issn.org/issn/2344-4681-journal-of-industrial-design-and-engineering-graphics nit jalandhar (EG MECI102)

Course Outcomes

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

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

2021-22 Onwards (MR21)	**Malla Reddy Engineering College** (Autonomous)		**B.Tech II Semester**	
Code: B0504	**Python Programming** (Common for CSE, IT, CSE (Cyber Security), CSE (AI and ML), CSE (Data Science), CSE (IoT) and AI)	**L**	**T**	**P**
Credits: 4		**3**	**1**	**-**

Course Objectives: This course will enable students to

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

MODULE - I   **[10Periods]**

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

MODULE – II   **[9 Periods]**

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

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

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

MODULE - III   **[10 Periods]**

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

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

MODULE – IV   **[10 Periods]**

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

MODULE - V   **[9 Periods]**

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

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

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

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

E–RESOURCES
1. "Learn Python - Free Interactive Python Tutorial", https://www.learnpython.org/
2. "Free Python Tutorial - Python For Beginner," https://www.udemy.com/ share/10 1EfoB 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

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

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

2021-22 Onwards (MR21)	Malla Reddy Engineering College (Autonomous)		B.Tech II Semester	
Code: B0B11	**Applied Physics Lab**	L	T	P
Credits: 1	(Common for AI&ML, CSE (AI & ML), CSE (Cyb. Sec.), CSE (IoT), CSE (Data Science) ,CSE and IT)	-	-	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.

<u>**List of Experiments:**</u>

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

Course Outcomes:

CO	Statement	Blooms TaxonomyLevel
CO1	Apply the basic principles of crystals and analysisof crystal structures using X-ray diffraction	Analyze
CO2	Understand type of defects in crystals	Understand
CO3	Distinguish free, damped and forced vibrations, develop basic knowledge on the distribution functions and simple applications	Analyze
CO4	Acquire the theoretical information about matter interms of quantum physics	Understand
CO5	Analyze the formation the bands therebyclassification of materials on the basis of transportproperties	Apply

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

2021-22 Onwards (MR21)	Malla Reddy Engineering College (Autonomous)	B.Tech II Semester		
Code: B0B18	Engineering Chemistry Lab (Common for ALL)	L	T	P
Credits: 1		-	-	2

Course objectives:

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

List of Experiments:

1. Calibration of Volumetric apparatus.

2. Estimation of Total Hardness of water by EDTA Method.

3. Estimation of an acid by P^Hmetry.

4. Estimation of alkalinity of water.

5. Estimation of strength of an acid by Conductometry.

6. Estimation of strength of an acid by Potentiometry.

7. Estimation of Mn^{+2}ion in $KMnO_4$ by Colorimetry.

8. Determination of viscosity of given liquids by Ostwald's viscometer.

9. Determination of surface tension of given sample using stalagmometer.

10. Estimation of iron (II) by dichrometry.

11. Determination of rate constant of hydrolysis of methyl acetate.

12. Preparation of Aspirin.

Course outcomes:

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

CO	Statement	Blooms Taxonomy Level
CO1	Acquire knowledge about the chemistry lab, kind of experiments that can be performed and the precautions to perform four types of titrations & understand the principle involved in the applications of the method	Analyze
CO2	Learn and apply basic technique used in chemistry laboratory for estimation hardness & alkalinity of water.	Apply
CO3	Understand about mineral analytic technique for estimation of ions/metal ions in minerals	Analyze
CO4	Apply instrumental techniques such as colorimetry, conductometry & potentiometry.	Understand
CO5	Learn to determine physical properties like free chlorides in water, viscosity & surface tension.	Understand

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

2021-22 Onwards (MR21)	Malla Reddy Engineering College (Autonomous)	B.Tech II Semester		
Code: B0506	**Python Programming Lab** (Common for CSE, IT, CSE (Cyber Security), CSE (AI and ML), CSE (Data Science) and CSE (IoT))	L	T	P
Credits: 2		-	1	2

Prerequisites: NIL

Course Objectives:

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

Software Requirements: Python

List of Programs:

1. a) Write a program to purposefully raise Indentation Error and correct it.
   b) Write a program to compute distance between two points taking input from the user (Pythagorean Theorem).
   c) Write a program add.py that takes 2 numbers as command line arguments and prints its sum.

2. a) Write a Program for checking whether the given number is a even number or not.
   b) Using for loop, write a program that prints out the decimal equivalents of 1/2, 1/3, 1/4, . . . , 1/10.
   c) Write a program using for loop that loops over a sequence. What is sequence?
   d) Write a program using a while loop that asks the user for a number, and prints a countdown from that number to zero.

3. a) Find the sum of all the primes below two million.
   b) Each new term in the Fibonacci sequence is generated by adding the previous two terms. By starting with 1 and 2, the first 10 terms will be: 1, 2, 3, 5, 8, 13, 21, 34, 55, 89
   c) By considering the terms in the Fibonacci sequence whose values do not exceed four million, find the sum of the even-valued terms.
   d) Write a program to count the numbers of characters in the given string and store them in a dictionary data structure
   e) Write a program to use split and join methods in the given string and trace a birthday with a dictionary data structure.

4. a) Write a program to combine two lists into a dictionary.
   b) Write a program to count frequency of characters in a given file. Can you use character frequency to tell whether the given file is a Python program file, C program file or a text file?

5. a) Write a program to print each line of a file in reverse order.
   b) Write a program to compute the number of characters, words and lines in a file.

6. a) Write a function ball _collide that takes two balls as parameters and computes if they are colliding. Your function should return a Boolean representing whether or not the balls are colliding.
   Hint: Represent a ball on a plane as a tuple of (x, y, r), r being the radius. If (distance between two balls centers) <= (sum of their radii) then (they are colliding)
   b) Find mean, median, mode for the given set of numbers in a list.

7. a) Write a function nearly_ equal to test whether two strings are nearly equal. Two strings a and b are nearly equal when a can be generated by a single mutation on b.
    b) Write a function dups to find all duplicates in the list.
    c) Write a function unique to find all the unique elements of a list.
8. a) Write a function cumulative_product to compute cumulative product of a list of numbers.
    b) Write a function reverse to reverse a list. Without using the reverse function.
        Create a Regular Expression and implement the following
9. a) Recognize the following strings: "bat," "bit," "but," "hat," "hit," or "hut."
    b) Match any pair of words separated by a single space, i.e., first and last names.
    c) Match any word and single letter separated by a comma and single space, as in last name, first initial.
10. Write a python program to implement multithreading scenarios.
11. Write a python program to simulate the banking operations using Class.
12. Write a python program to demonstrate the Queue / Stack operations using Class.

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

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

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

CO	Statement	Blooms Taxonomy Level
CO1	Apply core Python scripting elements such as variables and flow control structures	Analyze
CO2	Implement data structures like lists, tuple, dictionary and sequence in Python.	Apply
CO3	Build Python programs by using OOPs concepts and apply different file operations.	Analyze

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

Prerequisites: NIL

Course Objectives:

The main objectives of the course are to:

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

MODULE I: Mathematical Logic   [10 Periods]

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

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

MODULE II: Predicate Logic and Relations   [10 Periods]

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

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

MODULE III: Functions and Algebraic Structures   [10 Periods]

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

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

MODULE IV: Counting Techniques and Theorems   [09 Periods]

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

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

MODULE V: Generating functions and Recurrence Relation   [09 Periods]

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

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

TEXTBOOKS:

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

REFERENCES:

1. Kenneth H. Rosen, "**Discrete Mathematics and its Applications**", TMH, Fifth Edition.

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

E-RESOURCES:
1. http://www.cse.iitd.ernet.in/~bagchi/courses/discrete-book/fullbook.pdf
2. http://www.medellin.unal.edu.co/~curmat/matdiscretas/doc/Epp.pdf
3. http://ndl.iitkgp.ac.in/document/yVCWqd6u7wgye1qwH9xY7xPG734QA9tMJN2ncqS12 ZbN7p USSlWCxSgPOZJEokyWJlxQLYsrFyeITA70W9C8Pg
4. http://nptel.ac.in/courses/106106094/

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

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

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

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

2021-22 Onwards (MR21)	**Malla Reddy Engineering College** (Autonomous)		B.Tech. III Semester		
Code: B0508	**Computer Organization and Architecture** (Common for CSE, IT, CSE(DS), CSE(AIML),CSE(CS), and CSE(IOT))		**L**	**T**	**P**
Credits: 3			3	-	-

Prerequisites: No prerequisites

Objectives:

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

MODULE – I [10 Periods]

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

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

MODULE – II [10 Periods]

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

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

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

MODULE – III [9 Periods]

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

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

MODULE – IV [10 Periods]

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

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

MODULE – V [9 Periods]

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

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

Textbook:

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

References:

1. Computer Organization, Car Hamacher, ZvonksVranesic, SafeaZaky, 5th Edition, McGraw Hill.

2. Computer Organization and Architecture, William Stallings 6th Edition, Pearson/PHI.

3. Structured Computer Organization, Andrew S. Tanenbaum, 4th Edition, PHI/Pearson.

E-Resources:

1. https://books.google.co.in/books?isbn=8131700704
2. http://ndl.iitkgp.ac.in/document/yVCWqd6u7wgye1qwH9xY7Eh9eBOsT1ELoYpKlg_xn grkluevXO JLs1TbxS8q2icgUs3hL4_KAi5So5FgXcVg
3. http://ndl.iitkgp.ac.in/document/yVCWqd6u7wgye1qwH9xY7xAYUzYSlXl4zudlsolr-e7wQNrNXLxbgGFxbkoyx1iN3YbHuFrzI2jc_70rWMEwQ
4. http://nptel.ac.in/courses/106106092/

Outcomes:

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

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

2021-22 Onwards (MR21)	**Malla Reddy Engineering College** (Autonomous)		**B.Tech. III Semester**	
Code: B0509	**Data Structures** (Common for CSE, IT, CSE(DS), CSE(AIML),CSE(CS), and CSE(IOT) and AIML)	**L**	**T**	**P**
Credits: 3		**3**	**-**	**-**

Prerequisites: A course on "Programming for Problem Solving "

Course Objectives:

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

MODULE-I: [10 Periods]

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

MODULE-II: [09 Periods]

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

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

MODULE-III: [10 Periods]

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

MODULE-IV: [10 Periods]

Graphs: Graph Implementation Methods. Graph Traversal Methods.

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

MODULE-V: [09Periods]

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

Text Books:

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

References:

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

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

Course Outcomes:

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

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

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

2021-22 Onwards (MR21)	Malla Reddy Engineering College (Autonomous)		B.Tech. III Semester	
Code: B0510	**Object Oriented Programming through Java** (Common for CSE, IT, CSE(DS), CSE(AIML),CSE(CS), and CSE(IOT))	L	T	P
Credits: 3		3	-	-

Prerequisites: Computer Programming

Course Objectives:

This course will make students able

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

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

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

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

MODULE II: Basics of Java   **[11 Periods]**

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

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

MODULE III: Interfaces and Exception Handling   **[10 Periods]**

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

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

MODULE IV: Multithreading and Collection Classes   **[09 Periods]**

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

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

MODULE V: Event Handling, Layout manager and Swings   **[09 Periods]**

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

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

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

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

E-RESOURCES:
1. http://ndl.iitkgp.ac.in/document/xttk-4kfhvUwVlXBW-RPf64_TFk2i4LJhgQFPQ WAEt- Zobbm3twyubjRA1YOe9WVvwkN2qGcxBwdHaPdi_mMQ
2. https://ndl.iitkgp.ac.in/result?q={"t":"search","k":"object%20oriented%20programming"," s":["ty pe=\"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

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

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

2021-22 Onwards (MR21)	**Malla Reddy Engineering College** (Autonomous)		**B.Tech. III Semester**	
Code: B0511	**Operating Systems** (Common for CSE, IT, CSE(DS), CSE(AIML), CSE(CS), and CSE(IOT))	**L**	**T**	**P**
Credits: 3		**3**	**-**	**-**

Prerequisites: NIL

Course Objectives:

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

MODULE I: Computer System and Operating System Overview   [10 Periods]
Basic System and Process Operations - Overview of Computer System hardware, Operating System Objectives and services, Operating System Structure, System Calls, System Programs.
Process Management - Process Description, Process Control Block, Process States, Inter-process Communication.

MODULE II: Scheduling and Concurrency   [9 Periods]
CPU Scheduling - Basic Concepts, Scheduling Criteria, Scheduling Algorithms and evaluation, Threads Overview, Threading issues.
Concurrency - Process synchronization, the critical- section problem, Peterson's Solution, synchronization Hardware, semaphores, monitors, classic problems of synchronization.

MODULE III: Deadlocks   [10 Periods]
A: Deadlocks - System Model, Deadlock Characterization, Methods for handling Deadlocks, Deadlock Prevention.
B: Detection and Recovery   - Deadlock avoidance, Deadlock detection, Recovery from Deadlocks.

MODULE IV: Memory   [10 Periods]
Memory Management -Basic concepts, Swapping, Contiguous memory allocation, Paging, Segmentation, Virtual memory, Demand paging, Page-replacement algorithms, Thrashing.
Secondary Storage Structure and I/O Systems - Disk structure; Disk scheduling, Disk management, Swap space Management, RAID structure, Stable storage Implementation, Tertiary Storage Structure, I/O hardware, Application I/O interface, Kernel I/O subsystem.

MODULE V: Files   [08 Periods]
File Management - File System-File concepts, Access methods, Directory structure, File system mounting, File sharing and Protection. Implementing file systems-File system structure and implementation, Directory implementation, Allocation methods, Free-space management, Efficiency and performance.
Security - Protection, Security threats, Viruses, Cryptography as a security tool.

Text Books:

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

References:

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

E-Resources:

1. https://www.tutorialspoint.com/operating_system/operating_system_tutorial.pdf
2. https://archive.org/details/2005OperatingSystemConcepts7thEditionAbrahamSilberschatz
3. https://ndl.iitkgp.ac.in/document/BN1jh1UjGAJr_Zl4CiGeVCT3CaRCi4AlvzVWgkNQL QcFt_l b03ZmqLHrc1tBe3aA6pjyl3jlrBqPLRxX2VQUvQ
4. http://nptel.ac.in/courses/106108101/

Course outcomes

CO	Statement	Blooms Taxonomy Level
CO1	Distinguish between the different types of operating system environments.	Apply
CO2	Apply the concepts of process scheduling. Develop solutions to process synchronization problems.	Analyze
CO3	Identify Deadlocks, prevention of deadlocks, avoid deadlocks.	Apply
CO4	Analyze various memory management techniques.	Apply
CO5	Identify various issues of Operating Systems file systems.	Analyze

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

2021-22 Onwards (MR21)	Malla Reddy Engineering College (Autonomous)	B.Tech. III Semester		
Code: B0512	**Data Structures Lab** (Common for CSE, IT, CSE(DS), CSE(AIML), CSE(CS), and CSE(IOT))	**L**	**T**	**P**
Credits: 1.5		-	-	3

Prerequisites: A Course on "Programming for problem solving"

Objectives:

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

Software Requirements: C

List of Programs:

1   Write a program that uses functions to perform the following operations on singly linked list.:
i) Creation ii) Insertion iii) Deletion iv) Traversal

2   Write a program that uses functions to perform the following operations on doubly linked list.:
i) Creation ii) Insertion iii) Deletion iv) Traversal

3   Write a program that uses functions to perform the following operations on circular linked list.:
i) Creation ii) Insertion iii) Deletion iv) Traversal

4   Write a program that implement stack (its operations) using
i) Arrays ii) Pointers

5   Write a program that implement Linear Queue (its operations) using
i) Arrays ii) Pointers

6   Write a program that implement Deque (its operations) using
i) Arrays ii) Pointers

7   Write a program to implement all the functions of a dictionary using hashing.

8   Write a program that implement Binary Search Trees to perform the following operations
i) Creation ii) Insertion iii) Deletion iv) Traversal

9   Write a program to implement the tree traversal methods using recursion.

10 Write a program that implements the following sorting methods to sort a given list of integers in ascending order
i) Heap sort ii) Merge sort

11 Write a program to implement the graph traversal methods such as BFS and DFS.

12 Write a program to implement the Knuth-Morris- Pratt pattern matching algorithm.

TEXT BOOKS

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

REFERENCES

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

Course Outcomes:

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

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

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

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

2021-22 Onwards (MR21)	**Malla Reddy Engineering College** (Autonomous)		**B.Tech. III Semester**		
Code: B0513	**Object Oriented Programming through Java Lab** (Common for CSE, IT, CSE(DS), CSE(AIML), CSE(CS), and CSE(IoT))		**L**	**T**	**P**
Credits: 1.5			**-**	**-**	**3**

Prerequisites: NIL

Course Objectives:

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

- **Software Requirements:** Java

List of Programs

1. Write Java Programs that implement the following.
    a) Constructor
    b) Parameterized constructor
    c) Method Overloading
    d) Constructor overloading

2. Write a Java program
    a) checks whether a given string is a palindrome or not.
    b) for sorting a given list of names in ascending order.
    c) that reads a line if integers and then displays each integer and the sum of all integers(use string tokenizer class of java.util).

3. Write Java programs that uses the following keywords…
    a) this
    b) super
    c) static
    d) final

4. Write a Java program to implement
    a) Method Overriding.
    b) dynamic method dispatch.
    c) multiple inheritance.
    d) access specifiers.

5. Write a Java program that
    a) reads a file name from the user, and then displays information about whether the file exists, whether the file is readable, whether the file is writable, the type of file and the length of the file in bytes.
    b) reads a file and displays the file on the screen, with a line number before each line.
    c) displays the number of characters, lines and words in a test file.

6. Write a Java program for handling
    a) Checked exceptions.
    b) unchecked exceptions.

7. Write a Java program
    a) Creates three threads. First threads displays "Good Morning "for every one Second, the

second thread displays "Hello" for every two seconds, the third thread Displays "Welcome" for every three seconds.

b) that correctly implements producer consumer problem using concept of inter thread communication.

8. Write a Java program which demonstrates the use of following collection classes

a) Array List
b) Hash Set
c) Deque

9. Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +,-,*,/ operations. Add a text field to display the result.

10. Write a Java program for handling

a) mouse events.
b) key events.

11. Write a Java program that creates a user interface to perform integer divisions. The user enters two numbers in the text fields num1 and num2. The division of num1 and num2 is displayed in the result field when the divide button is clicked. If num1 or num2 were not an integer, the program would throw number format exception. If num2 were zero, the program would throw an arithmetic exception and display the exception in the message dialogue box.

12. Write a Java program that

a) Simulates traffic light. The program lets the user select one of three lights: red, yellow or green. When a radio button is selected, the light is turned on and only one light can be on at a time. No light is on when the program starts.

b) Allows the user to draw lines rectangles and ovals.

TEXT BOOKS:

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

REFERENCES:

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

Course Outcomes:

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

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

2021-22 Onwards (MR21)	Malla Reddy Engineering College (Autonomous)	B.Tech. III Semester		
Code: B0514	**Operating Systems Lab** (Common for CSE, IT, CSE(DS), CSE(AIML),CSE(CS), and CSE(IoT)))	L	T	P
Credits: 2		-	1	2

Prerequisites: NIL

Course Objectives:

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

Software Requirements: C++/JDK

List of Programs:

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

TEXT BOOKS:

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

REFERENCES:

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

Course Outcomes:

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

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

<table>
<tr><td colspan="16" align="center">CO- PO, PSO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak</td></tr>
<tr><td rowspan="2">COs</td><td colspan="12" align="center">Programme Outcomes (POs)</td><td colspan="3" align="center">PSOs</td></tr>
<tr><td>PO1</td><td>PO2</td><td>PO3</td><td>PO4</td><td>PO5</td><td>PO6</td><td>PO7</td><td>PO8</td><td>PO9</td><td>PO10</td><td>PO11</td><td>PO12</td><td>PSO1</td><td>PSO2</td><td>PSO3</td></tr>
<tr><td>CO1</td><td>2</td><td>3</td><td>1</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>2</td><td>1</td><td></td><td></td></tr>
<tr><td>CO2</td><td>2</td><td>2</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>2</td><td>2</td><td></td><td></td></tr>
<tr><td>CO3</td><td>1</td><td>2</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>1</td><td>1</td><td></td><td></td></tr>
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2021-22 Onwards (MR21)	Malla Reddy Engineering College (Autonomous)		B.Tech. III Semester	
Code: B00M1	Gender Sensitization (An Activity-based Course) (Common for CE, EEE, ME, ECE, MiE, CSE, IT, CSE(DS), CSE(AIML), CSE(CS), and CSE(IoT))	L	T	P
Credits: NIL		-	-	2

Prerequisites: NIL

Course Description

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

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

Objectives of the Course:

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

MODULE I: UNDERSTANDING GENDER [06 Periods]

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

MODULE II: GENDER ROLES AND RELATIONS [06 Periods]

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

MODULE III: GENDER AND LABOUR [07 Periods]

Division and Valuation of Labour-Housework: The Invisible Labor- "My Mother doesn't Work." "Sharethe Load."-Work: Its Politics and Economics -Fact and Fiction. Unrecognized and Unaccounted work.-Gender Development Issues-Gender, Governance and Sustainable Development- Gender 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 HumanRights Perspective-Sexual Harassment: Say No! -Sexual Harassment, not Eve-teasing- Coping withEveryday Harassment- Further Reading: *"Chupulu".*

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

MODULE V: GENDER AND CULTURE   [06 Periods]

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

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

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

➢ *Classes will consist of a combination of activities: dialogue-based lectures, discussions, collaborative learning activities, group work and in-class assignments. Apart from the above prescribed book, Teachers can make use of any authentic materials related to the topics given in the syllabus on "Gender".*

➢ **ESSENTIAL READING**: The Textbook, *"Towards a World of Equals: A Bilingual Textbook onGender" written* by A.Suneetha, Uma Bhrugubanda, DuggiralaVasanta, Rama Melkote,Vasudha Nagaraj, Asma Rasheed, GoguShyamala, Deepa Sreenivas and Susie Tharu **published by Telugu Akademi, Telangana Government in 2015.**

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

TEXT BOOKS:
- Towards a World of Equals: A bilingual Textbook on Gender, A Suneetha -etall

REFERENCES:
1. Sen, Amartya. "More than One Million Women are Missing.' New York Review of Books 37.20 (20 December 1990). Print. We Were Making History...' Life Stories of Women in the ToIrmgana People's Struggle. New Delhi: Kali for Women, 1989.
2. TriptiLahiri. "By the Numbers: Where Indian Women Work." Women's Studios Journal (14 November 2012) Available online at: http:// blogs.visj.com/ India real time/2012/11/14/by -the- numbers-where-Indan-womenworkP
3. K. Satyanarayana and Susie Thant (Ed.) Steel Nibs Are Sprouting: New Dalit Writing From South India, Dossier 2: Telugu And Kannada htto://harooreollins.co.in/BookDetailasp?FlookCndet,3732
4. Vimata. "Vantillu (The Kitchen)". Women Writing in India: 600 BC to the Present. Volume II: The 20th Century. Ed. Susie Thaw and K. Lalita. Delhi: Oxford University Press

1995. 599-601.

5. Shatrughna, Veena et al. Women's Work and its Impact on Child Health end Nutrition, Hyderabad, National Institute of Nutrition, Indian Council of Medical Research. 1993.
6. Stree Shakti Sanghatana. 'We Were Making I listory ....' Life Stories of Women in the Telangana People's Struggle. New Delhi: Kali for Women, 1989.

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

Course Outcomes:

At the end of the course,.

CO	Statement	Blooms Taxonomy Level
CO1	Students will have developed a better understanding of important issues related to gender in contemporary India	Apply
CO2	Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.	Apply
CO3	Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.	Develop
CO4	Students will acquire insight into the gendered division of labour and its relation to politics and economics.	Design
CO5	Men and women students and professionals will be better equipped to work and live together as equals.	Design

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

2021-22 Onwards (MR21)	Malla Reddy Engineering College (Autonomous)		B.Tech. IV Semester	
Code: B0B07	**Applied Statistics and Optimization Techniques** (Common for CSE,) IT, CSE(DS), CSE(AIML), CSE(CS), and CSE(IoT)	L	T	P
Credits: 3		3	-	-

Module – I [12 Periods]

Analysis of Variance & Analysis of Co-variance

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

Module – II [12 Periods]

Design of Experiments

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

Module III [13 Periods]

Transportation and Assignment

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

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

Module IV: Game Theory [13 Periods]

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

Method V: Queuing Theory [10Periods]

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

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

Proposed Text Books:

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

Proposed Reference Books:

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

Course Outcomes:

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

CO	Statement	Blooms Taxonomy Level
CO1	Perform Analysis of variance, ANCOVA and design of experiments inmanufacturing firms.	Analyze
CO2	Advanced design of experiments and their applications.	Apply
CO3	The students will learn the concept of quality control, Six Sigma and itsimportance to real life problems.	Apply
CO4	The student will be able to understand the concept of Multiple regressionand Application of Time-series,	Understand
CO5	The students would be able to find the expected queue length, the ideal time, the traffic intensity and the waiting time. These are very useful toolsin many engineering and data management problems in the industry. It is useful for all branches of engineering	Analyze

CO	CO-PO,PSOMapping (3/2/1indicatesstrengthofcorrelation)3-Strong,2-Medium,1-Weak														

CO	POs												PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO1	3	2	2	3	1	-	-	-	3	-	-	1	3	2	2
CO2	3	2	2	3	3	-	-	-	-	-	-	1	3	2	2
CO3	3	2	2	3	2	-	-	-	2	-	-	2	3	2	2
CO4	3	2	2	2	1	-	-	-	3	-	-	2	3	2	2
CO5	3	2	2	3	2	-	-	-	3	-	-	2	3	2	2

2021-22 Onwards (MR21)	Malla Reddy Engineering College (Autonomous)	B.Tech. IV Semester		
Code: B0515	**Database Management Systems** (Common for CSE, IT, CSE(DS), CSE(AIML), CSE(CS), and CSE(IoT))	L	T	P
Credits: 3		3	-	-

Prerequisites : Data Structures

The purpose of learning this course is to:

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

MODULE-I: Introduction: [10 Periods]

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

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

MODULE-II: [09 Periods]

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

MODULE-III: [10 Periods]

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

PL/SQL Concepts- Cursors, Stored Procedure, Functions Triggers and Exceptional Handling. **Schema Refinement and Normal Forms**: **schema refinement**: Pitfalls in Relational database, decomposing bad schema, Functional Dependency–definition, trivial and non-trivial FD, closure of FD set, closure of attributes, irreducible set of FD, Normalization–1Nf, 2NF, 3NF, Decomposition using FD-dependency preservation, BCNF, Multi-valued dependency, 4NF, Join dependency and 5NF.

MODULE-IV: Transaction Management and Concurrency Control [10 Periods]

Transaction Concept, Transaction State, Implementation of Atomicity and Durability, Concurrent Executions, Serializability, Recoverability, Implementation of Isolation, Testing for serializability, Lock Based Protocols, Timestamp Based Protocols, Validation- Based

Protocols, Multiple Granularity, Recovery and Atomicity, Log–Based Recovery, Recovery with Concurrent Transactions, Deadlock

MODULE-V: Storage and Indexing   **[09 Periods]**

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

Text Books

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

References

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

E-RESOURCES:

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

Course Outcomes:

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

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			

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

2021-22 Onwards (MR21)	**Malla Reddy Engineering College** (Autonomous)	**B.Tech. IV Semester**		
Code: B0516	**Design and Analysis of Algorithms** (Common for CSE,) IT, CSE(DS), CSE(AIML), CSE(CS), and CSE(IoT)	**L**	**T**	**P**
Credits: 3		3	-	-

Prerequisites: Data Structures

Course Objectives:

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

MODULE I: Basics of Algorithm Design [09 Periods]

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

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

MODULE II: Algorithm Methods [10 Periods]

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

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

MODULE III: Dynamic Programming and Optimization Techniques [10 Periods]

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

B: Optimization Techniques - All pairs shortest path problem, travelling sales person problem, Reliability design.

MODULE IV: Backtracking and Branch and Bound [10 Periods]

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

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

MODULE V: NP-Hard and NP-Complete problems [09 Periods]

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

TEXTBOOKS:

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

REFERENCES:

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

E-RESOURCES:

1. https://comsciers.files.wordpress.com/2015/12/horowitz-and-sahani-fundamentals -of-computer- algorithms-2nd-edition.pdf
2. https://books.google.co.in/books?id=7qKXCzF1XC8C&printsec=frontcover&dq=T.H. Cormen,C
3. .E.Leiserson,+R.L.Rivest,and+C.Stein,+%22Introduction+to+Algorithms%22,+second +edition,+
PHI+Pvt.+Ltd./+Pearson+Education,ebook,pdf&hl=en&sa=X&ved=0ahUKEwjFupOR xdXTAh XLQo8KHU7FC5cQ6AEIKjAB#v=onepage&q&f=false
4. http://en.cnki.com.cn/Article_en/CJFDTOTAL-JFYZ200208019.htm
5. http://nptel.ac.in/courses/106101060/

Course Outcomes:

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

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

CO- PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COs	Programme Outcomes (POs)												PSOs		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	2	3	2									3	2	
CO2	3	2	3	2									3	2	
CO3	3	2	3	2									3	2	
CO4	3	2	3	2									3	2	
CO5	3	2	3	2									3	2	
CO6		2					2				1				

2021-22 Onwards (MR21)	**Malla Reddy Engineering College** (Autonomous)	**B.Tech. IV Semester**		
Code: B1202	**Web Technologies** (Common for CSE, IT, CSE(DS), CSE(AIML),CSE(CS), CSE(IT))	**L**	**T**	**P**
Credits: 3		3	-	-

Objectives

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

MODULE I: [10 Periods]

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

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

MODULE II: [09 Periods]

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

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

MODULE III: [10 Periods]

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

MODULE IV: [10 Periods]

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

MODULE V: [09 Periods]

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

TEXT BOOKS:

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

REFERENCES:

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

E-RESOURCES:
1. https://kakeboksen.td.org.uit.no/Database%20System%20Concepts%206th%20edition. pdf
2. http://agce.sets.edu.in/cse/ebook/DBMS%20BY%20RAGHU%20RAMAKRISHNAN. pdf
3. http://airccse.org/journal/ijdms/ijdms.html
4. http://www.springer.com/computer/database+management+%26+information+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:

CO	Statement	Blooms Taxonomy Level
CO1	Gain knowledge of client side scripting, validation of forms and AJAX programming	Understand
CO2	Have understanding of server side scripting with PHP language	Understand
CO3	Have understanding of what is XML and how to parse and use XML Data with Java	Apply
CO4	To introduce Server side programming with Java Servlets and JSP	Create

	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			

2021-22 Onwards (MR21)	Malla Reddy Engineering College (Autonomous)	B.Tech. IV Semester		
Code: B0522	Computer Graphics	L	T	P
Credits: 3	[Professional Elective - I]	3	-	-

Prerequisites: NIL

Course Objectives:

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

MODULE I: Introduction of Graphics [10 Periods]

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

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

MODULE II: Transforming and Viewing [10 Periods]

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

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

MODULE III: 3D Objects Representation [10 Periods]

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

B: Models and M ethods: BezierandB, Spline surfaces, Basic illumination models, polygon rendering methods.

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

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

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

MODULE V: Surface detection Methods and Animation [09 Periods]

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

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

TEXTBOOKS:

1. Donald Hearnand M.Pauline Baker, **"Computer Graphics C Version"**, Pearson Education.
2. Foley, VanDam, Feinerand Hughes, **"Computer Graphics Principles & practice"**, 2nd edition in C, Pearson Education.

REFERENCES:

1. Donald Hearnand M.Pauline Baker,**"Computer Graphics"**,2nd Edition,PHI/Pearson Education.
2. Zhigandxiang, Roy Plastock, Schaum's outlines,**"ComputerGraphics",**2nd edition, Tata Mc- Grawhill.
3. David F.Rogers, **"Procedural Elements for Computer Graphics"**, Tata Mc Grawhill,2nd edition.

E-RESOURCES:

1. http://www.hiteshpatel.co.in/ebook/cg/Computer_Graphics_C_Version.pdf
2. http://ptgmedia.pearsoncmg.com/images/9780321399526/samplepages/0321399528.pdf
3. http://social.cs.uiuc.edu/papers/pdfs/g5kar.pdf
4. http://ndl.iitkgp.ac.in/document/yVCWqd6u7wgye1qwH9xY7y_TqI7sLJ_1X3zVWNHh Vw SwBCdfRRvSTrPP45TFWuzrxWT5ea_k_dP1rirZCeNbWw

Course Outcomes:

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

CO	Statement	Blooms Taxonomy Level
CO1	Develop simple graphics applications.	Understand
CO2	Apply 2D objects transformations.	Understand
CO3	Use the Concepts of 3D Object representations.	Apply
CO4	Design 3D object transformations and viewing.	Create
CO5	Build Animation sequences.	Create

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

2021-22 Onwards (MR21)	Malla Reddy Engineering College (Autonomous)	B.Tech. IV Semester		
Code: B1203	**Neural Networks**	**L**	**T**	**P**
Credits: 3	[Professional Elective - I]	3	-	-

Prerequisite: NIL

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

Module I: Basic Learning Algorithms   [09 Periods]

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

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

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

Support Vector Machines

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

Module III: A: Committee Machines   [12 Periods]

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

B: Neurodynamics Systems

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

Module IV: Attractor Neural Networks   [09 Periods]

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

-Continuous BAMs – Adaptive BAMs – Applications

Module V: Self Organizing Maps   [09 Periods]

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

TEXT BOOKS:

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

REFERENCES:

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

Course Outcomes:

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

CO	Statement	Blooms Taxonomy Level
CO1	Learn basic neural network architecture	Understand
CO2	Learn basic learning algorithms.	Understand
CO3	Understand data pre and post processing	Apply
CO4	Learn training, verification and validation of neural network models	Create
CO5	Design Engineering application that can learn using neural networks	Create

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

2021-22 Onwards (MR21)	Malla Reddy Engineering College (Autonomous)	B.Tech. IV Semester		
Code: B1204	**Android Application Development**	L	T	P
Credits: 3	[Professional Elective - I]	3	-	-

Prerequisite: NIL

Course Objectives:

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

Module I: Mobile and Information Architecture [10 Periods]

Introduction to Mobile: A brief history of Mobile, The Mobile Eco system, Need of Mobile, Types of Mobile Applications

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

Module II [10 Periods]

Introduction to Android: History of Mobile Software Development, The Open Handset Alliance Android platform differences. The Android Platform, Android SDK, Eclipse Installation, Android Installation, Building a Sample Android application.

Module III [10 Periods]

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

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

Module IV [09 Periods]

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

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

Module V [09 Periods]

Android APIs: Common Android APIs, Data and Storage APIs, Managing data using SQLite, Sharing Data between Applications with Content Providers. Networking APIs, Web APIs, Telephony APIs, Deploying Android Application

Text Books:

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

References:

1. Reto Meier, **"Professional Android 2 Application Development"**, Wiley India Pvt Ltd.

2. Mark L Murphy, **"Beginning Android"**, Wiley India Pvt Ltd.
3. Barry Burd, **"Android Application Development All in one"** Edition: I, Wiley India Pvt Ltd.

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

Course Outcomes

On successful completion of the course, a student will be able to:

CO	Statement	Blooms Taxonomy Level
CO1	Classify different types of Platforms.	Analyze
CO2	Appreciate the Mobility landscape.	Understand
CO3	Familiarize with Mobile apps development aspects.	Analyze
CO4	Design and develop mobile apps, using Android as development platform, with key focus on user experience design, native data handling and background tasks and notifications.	Create
CO5	Perform testing, signing, packaging and distribution of mobile apps.	Apply

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

2021-22 Onwards (MR21)	**Malla Reddy Engineering College** (Autonomous)	**B.Tech. IV Semester**		
Code: B0547	**Principles of Programming Languages**	**L**	**T**	**P**
Credits: 3	**[Professional Elective - I]**	**3**	**-**	**-**

Pre-requisites: Basic Mathematics in Computer Science

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

Module-I [10 Periods]

Preliminary Concepts: Reasons for studying programming languages, Programming domains, Language Evaluation Criteria, Influences on Language design, Language categories.

Programming Paradigms: Imperative, Object Oriented, functional Programming, Logic Programming. Implementation–Compilation and Virtual Machines, Programming Environments.

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

Module-II [9 Periods]

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

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

Module-III [9 Periods]

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

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

Module-IV [9 Periods]

Abstract Data types and Encapsulation: Introductions to Data Abstraction, Design Issues, Language Examples, Parameterized ADT, Encapsulation Constructs, Object Oriented Programming in

small talk, C++, Java, C#.

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

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

Module-V   **[10 Periods]**

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

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

Text Books:

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

Suggested Reading:

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

E-Resources:

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

Course Outcomes:

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

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

	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	PO12	PSO1	PSO2	PSO3
CO1	3	3	3			3				2		3	3	3	
CO2	2	3	3												1
CO3	3		3			2				3		2	3	3	
CO4		2	1			1				1		1			2
CO5	3	1										1			

2021-22 Onwards (MR21)	Malla Reddy Engineering College (Autonomous)	B.Tech. IV Semester		
Code: B0518	Free & Open-Source Software's	L	T	P
Credits: 3	[Professional Elective - I]	3	-	-

Unit I : Introduction [10 Periods]

Introduction: Open Source, Free Software, Free Software vs. Open Source software, Public Domain Software, FOSS does not mean no cost. History: BSD, The Free Software Foundation and the GNU Project. Methodologies Open Source History, Initiatives, Principle and methodologies. Philosophy : Software Freedom, Open Source Development Model Licenses and Patents: What Is A License, Important FOSS Licenses (Apache, BSD, GPL, LGPL), copyrights and copy lefts, Patents Economics of FOSS : Zero Marginal Cost, Income-generation opportunities, Problems with traditional commercial software, Internationalization

MODULE II : Social Impact [10 Periods]

Open source vs. closed source, Open source government, Open source ethics. Social and Financial impacts of open source technology, Shared software, Shared source, Open Source in Government.

MODULE III: Case Studies Example Projects: [10 Periods]

Apache web server, GNU/Linux, Android, Mozilla (Firefox), Wikipedia, Drupal, wordpress, GCC, GDB, github, Open Office. Study: Understanding the developmental models, licensings, mode of funding, commercial/non-commercial use. Open Source Hardware, Open Source Design, Open source Teaching. Open source media. Collaboration, Community and Communication

MODULE IV: [10 Periods]

Contributing to Open Source Projects Introduction to github, interacting with the community on github, Communication and etiquette, testing open source code, reporting issues, Icontributing code. Introduction to wikipedia, contributing to Wikipedia Or contributing to any prominent open source project of students choice Starting and Maintaining own Open Source Project.

MODULE V: Understanding Open Source Ecosystem Open Source Operating Systems: [10 Periods]

GNU/Linux, Android, Free BSD, Open Solaris. Open Source Hardware, Virtualization Technologies, Containerization Technologies: Docker, Development tools, IDEs, debuggers, Programming languages, LAMP, Open Source database technologies

Text books:
1. Unix Concepts and Applications by Sumitabha Das, Tata McGraw Hill Education, 2006.
2. The official Ubuntu Book, 8th Edition

Additional references:

1. The Linux Documentation Project: http://www.tldp.org/
2. Docker Project Home: http://www.docker.com
3. Linux kernel Home: http://kernel.org
4. Open Source Initiative: https://opensource.org/

5. Linux Documentation Project: http://www.tldp.org/
6. Wikipedia: https://en.wikipedia.org/
7. https://en.wikipedia.org/wiki/Wikipedia:Contributing_to_Wikipedia
8. Github: https://help.github.com/
9. The Linux Foundation: http://www.linuxfoundation.org/

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

CO	Statement	Blooms Taxonomy Level
CO1	Implement various applications using build systems	Apply
CO2	Understand the installation of various packages in open source operating systems	Understand
CO3	Create simple GUI applications using Gambas 3	Create
CO4	Understand various version control systems	Understand
CO5	Understand the kernel configuration and virtual environment	Understand

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

2021-22 Onwards (MR21)	Malla Reddy Engineering College (Autonomous)	B.Tech. IV Semester		
Code: B0520	**Database Management Systems Lab** (Common for CSE, IT,CSE(DS), CSE(AIML),CSE(CS), and CSE(IoT))	L	T	P
Credits: 2		-	1	2

Co-requisites

Co-requisite of course "Database Management Systems"

Course Objectives:

1. This course enables the students to practice the concepts learnt in the subject DBMS by developing a database for an example project.
2. The student is expected to practice the designing a database system using ER diagram, developing and querying a relational database using normalization techniques in the context of example database.
3. Students are expected to Learn SQL basics for data definition and data manipulation using "MySQL" database.
4. Students are expected to apply the learn developing database applications using procedures, cursors and triggers.

List of Experiments

1. Railway Reservation System -(Redesigning IRCTC database)
   Train (train Number, name, source, destination, start time, reach time, travel time, distance, class, days, type)
   Ticket (PNRNo, Transactinide, from station, To_station, date_of_journey, class date_of_booking, total_ticket_fare, train number)
   Passenger (PNR No, Serial no, Name, Age, Reservation_status)
   Train_Route(Train_No, route_no, station_code, name, arrival_time, depart_time, distance, day)
   Train_Ticket_fare(Train_No, class, base_fare, reservation_charge, superfast_charge, other_charge, tatkal_charge, service_tax)
   Create all the tables specified above. Make underlined columns as primary key.(use number, number(m,n), varchar(n), date, time, timestamp data types appropriately) Insert atleast 5 rows to each table. (Check www.irctc.co.in website for actual data)
   1. Use Interactive insertion for inserting rows to the table.
   2. Use ADT (vary) for class and days column in Train table.
2. Write simple DDL/DML Queries to
   1. Remove all the rows from Passenger table permanently.
   2. Change the name of the Passenger table to Passenger Details.
   3. List all train details.
   4. List all passenger details.
   5. Give a list of trains in ascending order of number.
   6. List the senior citizen passenger's details.
   7. List the station names where the code starts with 'M'.
   8. List the train's details within a range of numbers.
   9. Change the super-fast charge value in train fare as zero if it is null.
   10. List the passenger names whose tickets are not confirmed.
   11. List the base fare of all AC coaches available in each train. Find the ticket details where transaction id is not known.
   1) Use Interactive updating for updating the seat no for particular PNR NO.

2) Find the train names that are from Secunderabad to Mumbai, but do not have the source or destination in its name.

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

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

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

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

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

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

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

4. Use SQL PLUS functions to.

1. Find the passengers whose date of journey is one month from today.
2. Print the train names in upper case.
3. Print the passenger names with left padding character.
4. Print the station codes replacing K with M.
5. Translate all the LC in class column (Train_fare) to POT and display.
6. Display the fare details of all trains, if any value is ZERO, print as NULL value.
7. Display the pnrno and transaction id, if transaction id is null, print 'not generated'.
8. Print the date_of_jounrney in the format '27th November 2010'.
9. Find the maximum fare (total fare).
10. Find the average age of passengers in one ticket.
11. Find the maximum length of station name available in the database.
12. Print the fare amount of the passengers as rounded value.
13. Add the column halt time to train route.
14. Update values to it from arrival time and depart time. High Level:
15. Update values to arrival time and depart time using conversion functions.
16. Display the arrival time, depart time in the format HH:MI (24 hours and minutes).

5. Write Queries to. Use SET Operators

1. Find the train numbers for which reservation have not yet been made.
2. Find the train names that donot have a first AC class coach.
3. Print all the PNR nos available in the database.
4. Find passenger names who have booked to 'Pune'. Use Nested Query(in Operators)
1. Find the train names that stop in 'Warangal'.
2. Find the train names that are superfast and the service tax is zero.
3. Find the Passenger name who have booked for the train that starts from 'Secunderabad'.
4. Find the trains names that have all the AC coaches and the base fare is less than 3000 for each case.

6. Use Join Query

1. Find the train names that stop in 'Warangal'.
2. Find the train names that are superfast and the service tax is zero.
3. Find the Passenger name (and train name) who have booked for the train that starts from 'Secunderabad'.
4. Display the trains names, each type of class and the total fare for each type of

class.

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

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

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

Use Coorelated (and nested) Query

1.   Find the train names for which ten tickets have been reserved.

2.   Find the trains that have more than ten substations.

3.   Find the passengers who do not pass through 'Kachiguda'.

4.   Find passengers who have booked for super fast trains.

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

    1.   Take the start station code and end station code and display the train details.

    2.   List the train names and the number of sub stations it has.

    3.   List the stations where all types of trains stop.

    4.   List the trains names that has atleast four bookings.

    5.   Create a table cancellation history (Insert values from ticket and passenger table).

    6.   Create a table for all the train numbers and class available in train_ticket_fare with total seats.

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

8.   Write a simple PL/SQL block to.

    1.   Print the fibonacci series.

    2.   Print the factorial of a given number.

    3.   Print 'NOT confirmed' based on the reservation status, of a particular passenger.

    4.   Print the total seats available for a particular train and for a particular class.

9.   Write a cursor for the following.

    1.   Retrieve the passenger details for ─X train number and given journey date.

    2.   Display the train name (once) and the substation names.

    3.   Display the fare details of a particular train(use basic exceptions)

    4.   Write a cursor to update the reservation status of the passengers (generate seat number, if seats

have reached maximum, put waiting list number (30% of total seats), if waiting list number reaches maximum, put PQWL (10% of total seats), RAC-20%)

10. 1.   Write a PL/SQL procedure to.

    a.   List the details of passengers who has reserved next to ─Mr. X.

    b.   PNR No. of a passengers for a given source and a destination.

    2. Write a PL/SQL function to.

    a.   Get the PNRNo and return the total ticket fare.

    b.   Get the Passenger name, train no and return the total journey time in hour's and minutes.

11. Write a Trigger for the following:

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

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

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

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

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

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

Textbooks:

1. Database Management Systems, Raghurama Krishnan, Johannes Gehrke, Tata Mc Graw Hill 3rd Edition

2. Database System Concepts, Silberschatz, Korth, Mc Graw hill, V edition.

References:

1. Database Systems design, Implementation, and Management, Peter Rob & Carlos Coronel, 7th

2. Edition.

3. SQL The Complete Reference, James R. Groff, Paul N. Weinberg, 3rd Edition,

4. Oracle for Professionals, The X Team, S.Shah and V. Shah, SPD.

5. Database Systems Using Oracle: A Simplified guide to SQL and PL/SQL,Shah,PHI.

Outcomes:

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

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

2021-22 Onwards (MR21)	Malla Reddy Engineering College (Autonomous)	B.Tech. IV Semester		
Code: B0521	**Design and Analysis of Algorithms Lab** (Common for CSE, IT,CSE(DS),CSE(AIML),CSE(CS),and CSE(IoT))	**L**	**T**	**P**
Credits: 1.5		-	-	3

COURSE OBJECTIVES:

This course will make students.

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

Software Requirements: Turbo C++ / JDK

LIST OF PROGRAMS:

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

TEXTBOOKS

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

REFERENCES

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

2. R.C.T.Lee, S.S.Tseng, R.C.Chang and T.Tsai, **"Introduction to Design and Analysis of Algorithms A strategic approach"**, Mc GrawHill.

COURSE OUTCOMES:

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

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

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

2021-22 Onwards (MR21)	Malla Reddy Engineering College (Autonomous)	B.Tech. IV Semester		
Code: B1206	**Web Technologies Lab** (Common for CSE, IT, CSE(DS),CSE(AIML),CSE(CS),and CSE(IoT))	L	T	P
Credits: 1.5		-	-	3

Pre-requisites:

A Course on "Objected Oriented Programming"

Course Objectives:

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

Software's Required: JDK, BDK, Tomcat Server, Mysql, PHP

List of Programs:

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

Textbooks:

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

References:

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

Outcomes:

CO	Course Outcome	Bloom's Taxonomy Level
CO1	Design and develop interactive and dynamic web applications using HTML, CSS, JavaScript and XML	Understand
CO2	Apply client-server principles to develop scalable and enterprise web applications.	Apply
CO3	Utilize the concepts of JavaScript and Java to efficient front end web applications.	Apply

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

2021-22 Onwards (MR21)	Malla Reddy Engineering College (Autonomous)	B.Tech. IV Semester		
Code: B00M2	**Environmental Science**	L	T	P
Credits: NIL	((Common for CSE, IT,CSE(DS),CSE(AIML),CSE(CS),and CSE(IoT))	2	-	-

Pre-Requisites: NIL

Objectives

1. Creating the awareness about environmental problems among students.

2. Imparting basic knowledge about the environment and its allied problems.

3. Developing an attitude of concern for the environment.

4. Motivating students to participate in environment protection and environment improvement.

MODULE–I: Multidisciplinary Nature of Environmental Studies

Definition, Scope and Importance – Need for Public Awareness

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

MODULE–II: Ecosystems

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

a.   Forest ecosystem

b.   Grassland ecosystem

c.   Desert ecosystem

d.   Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

MODULE–III: Biodiversity and Its Conservation

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

MODULE – IV: Environmental Pollution and Control

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

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

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

(ODS). Deforestation and desertification, International conventions / Protocols: Earth summit, Kyoto protocol, and Montréal Protocol.

MODULE–V: Social Issues and the Environment

From Unsustainable to Sustainable Development- Urban problems related to energy - Water conservation, rain water harvesting, water shed management - Resettlement and rehabilitation of people; its problems and concerns. Case Studies -

Environmental Ethics:

Issues and possible solutions: Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies -Wasteland reclamation. – Consumerism and waste products. - Environment Protection Act. -Air (Prevention and Control of Pollution) Act. –Water (Prevention and control of Pollution) Act -Wildlife Protection Act -Forest Conservation Act -Issues involved in enforcement of environmental legislation. -Public awareness.

HUMAN POPULATION AND THE ENVIRONMENT: Population growth, variation among nations, Population explosion - Family Welfare Programme. -Environment and human health. - Human Rights. -Value Education. -HIV/AIDS. -Women and Child Welfare. -Role of information Technology in Environment and human health. –Case Studies.

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

References:
1. Textbook of Environmental Sciences and Technology by M. Anji Reddy, BS Publication.

Course Outcomes

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

CO	Course Outcome	Bloom's Taxonomy Level
CO1	Identify and analyze environmental problems as well as the risks associated with these problems	Analyze
CO2	Understand what it is to be a steward in the environment	Develop
CO3	Studying how to live their lives in a more sustainable manner	Analyze

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

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

2021-22 Onwards (MR21)	Malla Reddy Engineering College (Autonomous)	B.Tech. V Semester		
Code: B0525	**Software Engineering and Modeling** (Common for CSE, IT CSE (CS), CSE(AI ML), CSE (DS), CSE (IOT), and AIML)	**L**	**T**	**P**
Credits: 3		3	-	-

Course Objectives:

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

Module I: Introduction to Software Engineering [09 Periods]

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

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

Module II: Requirements of Software Engineering [09 Periods]

Software Requirements: Functional and non functional requirements, User requirements, System requirements, Interface specification, the software requirements document.

Requirements Engineering Process: Feasibility studies, requirements elicitation and analysis, requirements validation, requirements management

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

Module III: Phases of Software Engineering [09 Periods]

Design Engineering: Design process and design quality, design concepts the design model Creating

Architectural design: software architecture, data design, architectural styles and patterns, architectural design, conceptual model of UML, basic structural modeling, class diagrams, sequence diagrams, collaboration diagrams, use case diagrams, component diagrams.

Module IV: Test Strategies [09 Periods]

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

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

Module V: Risk Management [09Periods]

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

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

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

References:
1. Pankaj Jalote- An Integrated Approach to Software Engineering, Springer Verlag,1997.
2. James F Peters and WitoldPedryez, ―Software Engineering – An Engineering Approach, John Wiley and Sons, New Delhi,2000.
3. AliBehforooz and Frederick J Hudson, ―Software Engineering Fundamentals, Oxford University Press, New Delhi,1996.

E Resources:
1. https://books.google.co.in/books?id=bL7QZHtWvaUC&printsec=frontcover&dq=software +engineering+by+roger+pressman+vth+edition+free+download&hl=en&sa=X&ved=0ahU KEwiLkOz-pL_TAhWIuI8KHZSxD2cQ6AEIMDAC#v=onepage&q&f=false
2. https://books.google.co.in/books?id=PqsWaBkFh1wC&printsec=frontcover&dq=software+ engineering+by+ian+sommerville+FREE+download&hl=en&sa=X&ved=0ahUKEwjjv5fh pb_TAhUHOo8KHY5OAC4Q6AEIKjAB#v=onepage&q=software%20engineering%20by %20ian%20sommerville%20FREE%20download&f=false
3. http://ieeexplore.ieee.org/document/4807670/
4. https://link.springer.com/search?facet-journalid=40411&package=openaccessarticles& query=&facet-sub-discipline=%22Software+Engineering%22
5. http://freevideolectures.com/Course/2318/Software-Engineering
6. http://freevideolectures.com/Course/2318/Software-Engineering/5

Course Outcomes:

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

CO	Course Outcome	Bloom's Taxonomy Level
CO1	Analyze the customer business requirements and choose the appropriate Process model for the given project	Analyze
CO2	Elicit functional and non-functional requirements using rigorous engineering methodology	Develop
CO3	Conceptualize and achieve requirements defined for the system using Architectural styles and Design patterns	Analyze
CO4	Design test cases and define metrics for standardization	Apply
CO5	Assess, mitigate and monitor the risks and assuring quality standards	Apply

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

2021-22 Onwards (MR21)	Malla Reddy Engineering College (Autonomous)	B.Tech. V Semester		
Code: B1207	**Theory of Automata**	L	T	P
Credits: 3		3	-	-

Prerequisites: NIL

Course Objectives:

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

Module-I: Finite Automata [10 Periods]

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

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

Module-II: Regular Expression and Languages [10 Periods]

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

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

Module-III: Context Free Grammars and Push Down Automata [10 Periods]

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

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

Module-IV: Turing Machines [9 Periods]

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

Module-V: Undecidability [9 Periods]

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

Text Book:

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

Reference Books:

1. John C Martin, "Introduction to Language and Theory of Computation", 3rd Edition, TMH, 2003.
2. Daniel Cohen "Introduction to Computer Theory", 2nd Edition, Wiley Publications, 2007.
3. Mishra K., Chandrasekaran N.," Theory of Computer Science (Automata, Languages and Computation), 3rd Edition, Prentice Hall of India 2008.
4. Shyamalendra Kandar" Introduction to Automata Theory, Formal Languages and Computation‖, Pearson, 2013.

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

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

CO	Course Outcome	Bloom's Taxonomy Level
CO1	Design finite automata, RE's for a given language.	Analyze
CO2	Define properties of RL's, Design grammars, minimize FA and also apply the concept of pumping lemma to prove that certain languages are not regular.	Develop
CO3	Design PDA's for various CFG's and CFL's, simplify the CFG's, define properties of CFL's.	Analyze
CO4	Define programming techniques of Turing machines and design Turing machines for decidable problems.	Apply
CO5	Apply mathematical and formal techniques for solving problems in computer science and also define concepts of computability theory, and complexity theory.	Apply

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

2021-22 Onwards (MR21)	Malla Reddy Engineering College (Autonomous)	B.Tech. V Semester		
Code: B6201	**Computer Networks**	L	T	P
Credits: 3	(Common for CSE, IT CSE (CS), CSE(AI ML), CSE (DS), CSE (IOT), and AIML)	3	-	-

Prerequisites: NIL

Course Objectives:

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

Module-I: Basics of Networking and Physical Layer   **[10 Periods]**

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

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

Module-II: Data Link Layer   **[11 Periods]**

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

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

Module-III: Network Layer   **[09 Periods]**

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

Module-IV: Transport Layer   **[09Periods]**

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

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

Module-V: Application layer   **[09Periods]**

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

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

Text Books:

1. Behrouz A. Forouzan, **"Data Communications and Networking"**, 4thEdition,TMH, 2006.
2. Andrew S Tanenbaum, **"Computer Networks"**, 4th Edition, PearsonEducation/PHI.

References:

1. P.C .Gupta, **"Data communications and computer Networks"**, PHI.
2. S.Keshav, **"An Engineering Approach to Computer Networks"**, 2nd Edition,

Pearson Education.

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

E-Resources:

1. https://www.saylor.org/site/wp-content/uploads/2012/02/Computer-Networking-Principles- Bonaventure-1-30-31-OTC1.pdf
2. http://ebook-dl.com/downloadbook/230
3. https://doi.org/10.1016/0169-7552(89)90019-6
4. http://nptel.ac.in/courses/106105081/

Course Outcomes:

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

CO	Course Outcome	Bloom's Taxonomy Level
CO1	Understand the Layered Architecture of Computer Networks.	Undestand
CO2	Conceptualize the protocols of Data Link Layer and can build Local area networks.	Analyze
CO3	Apply Subnet and Supernet concepts in the construction of computer network.	Apply
CO4	Summarize the protocols used in Transport Layer, QoS and Congestion control mechanisms.	Undestand
CO5	Analyze different protocols of Application Layer and various security risks.	Analyze

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

2021-22 Onwards (MR21)	Malla Reddy Engineering College (Autonomous)		B.Tech. V Semester		
Code: B7301	Artificial Intelligence-I IT	L	T	P	
Credits: 3		3	-	-	

Pre-Requisites:

- Basic Programming in Python
- Data Structures

Objectives:

To develop semantic-based and context-aware systems to acquire, organize process, share and use the knowledge embedded in multimedia content. Research will aim to maximize automation of the complete knowledge lifecycle and achieve semantic interoperability between Web resources and services. The field of Robotics is a multi disciplinary as robots are amazingly complex system comprising mechanical, electrical, electronic H/W and S/W and issues germane to all these.

Module-I: Overview of AI   **[9 Hours]**

AI problems, foundation of AI and history of AI intelligent agents: Agents and Environments, the concept of rationality, the nature of environments, structure of agents, problem solving agents, problem formulation.

Module-II: Searching   **[9 Hours]**

Searching- Searching for solutions, uniformed search strategies – Breadth first search, depth first Search. Search with partial information (Heuristic search) Hill climbing, A*, AO* Algorithms, Problem reduction, Game Playing-Adversial search, Games, mini-max algorithm, optimal decisions in multiplayer games, Problem in Game playing, Alpha-Beta pruning, Evaluation functions**.**

Module -III: Knowledge Representations   **[10 Hours]**

Knowledge representation issues, predicate logic- logic programming, semantic nets- frames and inheritance, constraint propagation, representing knowledge using rules, rules-based deduction systems. Reasoning under uncertainty, review of probability, Baye's probabilistic interferences and dempstershafer theory.

Module -IV: Natural Language Processing   **[10 Hours]**

First order logic. Inference in first order logic, propositional vs. first order inference, unification & lifts forward chaining, Backward chaining, Resolution, learning from observation Inductive learning, Decision Trees, Explanation based learning, Statistical Learning methods, Reinforcement Learning.

Module -V: Expert Systems   **[9 Hours]**

Introduction, structure of expert systems, the human element in expert systems how expert systems works, problem areas addressed by expert systems, expert systems success factors, types of expert systems, expert systems and the internet interacts web, knowledge engineering, scope of knowledge, difficulties in knowledge acquisition, methods of knowledge acquisition, machine learning, intelligent agents, selecting an appropriate

knowledge acquisition method, societal impacts reasoning in artificial intelligence.

Text Books:
1. S. Russel and P.Norvig, "Artificial Intelligence–A Modern Approach", Second Edition, Pearson Education
2. David Poole, Alan Mackworth, Randy Goebel," Computational Intelligence: a logical approach", Oxford University Press.
3. G. Luger, "Artificial Intelligence: Structures and Strategies for complex problem solving", Fourth Edition, Pearson Education.
4. J. Nilsson, "Artificial Intelligence: A new Synthesis", Elsevier Publishers.

References:
1. https://nptel.ac.in/courses/106105077
2. https://nptel.ac.in/courses/106106126
3. https://aima.cs.berkeley.edu
4. https://ai.berkeley,edu/project_overview.html (for Practical's)

Course Outcomes:

After undergoing this course, the students will be able to:

CO	Course Outcome	Bloom's Taxonomy Level
CO1	Understanding fundamentals of AI and LISP	Understand
CO2	Understanding about Search and Control Strategies	Analyze
CO3	Understand different types of Knowledge Representations	Analyze
CO4	Understand how to process Natural Language	Apply
CO5	Understand of expert systems and Learning process	Understand

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

2021-22 Onwards (MR21)	**Malla Reddy Engineering College** (Autonomous)	**B.Tech.** **V Semester**		
Code: B7307	**Optimization Techniques**	**L**	**T**	**P**
Credits: 3	**[Professional Elective - II]**	**3**	**-**	**-**

Prerequisites:
- Ability to program in some language
- Prior exposure to fields such as machine learning, signal processing, operations research

Course Objectives:
- To introduce the basic concepts of linear programming
- To educate on the advancements in Linear programming techniques
- To introduce non-linear programming techniques
- To introduce the interior point methods of solving problems
- To introduce the dynamic programming method

Module-I [9 Periods]

Linear Programming: Introduction - formulation of linear programming model-Graphical solution–solving LPP using simplex algorithm – Revised Simplex Method.

Module-II: [8 Periods]

Advances In LPP: Duality theory- Dual simplex method - Sensitivity analysis–-Transportation problems– Assignment problems-Traveling sales man problem - Data Envelopment Analysis.

Module-III: [12 Periods]

Non Linear Programming: Classification of Non Linear programming – Lagrange multiplier method – Karush – Kuhn Tucker conditions–Reduced gradient algorithms–Quadratic programming method – Penalty and Barrier method.

Module-IV: [10Periods]

Interior Point Methods: Karmarkar's algorithm–Projection Scaling method–Dual affine algorithm–Primal affine algorithm Barrier algorithm.

Module-V: [11 Periods]

Dynamic Programming: Formulation of Multi stage decision problem– Characteristics–Concept of sub- optimization and the principle of optimality–Formulation of Dynamic programming– Backward and Forward recursion– Computational procedure– Conversion of final value problem in to Initial value problem.

Text Books
- Hillier and Lieberman "Introduction to Operations Research", TMH, 2000.
- R. Panneerselvam, "Operations Research", PHI, 2006.
- Hamdy ATaha, "Operations Research –An Introduction", Prentice Hall India, 2003

Reference Books:

1. Philips, Ravindran and Solberg, "Operations Research", John Wiley, 2002.
2. Rardin, "Optimization in Operation Research" Pearson Education Pvt. Ltd. New Delhi, 2005.

Course Outcomes:

CO	Course Outcome	Bloom's Taxonomy Level
CO1	Understand the concepts of linear programming	Understand
CO2	Apply Linear programming techniques	Analyze
CO3	Apply non-linear programming techniques	Analyze
CO4	To solve problems using interior point methods	Apply
CO5	Understand the dynamic programming	Understand

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

2021-22 Onwards (MR21)	Malla Reddy Engineering College (Autonomous)	B.Tech. V Semester		
Code: B1209	Data Analysis and Visualization	L	T	P
Credits: 3	[Professional Elective –II]	3	-	-

Pre-requisites : Nil

Course Objectives:
To Introduce the Numpy library in Python to support storage and operations on large multi-dimensional arrays and matrices
1. To Introduce large collection of mathematical functions to operate on multidimensional sequential data structures
2. To Demonstrate the functionality of the Pandas library in Python for open-source data analysis and Manipulation
3. To Demonstrate Data Aggregation, Grouping and Time Series analysis with Pandas
4. To Introduce the Matplotlib library in Python for resting static, animated and interactive visualizations

Module-I: [10 Periods]

Introduction to NumPy: Data types in Python-Fixed type arrays, creating arrays, array indexing, array slicing, reshaping arrays, array concatenation and splitting, Universal Functions, Aggregations, Broadcasting rules, Comparisons, Boolean Arrays, Masks, Fancy Indexing, Fast Sorting using np.sort and np.argsort, partial sorting-partitioning with K-nearest neighbors, Creating Structured Arrays, Compound types and Record Arrays.

Module-II: [9 Periods]

Introduction to Pandas: Series Object, Data Frame Object, Data Indexing and Selecting for Series and Data Frames, Universal Functions for Index Preservation, Index Alignment and Operations between Series and Data Frames, handling missing data, Operating on Null values, Hierarchical Indexing.

Module-III: [9 Periods]

Combining Datasets: Concat, Append, Merge and Joins, Aggregation and Grouping, Pivot Tables, Vectorized String Operations, Working with Time Series, High-Performance functions-query () and eval()

Module-IV: [8 Periods]

Inferential Statistics-Normal distribution, Poisson distribution, Bernoulli distribution, z-score, p-score, One-tailed and two-tailed, Type 1 and Type-2 errors, Confidence interval, Correlation, Z-test vs T-test, F-distribution, Chi-square distribution, the chi-square test of independence, ANOVA, data mining, Heart attack dataset analysis

Module-V: [9 Periods]

Visualization with Matplotlib: Simple Line plots, Scatter plots, Visualizing errors, Density and Contour plots, Histograms, Binnings, Multiple subplots, Three-dimensional plotting with Matplotlib, Geographic data with Basemap, Visualization with Seaborn.

Text Books:
1. Jake VanderPlas, "Python Data Science Handbook", O'Reilly Media, 2016.
2. Samir Madhavan, "Mastering Python for Data Science", Packt Publishing, 2015.

E-Resources:
1. https://www.coursera.org/learn/python-data-analysis?specialization=data-science-python
2. https://www.coursera.org/learn/python-plotting

Course Outcomes:

Upon completing this course, students will be able to:

CO	Course Outcome	Bloom's Taxonomy Level
CO1	Efficiently store and manipulate dense data in arrays with Numpy	Understand
CO2	Apply high level mathematical functions to aggregate, broadcast, index and sort multidimensional arrays.	Analyze
CO3	Create Series and Data Frame objects to operate on datasets.	Analyze
CO4	Perform Data cleaning, transformation, merging, aggregation on datasets.	Apply
CO5	Apply 2-D and 3-D plotting techniques on datasets	Understand

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

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

2021-22 Onwards (MR21)	Malla Reddy Engineering College (Autonomous)	B.Tech. V Semester		
Code: B6706	R Programming	L	T	P
Credits: 3	[Professional Elective–II]	3	-	-

Prerequisites: programming for problem solving

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

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

Module-I [09 periods]

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

Module-II [08 periods]

R Data Types: Vectors, Lists, Matrices, Arrays, Factors, Data Frame
Variables: Variable assignment, Data types of Variable, Finding Variable ls(), Deleting Variables - **Operators**: Arithmetic Operators, Relational Operators, Logical Operator, Assignment Operators, Miscellaneous Operators –
Decision Making: if statement, if – else statement, if– else if statement, switch statement
R Loops: repeat loop, while loop, for loop - Loop control statement: break statement, next statement.

Module-III [10 periods]

R-Function : function definition, Built in functions: mean(), paste(), sum(), min(), max(), seq(), user-defined function, calling a function, calling a function without an argument, calling a function with argument values - R-Strings – Manipulating Text in Data: substr(), strsplit(), paste(), grep(), toupper(), tolower() - R Vectors – Sequence vector, rep function, vector access, vector names, vector math, vector recycling, vector element sorting
R List - Creating a List, List Tags and Values, Add/Delete Element to or from a List, Size of List, Merging Lists, Converting List to Vector
R Matrices – Accessing Elements of a Matrix, Matrix Computations: Addition, subtraction, Multiplication and Division
R Arrays: Naming Columns and Rows, Accessing Array Elements, Manipulating Array Elements, Calculation Across Array Elements
R Factors –creating factors, generating factor levels gl().

Module-IV [10 periods]

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

rows in a Data frame rbind() and cbind() – Merging Data frames merge() – Melting and Casting data melt(), cast().

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

Module-V   **[9 periods]**

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

Text Books

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

References:

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

E-Resources:

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

Course Outcomes:

After completion of the course, students will be able to

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

COS	CO- PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
	Programme Outcomes(POs)												PSOs		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO1	PSO 2	PSO 3
CO1	1	2			2								1		
CO2			3											2	
CO3					3									2	
CO4				2											
CO5			3		3									3	3

2021-22 Onwards (MR21)	**Malla Reddy Engineering College** (Autonomous)	**B.Tech.** **V Semester**		
Code: B1208	**Information Retrieval** [Professional Elective-II]	**L**	**T**	**P**
Credits: 3		**3**	**-**	**-**

Prerequisites: Databases

Course Objectives:

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

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

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

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

Module-II: Cataloging and Indexing [9 Periods]

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

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

Module-III: Automatic Indexing [9 Periods]

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

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

Module-IV: User Search Techniques [10 Periods]

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

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

Module-V: Text Search Algorithms [9 Periods]

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

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

Text Book

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

References

1. Frakes, W.B., Ricardo Baeza-Yates: Information Retrieval Data Structures and Algorithms, Prentice Hall, 1992.

2. Information Storage & Retrieval By Robert Korfhage – John Wiley & Sons.
3. Modern Information Retrieval By Yates and Neto Pearson Education.

Course Outcomes:

CO	Course Outcome	Bloom's Taxonomy Level
CO1	Ability to apply IR principles to locate relevant information large collections of data	Understand
CO2	Ability to design different document clustering algorithms	Analyze
CO3	Implement retrieval systems for web search tasks.	Analyze
CO4	Design an Information Retrieval System for web search tasks.	Apply

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

2021-22 Onwards (MR21)	Malla Reddy Engineering College (Autonomous)	B.Tech. V Semester		
Code: B0535	**Multimedia and Rich Internet Applications** [Professional Elective–II]	**L**	**T**	**P**
Credits: 3		**3**	**-**	**-**

Prerequisites: NIL

Course Objectives:

1. This course aims to further develop students' competency in producing dynamic and creative graphic solutions for multimedia productions.
2. It provides students with the basic concepts and techniques of interactive authoring.
3. It introduces students with the advanced scripting skills necessary for implementing highly interactive, rich internet applications using multimedia technologies and authoring tools.
4. Students will develop aesthetic value and competencies in multimedia authoring.
5. Artistic visual style and layout design are stressed, as well as the editing and integration of graphic images, animation, video, and audio files.
6. The course allows students to master industry-wide software and technologies to create highly interactive, rich internet applications.

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Module-I: [09 Periods]

MRIA Fundamental concepts in Text and Image Multimedia and hypermedia, World Wide Web, overview of Multimedia software tools. Graphics and Image data represent from graphics Image data types, file formats. color in image and Video colors science, color Models in images color Models in video

Module-II: [10 Periods]

Fundamental concepts in video and digital audio: Types of Video signals analog video, digital video, and digitization of sound MIDT, quantization and transmission of audio Multimedia Data compression Lossless compression algorithms, lossy Compression algorithms. Image compression standards

Module-III: [12 Periods]

Basic video compression techniques-Case study: MPEG video coding I, Basic Audio compression techniques case study MPEG Audio compression, web 2.0 what is web 2.0, search, content Networks, user Generated content, Blogging.. Social Networking, social Media. Tagging, Social Marking, Rich Internet Applications, web services. Marshups, Location Based Services, XMC, RSS, Atom, json, and VOIP web 2.0 Monetization and Business Models, Future of the web

Module-IV: [14 Periods]

Rich Internet Applications (RIAS) with Adobe Flash: Adobe Flash - Introduction, Flash Movie Development, Learning Flash with Hands-on Examples Publish your Flash(with Hands-on Examples) Movie, creating special effects with Flash Creating a website splash screen, action Script, web sources. Rich Internet Application (RIAS) with Flex 3-Introduction, Developing with Flex 3, working with components, Advanced Component Development, visual effects and Multimedia

Module-V: [10 Periods]

Ajax-Enabled Rich Internet Application: Introduction, Traditional web Applications us Ajay Applications, Rich Internet Application with Ajax, History of Ajax Raw Ajax example using xml http request object. Using XML, Creating a full scale Ajax Enabled application. Dojo Toolkit.

Text Books:

1. Multimedia Communications: Protocols and Applications, Franklin F Kuo, J.Joaquin Garcia, Wolf gang Effelsberg, Prentice Hall Publications.
2. Multimedia Communications: Applications, Networks, Protocols and Standards, Fred Halsall, Addison Wesley Publications.
3. AJAX, Rich Internet Applications, and Web Development for Programmers, Paul J Deitel and Harvey M Deitel, Deitel Developer Series, Pearson education.

Reference Books:

1. Professional Adobe Flex 2, Rich Tretola, Simon barber and Renaun Erickson, Wrox, Wiley India Edition.
2. Multimedia Information Networking, Nalin K Sharda, PHI Learning.
3. Multimedia Computing, Communications & Applications, Ralf Steinmetz and Klara Nahrstedt, Pearson Education.
4. Multimedia Communication Systems: techniques, standards and networks, K.R.Rao, Bojkovi and Milovanovic, PHI Learning.
5. Programming Flex 3, C. Kazoun and J. Lott, SPD.
6. Dojo, J.E. Harmon, Pearson Education.
7. Adobe Flex 3: Training from the Source, Tapper & others, Pearson Education.
8. Principles of Multimedia, R.Parekh, TMH.
9. Mastering Dojo, R. Gill, C. Riecke and A. Russell, SPD.

Course Outcomes:

CO	Course Outcome	Bloom's Taxonomy Level
CO1	Understand the basic MRIA Fundamental concept	Understand
CO2	Ability to understand the fundamental concepts in video and digital audio	Analyze
CO3	Analyze the Rich Internet Applications (RIAS) with Adobe Flash	Analyze
CO4	Ability to create and design rich internet applications.	Apply
CO5	Ability to develop different multimedia tools to produce web based and independent user interface	Understand

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

2021-22 Onwards (MR21)	**Malla Reddy Engineering College** (Autonomous)	**B.Tech. V Semester**		
Code: B0159	**GREEN BUILDINGS** [OPEN ELECTIVE-I]	**L**	**T**	**P**
Credits: 3		**3**	**-**	**-**

Prerequisite: Nil

Course Objective: The purpose of the course is provide an overview of emerging delivery systems for high performance green buildings and the basis on which their sustainability can be evaluated.

MODULE I: [09 Periods]
Introduction to green buildings, green materials, sources of green materials, high-performance green buildings Impacts of building construction, operation, and disposal Methods and tools for building assessment, Green Globes

MODULE II: [10 Periods]
The green building process, Design and construction relationships, benefits of green building quality, healthy and safe environments , Site and landscape strategies.

MODULE III: [10 Periods]
A: Building energy system strategies, Water cycle strategies, Materials selection strategies, Indoor Environmental Quality [IEQ]
B: Analysis and strategies, Construction, team responsibilities and controls, Building commissioning strategies

MODULE IV: [10 Periods]
Economic issues and analysis, Use of the Green Strategies cost estimating tool, Future directions in green, high performance building technologies

MODULE V: [10Periods]
Carbon accounting Green Building Specification, Case Study on green buildings, Net Zero Energy Buildings, Sustainable Constructions in civil Engineering.

TEXT BOOKS:

1. Abe Kruger and Carl Seville, " Green Building, Principles and Practices in Residential Construction", Cengage Publications, 1st edition, 2012.

2. Ross Spiegel, Dru Meadows, "Green Building Materials: A Guide to Product Selection and Specification", 3rd Edition, 2010.

REFERENCES:
1. Charles J. Kibert, "Sustainable Construction: Green Building Design and Delivery", 2012

E RESOURCES:
1. http://www.ncrec.gov/Pdfs/bicar/GreenBuilding.pdf

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

1. Identify green building materials and their sources.
2. Understand the construction process of green buildings and their benefits quality,

healthy and safe environments.
3. Learn the strategies to construct green buildings.
4. Identify the issues a raised due to construction of green buildings.
5. Gain knowledge on the case studies of green buildings.

| COS | CO-PO MAPPING (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak |

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

2021-22 Onwards (MR21)	**Malla Reddy Engineering College** (Autonomous)	**B.Tech. V Semester**		
Code: B0535	**Software Engineering and Modeling Lab** Common for CSE, IT, CSE (CS), CSE (AIML), CSE (DS), CSE (IOT),and AIML)	**L**	**T**	**P**
Credits: 1.5		-	-	3

Co-requisite

A Course on "Software Engineering"

Course Objectives

1. To understand the software engineering methodologies involved in the phases for project development.

2. To gain knowledge about open source tools used for implementing software engineering methods.

3. To exercise developing product-startups implementing software engineering methods and modeling techniques.

Open source Tools: StarUML / UMLGraph / Topcased.

List of Experiments

Software Engineering: Do the following 8 exercises for any projects given in the list of sample projects or any other projects:

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

Sample Case Studies:

1. Passport automation System
2. Book Bank
3. Online Exam Registration
4. Stock Maintenance System
5. Online course reservation system
6. E-ticketing
7. Software Personnel Management System
8. Credit Card Processing
9. E-book management System.
10. Recruitment system

Modeling: (Develop modeling the below modeling diagrams for the above sample case study)

1. Design a Class Diagram
2. Design a Use case Diagram
3. Design a Sequence and Collaboration Diagrams

4. Design a Activity and State Chart Diagrams
5. Design a Interaction and Component Diagrams
6. Design a Deployment Diagram.

Text Books:

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

Course Outcomes

CO	Course Outcome	Bloom's Taxonomy Level
CO1	Ability to translate end-user requirements into system and software requirements	Understand
CO2	Ability to generate a high-level design of the system from the software requirements	Analyze
CO3	Will have experience and/or awareness of testing problems and will be able to develop a simple testing report	Understand
CO4	Identify all structural and behavioral concepts of the entire system	Understand
CO5	Develop a model using UML concepts by different types of diagrams like Usecase Diagram, Class Diagram, Sequence Diagram etc	Analyze

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

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

Prerequisites: NIL Course Objectives:

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

Software Requirements: Turbo C / C++

List of Programs:

1. Implement the data link layer farming methods:
    a) Character Count
    b) Character stuffing and destuffing.
    c) Bit stuffing and destuffing

2. Implement on a data set of characters the three CRC polynomials: CRC-12, CRC-16 and CRC- 32.

3. Implement Parity Check using the following techniques
    a) Single Dimensional Data
    b) Multi Dimensional Data

4. Implement the Even and Odd parity.

5. Implementation of Data Link Protocols
    a) Unrestricted Simplex Protocol
    b) Stop and wait Protocol
    c) Noisy Channel

6. Implementation of Sliding Window Protocols
    a) One bit sliding window protocol
    b) Go Back N sliding window protocol
    c) Selective Repeat sliding window protocol

7. Write a code simulating ARP /RARP protocols

8. Implementation of Routing Protocols
    a) Dijkstra's algorithm
    b) Distance Vector routing protocol
    c) Link State routing protocol

9. Implement the congestion algorithms
    a) Token bucket algorithm
    b) Leaky bucket algorithm

10. Implement DES algorithm.
11. Implement RSA algorithm.
12. Write a program to implement client-server application using TCP

Text Books:

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

References:

1. P.C .Gupta, **"Data communications and computer Networks"**, PHI.
2. S.Keshav, **"An Engineering Approach to Computer Networks"**, 2nd Edition, Pearson Education.
3. W.A. Shay, **"Understanding communications and Networks"**, 3rd Edition, Cengage Learning.

Course Outcomes:

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

CO	Course Outcome	Bloom's Taxonomy Level
CO1	**Implement** the various Protocols	Understand
CO2	**Analyze** Various Congestion Control Mechanisms	Apply
CO3	**Implement** encryption mechanisms using Symmetric Key and Assymetric Key algorithms	Understand

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

2021-22 Onwards (MR21)	Malla Reddy Engineering College (Autonomous)	B.Tech. V Semester		
Code: B00M3	Quantitative Aptitude and Verbal Reasoning-I (Common for all)	L	T	P
Credits: -		2	-	-

2021-22 Onwards (MR21)	**Malla Reddy Engineering College** (Autonomous)	**B.Tech. VI Semester**		
Code: B0H08	**Engineering Economics and Accountancy** Common for CSE, IT , CSE (CS), CSE (AIML), CSE (DS), CSE (IOT) and AIML)	L	T	P
Credits: 3		3	-	-

Prerequisites: NIL Course Objectives:

EEA is a think beyond program which will make the student to examine the application of microeconomics theory as applied to the manager's responsibilities in an organization. To explain the basic principles of managerial economics, accounting and current business environment underlying business decision making. This course should emphasize the quantitative and qualitative applications of economic principle to business analysis.

Module-I: Business Environment and Managerial Economics   [10 Periods]

Business Environment - Characteristic features of Business, Features and evaluation of Sole Proprietorship, Partnership, Joint Stock Company, Public Enterprises and their types, Latest trends in Business Environment (Entrepreneurship).

Managerial Economics - Definition, Nature and Scope of Managerial Economics– Demand Analysis: Demand Determinants, Law of Demand and its exceptions. Elasticity of Demand, Types, Significance of Elasticity of Demand, Demand Forecasting, Factors governing demand forecasting, methods of demand forecasting.

Module-II: Theory of Production and Cost Analysis   [10 Periods]

Theory of Production - Production Function – ISOquants and ISOcosts, MRTS, Least Cost Combination of Inputs, Cobb-Douglas Production function, Laws of Returns, Internal and External Economies ofScale.

Cost Analysis - Cost concepts, Opportunity cost, fixed vs. Variable costs, explicit costs Vs. Implicit costs, Out of pocket costs vs. Imputed costs. Break-even Analysis (BEA)- Determination of Break-Even Point (simple problems) - Managerial Significance and limitations of BEA.

Module-III: Market structures and Pricing Policies   [09 Periods]

A: Introduction to Markets & Market structures - Types of competition, Features of Perfect competition, Monopoly and Monopolistic Competition. Price-Output Determination in case of Perfect Competition and Monopoly.

B: Pricing Policies & Methods - Cost plus Pricing, Marginal Cost Pricing, Sealed Bid Pricing, Going Rate Pricing, PLC based pricing methods.

Module-IV: Capital and Capital Budgeting   [09 Periods]

Capital - Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements, Methods and sources of raising finance.

Capital Budgeting - Nature and scope of capital budgeting, features of capital budgeting proposals, Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR) and Net Present Value Method (simple problems)

Module-V: Financial Accounting and Ratios   [10 Periods]

Financial Accounting - Introduction, Accounting principles, Accounting Cycle,Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments).

Financial Analysis Through Ratios - Computation, Analysis and Interpretation of Liquidity Ratios (Current Ratio and quick ratio), Activity Ratios (Inventory turnover ratio and Debtor Turnover ratio), Capital structure Ratios (Debt- Equity ratio, Interest Coverage ratio), and Profitability ratios (Gross Profit Ratio, Net Profit ratio, Operating Ratio, P/E Ratio and EP

Text Books
1. Aryasri, "**Managerial Economics and Financial Analysis**", TMH, 2nd edition,2005.
2. Varshney & Maheswari, "**Managerial Economics**", 5th edition Sultan Chand,2003

References
1. H. Craig Peterson & W. Cris Lewis, "**Managerial Economics**", PHI, 4thEdition.
2. Domnick Salvatore, "**Managerial Economics In a Global Economy**", Thomson, 4th Edition.
3. Raghunatha Reddy & Narasimhachary, "**Managerial Economics & Financial Analysis**", 4th Edition Scitech.
4. S.N.Maheswari & S.K. Maheswari, "**Financial Accounting**", 6th EditionVikas.
5. Dwivedi, "**Managerial Economics**", Vikas, 6th Edition.

E-Resources
1. http://www.learnerstv.com/Free-Economics-video-lecture-courses.htm
2. http://nptel.ac.in/courses/110105067/
3. http://nptel.ac.in/courses/110107073/
4. http://nptel.ac.in/courses/109104073/

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

CO	Statement	Blooms Taxonomy Level
1	Capable of analyzing fundamentals of economics concepts which helps in effective business administration.	Understand
2	Cost -out put relations understand.	Analyze
3	Crate awareness on market structures and pricing policies of various business	Understand
4	Identify the types of Business organization of the company and the implementation requirements of each one.	Understand
5	Financial position of the company can be analyzing with the help of financial statements.	Understand

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

2021-22 Onwards (MR21)	Malla Reddy Engineering College (Autonomous)		B.Tech. VI Semester	
Code: B0532	**Compiler Design** Common for CSE, IT , CSE (CS), CSE (AIML), CSE (DS), CSE (IOT) and AIML)	**L**	**T**	**P**
Credits: 4		3	1	-

Prerequisites: Formal Languages and Automata Theory.

Course Objectives:

- To study the various phases in the design of a compiler
- To understand the design of top-down and bottom-up parsers
- To understand syntax directed translation schemes
- To introduce LEX and YACC tools
- To learn to develop algorithms to generate code for a target machine

Module I: **[09 Periods]**

Language Processors, the structure of a compiler, the science of building a compiler, programming language basics.

Lexical Analysis: The Role of the Lexical Analyzer, Input Buffering, Recognition of Tokens, The Lexical-Analyzer Generator Lex, Finite Automata, From Regular Expressions to Automata, Design of a Lexical-Analyzer Generator, Optimization of DFA-Based Pattern Matchers.

Module II: Syntax Analysis: **[10 Periods]**

Syntax Analysis: Introduction, Context-Free Grammars, Writing a Grammar, Top-Down Parsing, Recursive and Non recursive top-down parsers, Bottom-Up Parsing,

Introduction to LR Parsing: Simple LR, More Powerful LR Parsers, Using Ambiguous Grammars, Parser Generators.

Module III: **[10 Periods]**

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

Intermediate Code Generation: Variants of Syntax Trees, Three-Address Code, Types and Declarations, Type Checking, Control Flow, Back patching, Switch-Statements, Intermediate Code for Procedures.

Module IV: **[10 Periods]**

Run-Time Environments: Storage organization, Stack Allocation of Space, Access to Nonlocal Data on the Stack, Heap Management, Introduction to Garbage Collection, Introduction to Trace-Based Collection.

Machine Independent Optimizations: The Principal Sources of Optimization, Introduction to Data- Flow Analysis, Foundations of Data-Flow Analysis, Constant Propagation, Partial-Redundancy Elimination, Loops in Flow Graphs.

Module V: **[09 Periods]**

Code Generation: Issues in the Design of a Code Generator, The Target Language, Addresses in the Target Code, Basic Blocks and Flow Graphs, Optimization of Basic Blocks, A Simple Code Generator. **Machine Dependent Optimizations:** Peephole Optimization, Register Allocation and Assignment, Dynamic Programming Code-Generation.

Text Books:

1. Compilers: Principles, Techniques and Tools, Second Edition, Alfred V.Aho, Monica S.Lam, Ravi Sethi, Jeffry D. Ullman, Pearson.
2. Compiler Construction-Principles and Practice, Kenneth C Louden, Cengage Learning.

References:
1. Modern compiler implementation in C, Andrew W Appel, Revised edition, Cambridge University Press.
2. The Theory and Practice of Compiler writing, J. P. Tremblay and P. G. Sorenson, TMH
3. Writing compilers and interpreters, R. Mak, 3rd edition, Wiley student edition.

E-Resources:
1. https://nptel.ac.in/courses/106/104/106104123/

Course Outcomes:

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

CO	Course Outcome	Blooms Taxonomy Level
CO1	Design, develop, and implement a compiler for any language	Analyze
CO2	Use LEX and YACC tools for developing a scanner and a parser	Understand
CO3	Design and implement LL and LR parsers	Apply
CO4	Design algorithms to perform code optimization in order to improve the performance of a program in terms of space and time complexity	Apply
CO5	Apply algorithms to generate machine code	Understand

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

2021-22 Onwards (MR21)	**Malla Reddy Engineering College** (Autonomous)	**B.Tech. VI Semester**		
Code: B1210	**Machine Learning**	**L**	**T**	**P**
Credits: 4		**3**	**-**	**-**

Pre-requisites: Linear Algebra and Probability Theory
Course Objectives:
The objectives of this course are:
1. Understand the need and elements of Machine Learning
2. Study various machine learning techniques
3. Design solutions for real world problems using machine learning techniques.

Module I: [10 Periods]
Introduction to Machine Learning: Introduction, Classic and Adaptive machines, learning types, deep learning, bio-inspired adaptive systems, Machine Learning and big data; Elements of Machine Learning: Data formats, Learnability, Statistical learning concepts, Class balancing, Elements of Information theory.

Module II: [09 Periods]
Feature Selection and Feature Engineering: Data sets, creating training and test sets, managing categorical data, missing features, data scaling and normalization, Withering, Feature selection and filtering, PCA, Visualization of high-dimensional datasets;

Module III: [10 Periods]
Regression Algorithms: Linear models for regression, Regression types; Linear Classification Algorithms: Linear classification, logistic regression, grid search, classification metrics, ROC curve.

Naïve Bayes and Discriminant Analysis: Bayes theorem, Naïve Bayes classifiers, Discriminant analysis; Support Vector Machines: Linear SVM, Kernel-based classification

Module IV: [09 Periods]
Decision Trees and Ensemble Learning: Binary Decision trees, Introduction to Ensemble Learning- Random Forests, AdaBoost, Gradient Tree Boosting, Voting classifier

Module V: [10 Periods]
Clustering Fundamentals: Basics, k-NN, Gaussian mixture, K-means, Evaluation methods, DBSCAN, Spectral Clustering, Hierarchical Clustering;

Introduction to Neural Networks: Introduction to deep learning, MLPs with Keras, deep learning model layers, introduction to Tensorflow

Text Books:
1. Giuseppe Bonaccorso, "Machine Learning Algorithms", 2nd Edition, Packt, 2018,
2. Tom M. Mitchell, "**Machine Learning**", MGH, 1st Edition,2013.
3. Stephen Marsland, "**Machine Learning: An Algorithmic Perspective**", Chapman and Hall / CRC, 2nd Edition, 2014.

References
1. Abhishek Vijavargia "Machine Learning using Python", BPB Publications, 1st Edition, 2018
2. ReemaThareja "Python Programming", Oxford Press, 2017
3. Yuxi Liu, "Python Machine Learning by Example", 2nd Edition, PACT, 2017

E-Resources

1. https://www.guru99.com/machine-learning-tutorial.htm
2. https://www.tutorialspoint.com/machine_learning_with_python/index.htm
3. https://www.geeksforgeeks.org/machine-learning/
4. http://nptel.ac.in/courses/106106139/
5. http://nptel.ac.in/courses/106105152/

Course Outcomes:

On successful of the course student will be able to:

CO's	Statement	Blooms Taxonomy Level
CO1	Define the basic concepts related to Machine Learning	Analyze
CO2	Recognize the underlying mathematical relationships within and across Machine Learning algorithms and their paradigms	Understand
CO3	Determine the various applications of Machine Learning.	Apply
CO4	Design and develop solutions to real world problems using Machine Learning Algorithms	Apply
CO5	Evaluate and interpret the results of the various machine learning technique	Understand

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

2021-22 Onwards (MR21)	Malla Reddy Engineering College (Autonomous)	B.Tech. VI Semester		
Code: B0533	**Distributed Systems** [Professional Elective - III]	L	T	P
Credits: 3		3	-	-

Prerequisites: Computer Networks, DBMS and Operating Systems
Course Objectives:

1. Student will be able to learn fundamental aspects of Distributed systems
2. Analyzebasics of Architectural and Fundamental Models.
3. To identify various types of requirements and the process for Distributed objects.
4. To make use of various OS layers to conceptualize and construct a system
5. To demonstrate different file systems tactics and define Events and time ordering in distributed transactions.

Module-I: Basic Concepts [09 Periods]

Characterization of Distributed Systems - Examples - Resource Sharing and the Web - Challenges- System Models-Architectural and Fundamental Models-Networking and Internetworking-Types of Networks – Internet Protocols

Module-II: Processes and Distributed Objects [09 Periods]

Inter- process Communication - The API for the Internet Protocols - External Data Representation and Marshalling - Client -Server Communication - Group Communication - Distributed Objects and Remote Invocation - Communication Between Distributed Objects - Remote Procedure Call - Events and Notifications -

Module-III: Operating System Issues I [10 Periods]

The OS Layer- Protection - Processes and Threads - Communication and Invocation- OS Architecture - Security - Overview - Cryptographic Algorithms - Digital Signatures - Distributed File Systems- File Service Architecture- Sun Network File System-The Andrew File System.

Module-IV: Operating System Issues II [10 Periods]

Name Services- Domain Name System - Directory and Discovery Services -Global Name Service - Clocks - Events and Process States - Synchronizing Physical Clocks - Logical Time And Logical Clocks - Global States

- Distributed Debugging - Distributed Mutual Exclusion – Elections.

Module-V: Distributed Transaction Processing [10 Periods]

Transactions - Nested Transactions - Locks - Optimistic Concurrency Control - Timestamp Ordering - Flat and Nested Distributed Transactions - Atomic Commit Protocols - Concurrency Control in Distributed Transactions - Distributed Deadlocks - Transaction Recovery. Examine transaction recovery and concurrency control in distributed transactions

Text Books:

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

References:

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

E- References:

1. http://www.gecg .in/papers/ds5thedn.pdf
2. https://cs. uwaterloo.ca /~bemard/courses /cs454 /0.Begin.pdf
3. .https://www.cs.helsinki.fi/u/jakangas/Teaching/DistSys/DistSys-08f-l.pdf
4. https: //courses.cs.ut.ee /MTAT.08.009/2014 fall/uplo ads /Main/slides 10-2.pdf

Course Outcomes:

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

CO	Course Outcome	Blooms Taxonomy Level
CO1	Design architectural models of distributed systems.	Analyze
CO2	Summarize communication between Distributed Objects.	Understand
CO3	Apply security algorithms on distributed systems.	Apply
CO4	Categorize various name services	Apply
CO5		

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

COs	PO1	PO2	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	1		1							2		2
CO2	3	2	2	1	2								2		2
CO3	3	3	3						2	1		2	2		2
CO4	3	2	2	2	2	1	1					1	2		2

2021-22 Onwards (MR21)	Malla Reddy Engineering College (Autonomous)	B.Tech. VI Semester		
Code:B1211	Soft Computing	L	T	P
Credits: 3	[Professional Elective - III]	3	-	-

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

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

Module-I: Introduction to Soft Computing [8 Periods]
Concept of computing systems, "Soft" computing versus "Hard" computing, Characteristics of Soft computing, Some applications of soft computing techniques.

Module-II: Fuzzy logic [9 Periods]
Introduction to Fuzzy logic, Fuzzy sets and membership functions, Operations on Fuzzy sets, Fuzzy relations, rules, propositions, implications and inferences, Defuzzification techniques, Fuzzy logic controller design.Some applications of Fuzzy logic.

Module-III: Genetic Algorithms [10 Periods]
Concept of "Genetics" and "Evolution" and its application to proablistic search techniques, Basic GA framework and different GA architectures, GA operators: Encoding, Crossover, Selection, Mutation, etc. Solving single-objective optimization problems using GAs.

Module-IV: Multi-objective Optimization Problem Solving [9 Periods]
Concept of multi-objective optimization problems (MOOPs) and issues of solving them, Multi- Objective Evolutionary Algorithm (MOEA), Non-Pareto approaches to solve MOOPs, Pareto-based approaches to solve MOOPs, Some applications with MOEAs.

Module-V: Artificial Neural Networks [9 Periods]
Biological neurons and its working, Simulation of biological neurons to problem solving, Different ANNs architectures, training techniques for ANNs, Applications of ANNs to solve some real-life problems.

Resources & References
The following text and reference books may be referred to for this course.
1. Fuzzy Logic: A Pratical approach, F. Martin, Mc neill, and Ellen Thro, AP Professional, 2000.
2. Fuzzy Logic with Engineering Applications (3rd Edn.), Timothy J. Ross, Willey, 2010.
3. Foundations of Neural Networks, Fuzzy Systems, and Knowldge Engineering, Nikola K. Kasabov, MIT Press, 1998.
4. Fuzzy Logic for Embedded Systems Applications, Ahmed M. Ibrahim, Elesvier Press, 2004.
5. An Introduction to Genetic Algorithms, Melanie Mitchell, MIT Press, 2000.
6. Genetic Algorithms in Search, Optimization and Machine Learning, David E. Goldberg, Pearson Education, 2002.
7. Practical Genetic Algorithms, Randy L. Haupt and sue Ellen Haupt, John Willey & Sons,

2002.

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

Course Outcomes:

After completion of the course, students able to learn

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

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

2021-22 Onwards (MR21)	Malla Reddy Engineering College (Autonomous)	B.Tech. VI Semester		
Code: B6203	Cryptography and Network Security	L	T	P
Credits: 3		3	-	-

Prerequisites: Computer Networks

Course Objectives:

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

Module-I: Basic Principles [09 Periods]

Security Goals, Cryptographic Attacks, Services and Mechanisms, Mathematics of Cryptography **Module-II: Symmetric Encryption [10 Periods]** Mathematics of Symmetric Key Cryptography, Introduction to Modern Symmetric Key Ciphers, Data Encryption Standard, Advanced Encryption Standard.

Module-III: Asymmetric Encryption [10 Periods]

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

Module-IV: **Data Integrity, Digital Signature Schemes and Key Management** [09 Periods]

Message Integrity and Message Authentication, Cryptographic Hash Functions, Digital Signature, Key Management. Security at the Network Layer: IPSec, System Security

Module-V: **Security in Transport Layer and Application Layer** [10 Periods]

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

Text Books:

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

References:

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

E –Resources

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

Course Outcomes:

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

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

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

CO	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO 1	3	3	1	-	-	-	-		-	-	-	1	2	1	1
CO 2	3	3	1	1	-	-	-	-	-	-	-	1	3	2	-
CO 3	3	1	1	1	-	-	-	-	-	-	-	1	3	2	-
CO 4	3	3	1	1	-	-	-	-	-	-	-	1	2	2	1
CO 5	3	3	1	1	-	-	-	-	-	-	-	1	3	2	-

2021-22 Onwards (MR21)	Malla Reddy Engineering College (Autonomous)	B.Tech. VI Semester		
Code: B6217	Cyber Security	L	T	P
Credits: 3	[Professional Elective - III]	3	-	-

Prerequisites: NIL

Course Objectives:

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

Module-I: Policies and Security Evolution [10 Periods]

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

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

Module-II: Cyber Security Objectives and Guidance [10 Periods]

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

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

Module-III: Policy Catalog and Issues [10 Periods]

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

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

Module-IV: Cyber Management and Infrastructures Issues [09 Periods]

Cyber Management Issues - Fiduciary Responsibility – Risk Management – Professional Certification – Supply Chain – Security

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

Module-V: Case Study [09 Periods]

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

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

Text Books

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

References

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

E-Resources

1. http://www.esoln.net/edownload/Download/Cyber_Security_Policy_Guidebook.pdf
2. http://index-of.es/Hack/CyberSecuity.pdf
3. https://www.acm.org/education/TowardCurricularGuidelinesCybersec.pdf
4. https://www.cs.cmu.edu/~hovy/papers/14dgo-cybersecurity-taxonomy.pdf
5. http://ndl.iitkgp.ac.in/document/yVCWqd6u7wgye1qwH9xY77N9KJP4BJuXxkVQS Jo9fLOOf1gtbY8enNTX_Gat1aW0f-JrSQu1YTNmVwRFJ_mJ7Q
6. http://ndl.iitkgp.ac.in/document/yVCWqd6u7wgye1qwH9xY737OFS2a5kP6Ph6KB9 KG9RiRGN-S5LJoIuO6-Z-TBERz0mAxCmQX4GTFW2WfvuCVAg

Course Outcomes:

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

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

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

2021-22 Onwards (MR21)	Malla Reddy Engineering College (Autonomous)	B.Tech. VI Semester		
Code:B6705	**ADVANCED PYTHON PROGRAMMING**	**L**	**T**	**P**
Credits: 3		3	-	-

Prerequisites: Python programming

Course Objectives:

1. To Proficient data manipulation using NumPy and Pandas, missing data, and arithmetic operations.
2. To know Effective data processing from diverse sources, merging, and group operations with Pandas.
3. To do analysis of time-based data, encompassing date handling, shifting, resampling, and moving window functions.
4. To develop the Competence in GUI development with Tkinter, CRUD operations in SQL and an introduction to Flask and Django.
5. To know about machine learning concepts via scikit-learn, covering preprocessing, supervised/unsupervised learning, and neural networks.

MODULE – I   **[10 periods]**

Numpy: Introduction to Numpy, Data types used in Numpy, Array Indexing and Slicing - Transposing Array and Swapping Axes - Saving and Loading Array - Universal Functions - Mathematical and Statistical Functions in Numpy.

Pandas: Introduction to Pandas , Pandas Data Indexing and Slicing, Handling missing data, Aggregation and Grouping , Arithmetic Operations between Data Frames and Series - Function Application.

MODULE – II   **[10 periods]**

Data Input, Input from Text files, Visual Inspection, Reading ASCII Data into Python, Read and write from MSExcel and CSV files, Reading Multiple CSV files, Processing a single Worksheet and Multiple Worksheets,Data Wrangling Combining and Merging Data Sets, Data Aggregation and Group Operations GroupBy Mechanics.

MODULE – III   **[08 periods]**

Time Series: Date and Time data types and tools, Time series Basics, Date ranges, Frequencies and Shifting, Time Zone Handling, Periods and Arithmetic's, Resampling and Frequency Conversion, Moving window functions.

MODULE – IV   **[08 periods]**

GUIS in Python : Tkinter: Introduction, Components and Events, An example GUI, Button, text widgets; SQL: Installation, DB Connection, CRUD operations(Create, Read, Update, Delete), Python package – Flask.

Django: Introduction, Installation, Creating a hello world page; API and Security, scikit-learn Techniques: Data Preprocessing, Supervised and Unsupervised:

MODULE-V   **[09 periods]**

Tensorflow: Introduction, create a simple project: Keras: Introduction and applications Data Analysis Use cases: USA.gov data from bitly- counting time zones with pandas, Movie lens 1M dataset-measuring rating disagreement, US Baby names-analyzing naming Trends.

TEXT BOOKS:

- Python Data Science Handbook By Jake Vanderplas, oreally publishers, 2ndedition, 2012
- The Hitchker's Guide to Python By Kenneth reitz and Tanya schelusser,2016edition

REFERENCES:

- Gowrishanker and Veena, "Introduction to Python Programming", CRC Press,2019.
- Python Crash Course, 2nd Edition, By Eric Matthes, May 2019 • NumPyEssentials, By Leo Chin and Tanmay Dutta, April 2016
- Joel Grus, "Data Science from scratch", O'Reilly, 2015.
- Wes Mc Kinney, "Python for Data Analysis", O'Reilly Media, 2012.
- Kenneth A. Lambert, (2011), "The Fundamentals of Python: First Programs",Cengage Learning
- Jake Vanderplas. Python Data Science Handbook: Essential Tools for Working with Data 1st Edition.

Course Outcomes:

CO	Course Outcome	Blooms Taxonomy Level
CO1	Proficient use of NumPy and Pandas for data manipulation, including indexing, slicing, missing data handling, and arithmetic operations.	Analyze
CO2	Skillful processing of data from various sources, merging datasets, group operations,and data aggregation using Pandas.	Analyze
CO3	Ability to analyze and manipulate time series data, including date handling, shifting,resampling, and moving window functions.	Apply
CO4	Development of GUIs using Tkinter, CRUD operations with SQL, and introduction toweb development with Flask and Django.	Apply
CO5	Introduction to scikit-learn and TensorFlow/Keras techniques for data preprocessing,supervised and unsupervised learning, and basic neural networks.	Analyze

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

2021-22 Onwards (MR21)	**Malla Reddy Engineering College** (Autonomous)	**B.Tech. VI Semester**		
Code: B0120	**DISASTER MANAGEMENT & MITIGATION** **(OPEN ELECTIVE-II)**	**L**	**T**	**P**
Credits: 3		**3**	**-**	**-**

Prerequisite: NIL

Course Objectives: This course provides the knowledge and understanding of the disaster phenomenon, its different contextual aspects, impacts and public health consequences along with International Strategy for Disaster Reduction. It also has the potential to make the student design and implement disaster mitigation measures.

MODULE I: Concept of Hazards and Disasters   [10 Periods]

Environmental Hazards & Disasters Concept of Environmental Hazards, Environmental Stress & Environmental Disasters. Different Approaches & relation with human Ecology – Landscape, Ecosystem and Perception Approach - Human Ecology & its application in geographical researches.

Types of Environmental Hazards & Disasters Natural hazards and Disasters – Man induced hazards & Disasters - Natural Hazards- Planetary Hazards/ Disasters - Extra-Planetary Hazards/ disasters - Planetary Hazards- Endogenous Hazards - Exogenous Hazards.

MODULE II: Classification of Hazards   [10 Periods]

Endogenous Hazards Volcanoes: Volcanic Hazards/ Disasters - Causes and distribution of Volcanoes – Hazardous effects of volcanic eruptions - Environmental impacts of volcanic eruptions. Earthquake Hazards/ Disasters - Causes of Earthquakes - Distribution of earthquakes - Hazardous effects of earthquakes - Earthquake Hazards in India - Human adjustment, perception & mitigation of earthquake. Landslides: causes and impacts. Avalanches -causes and impacts.

Exogenous Hazards Infrequent events: Cyclones – Lightning – Hailstorms, Cyclones: Tropical cyclones & Local storms - Destruction by tropical cyclones & local storms (causes , distribution human adjustment, perception & mitigation), Cumulative atmospheric hazards/ disasters : Floods- Droughts- Cold waves- Heat waves Floods:- Causes of floods- Flood hazards in India- Flood control measures [Human adjustment, perception & mitigation], Droughts: Impacts of droughts- Drought hazards in India- Drought control measures, Extra Planetary Hazards/ Disasters-Man induced Hazards
/Disasters- Physical hazards/ Disasters-Soil Erosion Soil Erosion: Mechanics & forms of Soil Erosion- Factors & causes of Soil Erosion- Conservation measures of Soil Erosion. Chemical hazards/ disasters: Release of toxic chemicals, nuclear explosion- Sedimentation processes, Sedimentation processes: Global Sedimentation problems- Regional Sedimentation problems- Sedimentation & Environmental problems- Corrective measures of Erosion & Sedimentation, Biological hazards/ disasters: Population Explosion.

MODULE III: Approaches and Measures in Disaster Management   [10 Periods]

A: Emerging Approaches Three Stages: Pre-disaster stage (preparedness), Emergency Stage, Post Disaster stage (Rehabilitation).

B: Natural Disaster Reduction & Management Provision of Immediate relief measures to disaster affected people, Prediction of Hazards & Disasters, Measures of adjustment to natural hazards

MODULE IV: Disaster Management [09 Periods]

An integrated approach for disaster preparedness, mitigation & awareness. Mitigation-Institutions- discuss the work of following Institution.

a) Meteorological Observatory
b) Seismological Observatory
c) Volcano logical Institution
d) Hydrology Laboratory
e) Industrial Safety Inspectorate
f) Institution of Urban & Regional Planners
g) Chambers of Architects
h) Engineering Council
i) National Standards Committee

Integrated Planning- Contingency Management Preparedness –

a) Education on disasters

b) Community involvement

c) The adjustment of Human Population to Natural Hazards & Disasters Role of Media

Monitoring Management- Discuss the programme of disaster research & mitigation of disaster of following organizations.

a) International Council for Scientific Unions [ICSU]- Scientific Committee on Problems of the Environment [SCOPE], International Geosphere- Biosphere programme [IGBP]
b) World Federation of Engineering Organizations [WFED]
c) National Academy of Sciences
d) World Meteorological Organizations [WMO] e] Geographical Information System [GIS]
e) International Association of Seismology & Physics of Earth's Interior [IASPEI]
f) Various U.N agencies like UNCRD, IDNDR, WHO, UNESCO, UNICEF, UNEP.

MODULE V: Disaster Management in India [09 Periods]

A regional survey of Land Subsidence, Coastal Disaster, Cyclonic Disaster & Disaster in Hills with particular reference to India

Ecological planning for sustainability & sustainable development in India- Sustainable rural development: A Remedy to Disasters-Role of Panchayats in Disaster mitigations **C:** Environmental policies & programmes in India- Institutions & National Centers for Natural Disaster reduction, Environmental Legislations in India, Awareness, Conservation Movement, Education & Training.

TEXT BOOKS:

1. Jagbir Singh, "Disaster Management–Future Challenges and Opportunities", I.K.International Publishing House, 1st Edition, 2005.

2. Coppala P Damon, "Introduction to International Disaster Management", ABD Publishers, 2007.

REFERENCES:

1. R.B.Singh [Ed], "Environmental Geography", Heritage Publishers, New Delhi, 1st Edition,1990.

2. Kates,B.I & White. G.F, "The Environment as Hazards", oxford publishers, 5th Edition,

New York, 1978.
3. R.B. Singh [Ed] **-** Disaster Management, Rawat Publication, New Delhi, 1ˢᵗ Edition, 2000.

E RESOURCES:
1. http://www.wcpt.org/disaster-management/what-is-disaster-management.
2. http://study.com/academy/lesson/what-are-cyclones-types-causes-effects.html.

Course Outcomes:

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

1. Analyze, evaluate and manage the environmental, social, cultural, economical, legal and organizational aspects influencing vulnerabilities and capacities to face disasters.
2. Assess the different public health aspects at local and global levels as a result of Disaster and can plan well to mitigate them.
3. Gain knowledge in various emerging approaches and measure in disaster management.
4. Understand the role of disaster management through Meteorological Observatory, Seismological Observatory, Volcanological Institution, etc.,
5. Acquire the information about Disaster Management, Ecological planning and sustainable development and Environmental policies, Disaster Reduction programs in India.

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

2021-22 Onwards (MR21)	Malla Reddy Engineering College (Autonomous)	B.Tech. VI Semester		
Code: B0H03	**English Communication and Presentation Skills Lab** (Common for CSE,IT,CSE (CS), CSE (AIML), CSE (DS), CSE (IOT), and AIML)	L	T	P
Credits: 1		-	-	2

Prerequisite: NIL

Course Objectives:
The learners need to be aware of the characteristics of technical communication in their workplaces; as a result, they are exposed to different channels of technical communication. Hence the acquired skills make the learners effective communicators using persuasive language. Besides the above said, one of the major objectives is to maintain objectivity in writing documents and to produce professional quality documents using different components of the language.

Introduction: Effective Communication binds any progressive organization. At the B Tech third year level, the Technical Communication and Presentation skills laboratory is introduced to help students succeed in attaining a challenging and a professional career. Each unit aims to reinforce learning and helps the learners perform well before and after they enter the world of work. The course is designed to be practical, stimulating and challenging providing opportunities to the learners to go beyond the classrooms and get empowered in Technical Communication skills. The course enables the students understand the employers' expectations that are varied from company to company while giving them insight into the acceptable norms of attitude, behavior and etiquette. The course also focuses on the presentation skills of the learners

Methodology: Facilitator's role: Since classroom learning augments thinking process, helping them to develop written, spoken and non-verbal communication, the facilitator / Faculty would briefly discuss the topics with the students and later on guide them while the students involved in activities, writing work and while making presentations. The facilitator is required to design a lot of practical/industry oriented project works for the students

*Students are required to participate, perform, write and submit the work in the form of written documents or Power Point Presentations to hone their spoken written and non-verbal communication skills. Students are to take up field work and submit the project work.

Module-I: Oral Presentation
Mechanics of Presentations – Methodology of Presentation, Importance of Non-verbal communication during presentations– Nuances of Presentation.
*This particular MODULE is for internal evaluation purpose(s).

Module-II: E-Correspondence and Email etiquette
Common web mail services, yahoo, gmail etc, fields to pay attention- To:, Cc:, Bcc:, Reply All, Subject, Salutation, Body, Signature, Font, Caps Lock , Highlight, The 'KISS' strategy (Keep It Simple and Short,)Points to remember while signing off, Introduction to Technical Vocabulary.
•   This MODULE is purely for internal assessment/evaluation

Module-III: Group Discussion
Initiators- Contributor-Informer-Team Leader-Motivator-Creative Contributor , Importance of , Non- verbal communication -eye contact, voice characters, posture, gestures, do's and don'ts, Role play and Simulation- Learners assuming the roles of characters and participating in Group discussion, analysis, or prediction with strictly defined goals.

Module-IV: Interview Skills & Office Etiquette
Preparing for the interview, types of interviews, interview session, importance of non-verbal

communication during the interview, do's and don'ts of interview, follow up and thanking letter. FAQ's. Formal Conversation, office attire- do's and don'ts, greetings and meetings, speaking to seniors and handshakes, offering and taking visiting cards.

Module V: Job Hunt Process

SWOT analysis, correspondence and browsing the internet to search for a suitable job(s), job application-cover letter drafting, drafting a winning resume', types of resume's - electronic, video and printed resume's

• Instruction: Students are required to prepare their video resume which will be assessed by the faculty member.

References

1. Chrissie: **Handbook of Practical Communication Skills**: Jaico Publishing house, 1999.
2. Daniels, Aubrey: **Bringing Out the Best in People**: Tata McGraw-Hill: New York, 2003.
3. Wright, Goulstone, Mark: **Just Listen: Discover the Secret to getting through to absolutely anything** : American Management Association, 2010.
4. Leslie. T. Giblin: **Skill with people** Publication details not known
5. Lewis, Norman: **Word Power Made Easy**: Goyal Publications: New Delhi, 2009.
6. Murthy, A.G, Krishna,: **Ten Much** : Tata McGraw-Hill :New Delhi, 2010.

E-Resources

1. http://www.mindtools.com/pages/article/newTMC_05.htm
2. http://www.kent.ac.uk/careers/intervw.htm
3. http://www.wikihow.com/Write-a-Report

Course Outcomes:

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

CO	Course Outcome	Blooms Taxonomy Level
CO1	Give Oral Presentations Confidently.	Analyze
CO2	Draft appropriate Resume in accordance with the context.	Analyze
CO3	Participate and present their view and ideas logically and confidently.	Apply
CO4	Understand the importance of communication in various settings.	Apply
CO5	Utilize the technology for career advancement.	Analyze

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

2021-22 Onwards (MR21)	Malla Reddy Engineering College (Autonomous)		B.Tech. VI Semester		
Code:B0543	**Compiler Design Lab**		L	T	P
Credits: 2	(Common for CSE, IT,CSE(CS),CSE (AIML),CSE(DS),CSE(IOT)and AIML)		-	1	2

Prerequisites: Basic Programming

Course Objectives:
1. To understand the various phases in the design of a compiler.
2. To understand the design of top-down and bottom-up parsers.
3. To understand syntax directed translation schemes.

Software Requirements: Turbo C / C++

List of Programs:
1. Write a LEX Program to scan reserved word & Identifiers of C Language. The lexical analyzer should ignore redundant spaces, tabs and newlines. It should also ignore comments.
2. Write a C program to recognize strings under 'a*', 'a*b+', 'abb'
3. Write a C program to test whether a given identifier is valid or not
4. Write a Program to implement Recursive Descent Parser for language.
5. Write a Program to Design a Predictive Parser for the Language Accepted by the given Grammar.
6. Write a Program for Implementation of Shift Reduce parsing
7. Write a program to calculate first function for the given grammar.
8. Write a program to implement Simple LR Parser for the given language
9. Write a program to Implement SLR (1) Parsing algorithm for the given language
10. Write a program to Design LALR bottom-up parser for the given language
11. Write a program to Design CLR bottom-up parser for the given language
12. Write a C program to generate three address codes.

Textbooks:

1. Andrew N. Appel," Modern **Compiler Implementation in C**", Cambridge University Press.

2. A.V. Aho. J.D.Ullman ,"**Principles of compiler design**" ,Pearson Education.

3. D.M Dhamdhere," Systems **programming and operating systems**" ,2ndedition, tata McGraw hill publishing comp pvtLtd.

References:

1. Dick Grune, Henry E. Bal, Cariel T. H. Jacobs," **Modern Compiler Design**", Wiley dreamtech.
2. Cooper & Linda," **Engineering a Compiler**", Elsevier.
3. Louden," **Compiler Construction**", Thomson.

Course Outcomes:

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

CO	Course Outcome	Blooms Taxonomy Level
CO1	Ability to design, develop, and implement a compiler for any language.	Analyze
CO2	Able to use lex and yacc tools for developing a scanner and a parser.	Analyze
CO3	Able to design and implement LL and LR parsers.	Apply

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

2021-22 Onwards (MR21)	Malla Reddy Engineering College (Autonomous)	B.Tech. VI Semester		
Code: B1212	**Machine Learning Lab**	**L**	**T**	**P**
Credits: 1		**-**	**-**	**2**

Course Objectives:

This course provides the students a broad introduction to python programming, machine learning, discuss about various learning algorithms like decision tree learning, Bayesian learning, computational learning, instance-based learning, combined inductive and analytical learning methods, analyze genetic algorithms and various learning set of rules.

List of Programs:

1. Install python and useful packages and load the sample dataset to understand, and visualize
2. Implement Simple Linear Regression
3. Implement Multivariate Linear Regression.
4. Implement Simple Logistic Regression and Multivariate Logistic Regression.
5. Implement Decision Trees.
6. Implement any 3 Classification Algorithms.
7. Implement Random Forests Algorithm
8. Implement K-Means, KNN Algorithms
9. Implement SVM On Any Applicable Datasets.
10. Implement Neural Networks
11. Implement PCA.
12. Implement Anomaly Detection and Recommendation.

References

Machine Learning with Python/Scikit-Learn, - Application to the Estimation of Occupancy and Human Activities, pp. 1-103

Course Outcomes:

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

CO	Course Outcome	Blooms Taxonomy Level
CO1	Apply Machine learning approaches for a given problem.	Analyze
CO2	Analyze and identify the need for machine learning techniques for a particular domain.	Analyze
CO3	Develop the real time applications and predict its outcomes using machine learning algorithms.	Apply

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

2021-22 Onwards (MR21)	Malla Reddy Engineering College (Autonomous)	B.Tech. VI Semester		
Code: B00M4	**Quantitative Aptitude and Verbal Reasoning – II**	L	T	P
Credits: NIL	(Common for all)	2	-	-

2021-22 Onwards (MR21)	Malla Reddy Engineering College (Autonomous)	B. Tech. VII Semester		
Code: B0H09	**Management Fundamentals**	**L**	**T**	**P**
Credits: 3	(Common for EEE, ECE and IT)	**3**	**-**	**-**

Prerequisites: Nil

Course Objectives:

Through reading the text, references and discussion of cases students should be able to understand the fundamentals underlying the management of an organization.

Module–I: Management and Principles of Management   [09 Periods]

Introduction to Management: Concepts of Management and organization-nature, importance and Functions of Management, Taylor's Scientific Management Theory, Fayol's Principles of Management. **Management Theories:** Mayo's Hawthorne Experiments, Maslow's Theory of Human Needs, Douglas McGregor's Theory X and Theory Y, Herzberg's Two-Factor Theory of Motivation, Systems Approach to Management, Leadership Styles, Corporate Social responsibility.

Module – II: Planning, Organization and types of Structures   [10 Periods]

Planning: Need for planning- -Steps in the process of planning-Advantages and limitation of planning. Types of planning - Vision, Mission, Goals, Objectives, Policy, Strategy, Programmes,

Elements of Corporate Planning Process, Management by Objectives (MBO).

Organization and types of Structures: Basic concepts related to Organization - Departmentation and Decentralization, Types of Organizations- Line organization, Line and staff organization, functional organization, committee organization, matrix organization, Virtual Organization, Cellular Organization, boundary less organization, inverted pyramid structure, lean and flat Organization structure.

Module – III: Staffing and Controlling   [10 Periods]

Staffing: Basic concepts of HRM, functions of HR Manager: Manpower planning, Recruitment, Selection, Training and Development. Performance Appraisal, Job Evaluation and Merit Rating.

Controlling: process of controlling, types of controlling, managing productivity, Quality Control: chart, R chart, C chart, P chart, (simple Problems), Deming's contribution to quality.

Module – IV: Operations and Materials Management   [09 Periods]

Operations Management: Principles and Types of Plant Layout-Methods of production (Job, batch and Mass Production), Work Study -Basic procedure involved in Method Study and Work Measurement.

Materials Management: Objectives, Need for Inventory control, EOQ, ABC Analysis, Purchase Procedure, Stores Management and Stores Records.

Module–V: Project Management and Contemporary Practices   [10 Periods]

Project Management (PERT/CPM): Network Analysis, Programme Evaluation and Review Technique (PERT), Critical Path Method (CPM), Identifying critical path, Probability of Completing the project within given time, Project Cost Analysis, Project Crashing. (Simple problems)

Contemporary Management Practices: Basic concepts of ERP, Just-In-Time (JIT) System, Total Quality Management (TQM), six sigma and Capability Maturity Model (CMM) Levels, Bench marking, Balanced Score card.

Text Books:

1. Aryasri, **Management Science**, 4th edition TMH, 2004.
2. Stoner, Freeman, Gilbert, **Management,** Pearson Education, New Delhi, 6thEd, 2004.

References*:*

1. Kotler Philip & Keller Kevin Lane, **"Marketing Management"**, PHI, 12th edition, 2005
2. Koontz & Weihrich, **"Essentials of Management"**, TMH, 6th edition,2005.
3. Thomas N.Duening & John M. Ivancevich **"Management - Principles and Guidelines"**, Biztantra, 5th edition 2003.
4. Memoria & S.V. Gauker, **"Personnel Management"**, Himalaya, 25th edition,2005
5. Samuel C. Certo, **"Modern Management"**, PHI, 9th edition,2005.

E-Resources:

1. http://freevideolectures.com/Course/2689/Management-Science
2. http://www.onlinevideolecture.com/?course=mba-programs&subject=human-resource-management
3. http://www.onlinevideolecture.com/?course=mba-programs&subject=marketing-fundamental
4. http://freevideolectures.com/Course/2371/Project-and-Production-Management
5. http://nptel.ac.in/courses/110105034/

Course Outcomes:

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

CO	Course Outcome	Blooms Taxonomy Level
CO1	Understand the various concepts, principles and theories of management.	Analyze
CO2	Understand the basic concepts of planning and various structures of organizations.	Analyze
CO3	Understand the process of staffing and controlling	Apply
CO4	Understand the process of operations management. Also learn the concepts of materials management and marketing management at an organization.	Apply
CO5	Understand the various contemporary management practices. Also the project management techniques.	Analyze

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

2021-22 Onwards (MR21)	**Malla Reddy Engineering College** (Autonomous)	B. Tech. VII Semester		
Code: B0536	**Data Mining**	**L**	**T**	**P**
Credits: 3		3	-	-

Prerequisites: NIL

Course Objectives:

This course provides the students to understand stages in building a Data Warehouse, identify the need and importance of preprocessing techniques, implement similarity and dissimilarity techniques, analyze and evaluate performance of algorithms for Association Rules, analyze Classification and Clustering algorithms.

Module-I: Introduction   **[09 Periods]**

Motivation for Data Mining-Data Mining-Definition and Functionalities–Classification of DM Systems
-DM task primitives-Integration of a Data Mining system with a Database or a Data Warehouse-Issues in DM–KDD Process

Module-II: Data Pre-processing   **[10 Periods]**

Data summarization, data cleaning, data integration and transformation, data reduction, data discretization and concept hierarchy generation, feature extraction , feature transformation, feature selection, introduction to Dimensionality Reduction, CUR decomposition.

Similarity and Dissimilarity Measurement: Similarity and Dissimilarity between simple attributes, Dissimilarities and similarities between data objects, Examples of Proximity measures, Issues in Proximity Calculation, Selection of right proximity measure.

Module-III: Classification and Association   **[09 Periods]**

Basic Concepts, General Approach to solving a classification problem, Decision Tree Induction: Working of Decision Tree, building a decision tree. Methods for expressing an attribute test conditions, measures for selecting the best split, Algorithm for decision tree induction, Bayes' Theorem, Naïve Bayesian Classification, Bayesian Belief Networks, Data Generalization and summarization-based characterization-Attribute relevance - class comparisons, Frequent Item Set generation, Rule generation, compact representation of frequent item sets, FP- Growth Algorithm.

Module-IV: Cluster Analysis: **[10 Periods]**

Clustering: Problem Definition, Clustering Overview, Evaluation of Clustering Algorithms, Partitioning Clustering -K-Means Algorithm, K-Means Additional issues, PAM Algorithm; Hierarchical Clustering – Agglomerative Methods and divisive methods, Basic Agglomerative Hierarchical Clustering, Strengths and Weakness; Outlier Detection, Clustering high dimensional data, clustering Graph and Network data.

Module-V: Web Mining   **[10 Periods]**

Introduction to Web Mining, Web content mining, Web usage mining, Web Structure mining, Web log structure and issues regarding web logs, Spatial Data Mining, Temporal Mining, And Multimedia Mining, Applications of Distributed and parallel Data Mining.

Text Books

1. Pang-Ning Tan & Michael Steinbach, "**Introduction to Data Mining**", Vipin Kumar, Pearson.
2. Jiawei Han, Michel Kamber," **Data Mining concepts and Techniques**", 3/e, Elsevier.

3. J. Han, M. Kamber, "Data Mining Concepts and Techniques", Morgan Kaufmann

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

E-Resources
1. http://www-users.cs.umn.edu/~kumar/dmbook/index.php
2. http://myweb.sabanciuniv.edu/rdehkharghani/files/2016/02/The-Morgan-Kaufmann-Series-in-Data-Management-Systems-Jiawei-Han-Micheline-Kamber-Jian-Pei-Data-Mining.-Concepts-and-Techniques-3rd-Edition- Morgan-Kaufmann-2011.pdf
3. http://www.ijctee.org/files/Issuethree/IJCTEE_1111_20.pdf
4. http://www.ccsc.org/southcentral/EJournal/2010/Papers/Yihao%20final%20paper%20CCSC%20for%20submission.pdf
5. https://gunjesh.wordpress.com/

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

CO	Course Outcome	Blooms Taxonomy Level
CO1	**Understand** the basic concepts in data mining	Analyze
CO2	**Understand** the need and importance of data preprocessing techniques	Analyze
CO3	**Implementation** of a classification problems	Apply
CO4	**Implementing** various Clustering algorithms	Apply
CO5	**Understand** different types of Web Mining techniques	Analyze

	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

2021-22 Onwards (MR21)	**Malla Reddy Engineering College** (Autonomous)	**B. Tech. VII Semester**		
Code:B1213	**DevOps**	L	T	P
Credits:3		3	-	-

Course Objectives:

The main objectives of this course are to

1. Describe the agile relationship between development and IT operations.

2. Understand the skill sets and high-functioning teams involved in DevOps and related methods to reach a continuous delivery capability

3. Implement automated system update and DevOps lifecycle

Module-I: Introduction   **[8 Periods]**

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

Module-II: Software Development and Architecture   **[10 Periods]**

Software Development Models and DevOps: DevOps Lifecycle for Business Agility, DevOps, and Continuous Testing.

DevOps influence on Architecture: Introducing software architecture, the monolithic scenario, Architecture rules of thumb, the separation of concerns, Handling database migrations, Microservices, and the data tier, DevOps, architecture, and resilience.

Module-III: Project Management   **[9 Periods]**

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

Module-IV: Testing Tools and Automation   **[10 Periods]**

Testing Tools and Automation: Various types of testing, Automation of testing Pros and cons, Selenium-Introduction, Selenium features, JavaScript testing, Testing backend integration points, Test-driven development, REPL-driven development

Deployment of the System: Deployment systems, Virtualization stacks, code execution at the client, Puppet master and agents, Ansible, Deployment tools: Chef, SaltStack and Docker

Module-V: Code Monitoring   **[9 Periods]**

Code monitoring tools: Nagios, Munin, Ganglia, Log handling. Introduction to issue trackers, Need of Issue Tracker: Workflows and issues, Problems with issue tracker proliferation, Trackers tools: Bugzilla, GitLab tracker, and Jira

Text Books

1. Joakim Verona. Practical Devops, Second Edition. Ingram short title; 2nd edition (2018). ISBN-10: 1788392574

2. Deepak Gaikwad, Viral Thakkar. DevOps Tools from Practitioner's Viewpoint. Wiley publications. ISBN: 9788126579952

Reference Books
1. Len Bass, Ingo Weber, Liming Zhu. DevOps: A Software Architect's Perspective. Addison Wesley; ISBN10: 9780134049847

Course Outcomes:

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

CO	Course Outcome	Blooms Taxonomy Level
CO1	Identify components of DevOps environment	Analyze
CO2	Describe Software development models and architectures of DevOps	Analyze
CO3	Apply different project management, integration, testing and code deployment tool	Apply
CO4	Investigate different DevOps Software development models	Apply
CO5	Collaborate and adopt DevOps in real-time projects	Apply

CO-PO,PSOMapping (3/2/1indicatesstrengthofcorrelation)3-Strong, 2-Medium,1-Weak															
COs	**ProgrammeOutcomes (POs)**												**PSOs**		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1			3	2	3							3	2		
CO2	2	3			3		3					2		2	
CO3	3	3		2	3										
CO4			2				2						2		1
CO5	3			3		3						3	2		

2021-22 Onwards (MR21)	**Malla Reddy Engineering College** (Autonomous)	**B. Tech.** VII Semester		
Code: B0529	**Advanced Computer Architecture** [Professional Elective - IV]	**L**	**T**	**P**
Credits: 3		**3**	**-**	**-**

Pre-requisites: Computer Organization

Course Objectives:

This course helps to explore on the advanced concepts and state-of-the-art developments in computer architecture: memory systems, pipelining, simultaneous multithreading, run- time optimization, array processing, parallel processing, multiprocessing, abstract analytic models, power-aware computing, embedded computing, relationship between computer design and application requirements, cost/performance tradeoffs, and many example computers of interesting and un usual features.

Module-I: [09 Periods]

Fundamentals of Computer Design- Technology trends- cost price and their trends- measuring and reporting performance - quantitative principles of computer design

Module-II: [09 Periods]

Instruction Set Principles and Examples- Classifying instruction set architecture - memory addressing- type and size of operands- operations in the instruction set- instructions for control flow- encoding an instruction set.

Module-III: [10 Periods]

Instruction Level Parallelism (ILP) and its Dynamic Exploitation–Concepts and challenges- overcoming data hazards- reducing branch costs with dynamic hardware prediction–high performance instruction delivery- hardware based speculation ILP software approach- compiler techniques- static branch protection - VLIW approach -

H.W support for more ILP at compile time.

Module-IV: [10 Periods]

Memory Hierarchy Design- Cache performance- reducing cache misses' penalty and miss rate – virtual memory. Multiprocessors and thread level parallelism- symmetric shared memory architectures- distributed shared memory- Synchronization- multi threading

Module-V: [10 Periods]

Storage Systems - Types – Buses - RAID- errors and failures - designing an I/O system in five easy pieces. Inter connection networks and clusters - interconnection network media – practical issues in interconnecting networks – clusters- designing a cluster

Text Books:

1. Computer Architecture A quantitative approach 3rd edition John L. Hennessy & David A. Patterson Morgan Kaufmann (An Imprint of Elsevier)

Reference Books:

1. "Computer Architecture and parallel Processing" Kai Hwang and A.Briggs International Edition McGraw-Hill.

2. Advanced Computer Architectures, Dezso Sima, Terence Fountain, Peter Kacsuk, Pearson.

Course Outcomes:

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

CO	Course Outcome	Blooms Taxonomy Level
CO1	Understand and apply concept and principle of cache memory and virtual memory to high -performance computer architecture.	Analyze
CO2	Understand pipelining and its speed advantage & design pipelined logic.	Analyze
CO3	Proficient in fault-tolerant design techniques and examine various methods of error detection and correction such as TMR and Hamming Codes.	Develop
CO4	Identify tradeoffs between complex instruction set computers (CISC) and reduced instruction set computers (RISC).	Design
CO5	Analyze and perform tradeoffs between the cost, performance, and reliability of alternative computer architectures.	Analyze

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

2021-22 Onwards (MR21)	Malla Reddy Engineering College (Autonomous)	B. Tech. VII Semester		
Code: B0541	**Image Processing**	L	T	P
Credits: 3	[Professional Elective - IV]	3	-	-

Pre-requisites: AI

Course Description

This course emphasizes general principles of image processing, rather than specific applications. Lectures will cover topics such as point operations, color processing, image thresholding/segmentation, morphological image processing, image filtering and DE convolution, noise reduction and restoration, scale-space techniques, feature extraction and recognition, image registration, and image matching. This course includes foundations of pattern recognition algorithms and machines, including statistical and structural methods. Data structures for pattern representation, feature discovery and selection, classification vs. description, parametric and non-parametric classification.

Course Objectives

The objective of this course is to

- imparts knowledge in the area of image and image processing
- understand fundamentals of digital image processing
- provide knowledge of the applications of the theories taught in Digital Image Processing
- learn the fundamentals of Pattern recognition and to choose an appropriate feature
- classification algorithm for a pattern recognition problems and apply them properly using modern computing tools such as MATLAB, C/C++ etc.

Module-I: Introduction to Image Processing [9 Periods]

Image formation, image geometry perspective and other transformation, stereo imaging elements of visual perception. Digital Image-sampling and quantization serial & parallel Image processing.

Module-II: Image Restoration [9 Periods]

Image Restoration-Constrained and unconstrained restoration Wiener filter , motion blur remover, geometric and radiometric correction Image data compression-Huffman and other codes transform compression, predictive compression two tone Image compression, block coding, run length coding, and contour coding.

Module-III: Segmentation Techniques [10 Periods]

Segmentation Techniques-thresh holding approaches, region growing, relaxation, line and edge detection approaches, edge linking, supervised and unsupervised classification techniques, remotely sensed image analysis and applications, Shape Analysis – Gestalt principles, shape number, moment Fourier and other shape descriptors, Skelton detection, Hough trans-form, topological and texture analysis, shape matching.

Module-IV: Pattern Recognition [9 Periods]

Basics of pattern recognition, Design principles of pattern recognition system, Learning and adaptation, Pattern recognition approaches, Mathematical foundations – Linear algebra, Probability Theory, Expectation, mean and covariance, Normal distribution, multivariate normal densities, Chisquared test.

Module-V: Statistical Patten Recognition   **[9 Periods]**

Bayesian Decision Theory, Classifiers, Normal density and discriminant functions, Parameter estimation methods: Maximum-Likelihood estimation, Bayesian Parameter estimation, Dimension reduction methods – Principal Component Analysis (PCA), Fisher Linear discriminant analysis, Expectation-maximization (EM), Hidden Markov Models (HMM),Gaussian mixture models.

Text Books

1. Digital Image Processing – Ganzalez and Wood, Addison Wesley, 1993.
2. Fundamental of Image Processing – Anil K.Jain, Prentice Hall of India.
3. Pattern Classification – R.O. Duda, P.E. Hart and D.G. Stork, Second Edition John Wiley, 2006

Reference Books

1. Digital Picture Processing – Rosenfeld and Kak, vol.I & vol.II, Academic,1982
2. Computer Vision – Ballard and Brown, Prentice Hall, 1982
3. An Introduction to Digital Image Processing – Wayne Niblack, Prentice Hall, 1986
4. Pattern Recognition and Machine Learning – C. M. Bishop, Springer, 2009.
5. Pattern Recognition – S. Theodoridis and K. Koutroumbas, 4th Edition, Academic Press,2009

E-Resources:

1. http://www.nptel.iitm.ac.in/courses/IIT-Kanpure.Communication
2. DIP Image Databases
3. http://www.imagescience.org/

Course Outcomes:

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

CO	Course Outcome	Blooms Taxonomy Level
CO1	Understand different types signal processing techniques used for image sharpening and smoothing	Understand
CO2	perform and apply compression and coding technique used for image data	Analyze
CO3	understand the nature and inherent difficulties of the pattern recognition problems	Understand y
CO4	understand pattern recognition problems and classification techniques such as Bayesian, maximum-likelihood	Apply
CO5	select a suitable classification process, features, and proper classifier to address a desired pattern recognition problem	Analyze

CO- PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COs	Programme Outcomes (POs)												PSOs		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	1												1	1	
CO2	1	2	2	4		3					2		1	1	
CO3	2	3	2		4		1	4				1	1	1	
CO4	3	2	2						4	5	3			2	2
CO5	4	5	1									4	1		1

2021-22 Onwards (MR21)	**Malla Reddy Engineering College** (Autonomous)	**B. Tech.** VII Semester		
Code: B1214	**Social Media Analytics**	**L**	**T**	**P**
Credits: 3	[Professional Elective -IV]	3	-	-

Pre-Requisites: Cybercrime and Information Warfare, Computer Networks.

Course Objectives:

Module-I: [9 Periods]

Introduction to Social Media Analytics (SMA): Social media landscape, Need for SMA; SMA in Small organizations; SMA in large organizations; Application ofSMA in different areas

Network Fundamentals and Models: The social networks perspective - nodes, ties and influencers, Social network and web data and methods.Graphs and Matrices- Basic measures for individuals and networks. Information visualization

Module–II: [9 Periods]

Making Connections: Link analysis. Random graphs and network evolution. Social contexts: Affiliation and identity.

Web Analytics Tools and Techniques: Click stream analysis, A/B testing, online surveys, Useof Google Analytics; Web crawling and indexing; Natural Language Processing Techniques for Micro- text Analysis.

Module- III: [10 Periods]

Facebook Analytics: Introduction, parameters, demographics. Analyzing page audience. Reach and Engagement analysis. Post- performance on FB, Use of Facebook Business Manager; Social campaigns. Measuring and Analyzing social campaigns, defining goals and evaluating outcomes, Network Analysis. (LinkedIn, Instagram, YouTube Twitter etc.

Module- IV: Computer Forensics [9 Periods]

Processing and Visualizing Data, Influence Maximization, Link Prediction, Collective Classification. Applications in Advertising and Game Analytics (Use of tools like Unity30 / PyCharm),

Introduction to Python Programming, Collecting and analyzing social media data; visualization and exploration**.**

Module- V: Mobile Forensics and Legal Aspects of Digital Forensics [9 Periods]

Mobile Forensics: mobile forensics techniques, mobile forensics tools.

Legal Aspects of Digital Forensics: IT Act 2000, amendment of IT Act 2008. Recent trends in mobile forensic technique and methods to search and seizure electronic evidence.

Text Books and Reference Books:

1. Mathew Ganis, Avinash, Koihrkar, Social Media Analytics, IBM Press, 2015 / 1st
2. Jim Sterne, Social Media Metrics, Wiley,Latest
3. Oliver Blanchard, Social Media ROI, Que, Publishing, Latest
4. Marshall Sponder, Gorah F.Khan, Digital Analytics for Marketing, Routledge, 2017 / 1st
5. Marshall Sponder, Social Media Analytics, McGraw Hill, Latest

6. Tracy L. Tuten, Michael R. Solomon, Social Media Marketing,Sage,,2018 / 3rd
7. Gohar F. Khan,Creating Value With Social Media Analytics Create Space Independent Publishing 2018 / 1st
8. Alex Gonsalves, Social Media Analytics Strategy, AP Press, 2017 / 1st

E-resources:
1. https://searchbusinessanalytics.techtarget.com/definition/social-media-analytics
2. https://analytics.facebook.com
3. https://gameanalytics.com/blog/best-tools-for-mobile-game-developers.html
4. https://www.jetbrains.com/pycharm/features/scientific_tools.html

Course Outcomes:

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

CO	Course Outcome	Blooms Taxonomy Level
CO1	Evaluate effectiveness of different social media campaigns using various analytical tools.	Analyze
CO2	Apply appropriate analytic tools to a range of social media data sources.	Analyze
CO3	Examine how different industries across the globe are using social media analytics.	Apply
CO4	Analyze unstructured data primarily textual comments - for sentiments expressed in them.	Apply
CO5	Evaluate the effectiveness of a campaign using social media analytics and Google Analytics.	Analyze

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

2021-22 Onwards (MR21)	Malla Reddy Engineering College (Autonomous)	B. Tech. VII Semester		
Code: B1215	UI/UX Designing	L	T	P
Credits: 3	[Professional Elective - IV]	3	-	-

Pre-requisites: Basic knowledge of software and knowledge of programming languages
Course Objectives:
This UI UX course focuses on the core skills involved in UI/UX designing, including the understanding of different stages of design thinking, working with tools such as Adobe XD / Sketch, identification of appropriate research methods, UI methodologies, and more

Module-I: User-Centered Design Process and User Research   [10 Periods]
Scripting Languages: HTML, CSS, Fundamentals of graphics design, principles of visual design **User-Centered Design Process:** Overview of UI & UX Design, Overview of the UX Design Process, Difference between User Interface (UI) vs User Experience (UX)
User Research: Introduction to User Research, Importance of User Research in UX Design, User research method: Surveys, Contextual Inquiry, Identifying Appropriate Research Methods, Defining user research goals, objectives and questions, Recruiting users

Module-II: Designing Interactions   [9 Periods]
An affinity analysis, modelling, decision tree diagrams and activity diagrams, Defining problem and vision statement, Persona creation – Primary and Secondary persona, Requirement definition, Creative ideation–brainstorming and ideation techniques, Scenarios and functionality extraction, Information architecture, Task flows, Wireframe design

Module-III: Fundamentals of UI, Heuristics and Interaction Design   [9 Periods]
Design Principles for UX and UI Design, UI Elements-Patterns, Material Design (Google) and Human Interface Design (Apple) guidelines, Interaction Principles & Interaction Behaviour, Master the Brand Platforms & Style Guides, Understand problems and design solutions for e-commerce, social media, message, data, and dashboard design

Elementary Sketching & Wire framing

Principles of Sketching, Core Responsive Design, Wireframing vs Wireflows, Click through Wireframing Prototyping, Wireflow Creation, Work with different tools – Sketch, Figma, Adobe XD **Module-IV: Low-High Fidelity Design[9 Periods]** Inclusive Design and Designing for Accessibility, Building High-Fidelity Mockups, Designing Efficiently with Tools, Interaction Patterns, Designing animations and interactions,

Understand Style guides, elements, prototyping, Building a Design System – Style guides, color palette, fonts, grid, iconography, UI elements,

Photography, Imagery, and Illustration

Use of grids in UI design, Design animations and interaction patterns for key UI elements,
Module-V: Usability Evaluation and Product Design   [9 Periods]
Usability Evaluation

Type of usability evaluation – Qualitative & Quantitative evaluation, Guerilla testing , A/B Testing, Unmoderated remote usability testing, Card sorting, Session recording, think aloud. Think aloud– Introduction and advantages, Designing evaluation protocol, Conducting usability evaluation study, Conduct Usability Test explicit, Synthesize your Test Findings, UX practices in corporate World

Interaction with Development Team

Understand how to collaborate and communicate with Developers, Prepare for handing off

designs, How to effectively present your ideas, Receiving and giving Feedback
Product Design
Types of products & solutions, Design Psychology for e-commerce sites, Design Thinking
Life Cycle

Text / Reference Books:
1. "Fundamentals of Creating a Great UI/UX" by Creative Tim
2. **"Refactoring UI" by Steve Schoger & Adam Wathan**
3. **"Laws of UX: Using Psychology to Design Better Products & Services" by Jon Yablonski Course Outcomes:**

Upon completion of the course, the students should be able to:

CO	Course Outcome	Blooms Taxonomy Level
CO1	Identification of problems in UI/UX Design	Understand
CO2	Understand UI principles, latest UI patterns	Analyze
CO3	Implement UI methodologies and building of high-fidelity mockups	Understand y
CO4	Creation of animations and synthesizing of test findings	Apply
CO5	Effective communication with developers and design the products	Analyze

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

2021-22 Onwards (MR21)	Malla Reddy Engineering College (Autonomous)	B. Tech. VII Semester		
Code: B0527	CLOUD COMPUTING [Professional Elective - IV]	L	T	P
Credits: 3		3	-	-

Prerequisites

1. Acourseon"OperatingSystems"

Objectives

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

Module–I:[10Periods]

ComputingParadigms: High-PerformanceComputing,ParallelComputing,DistributedComputing, Cluster Computing, Grid Computing, Cloud Computing, Bio computing, MobileComputing,Quantum Computing,Optical Computing, Nanocomputing.

Module–II:[9Periods]

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

Module–III:[10Periods]

Cloud Computing Architecture and Management: Cloud architecture, Layer, Anatomy oftheCloud,NetworkConnectivityinCloudComputing,Applications,ontheCloud,Managing the Cloud, Managing the Cloud Infrastructure Managing the Cloud application,MigratingApplicationtoCloud,PhasesofCloudMigrationApproachesforCloudMigration.

Module–IV:[9Periods]

Cloud Service Models: Infrastructure as a Service, Characteristics of IaaS. Suitability ofIaaS,ProsandConsofIaaS,SummaryofIaaSProviders,PlatformasaService,Characteristics of PaaS,Suitability of PaaS, Pros and Cons of PaaS,Summary of PaaSProviders, Software as a Service, Characteristics of SaaS, Suitability of SaaS, Pros and ConsofSaaS, Summaryof SaaS Providers, OtherCloud ServiceModels.

Module–V:[10Periods]

Cloud Service Providers: EMC, EMC IT, Captiva Cloud Toolkit, Google, Cloud Platform,Cloud Storage, Google Cloud Connect, Google Cloud Print, Google App Engine, AmazonWeb Services, Amazon Elastic Compute Cloud, Amazon Simple Storage Service, AmazonSimpleQueue,service, Microsoft,WindowsAzure,MicrosoftAssessmentandPlanningToolkit, SharePoint, IBM, Cloud Models, IBM Smart Cloud, SAP Labs, SAP HANA CloudPlatform,VirtualizationServices Provided bySAP, Sales force, SalesCloud, **ServiceCloud:**Knowledgea sa Service, Rackspace, VMware, Manjrasoft,Aneka Platform.

TEXT BOOKS

1. John W. Rittinghouse, "**Cloud Computing: Implementation, Management, and Security** ". James F. Ransome, CRC Press 2009.
2. Kai Hwang. Geoffrey C.Fox, Jack J. Dongarra, "**Distributed and Cloud Computing From Parallel Processing to the Internet of Things**", Elsevier, 2012.
3. Rajkumar Buyya, James Broberg and Andrzej M. Goscinski," **Cloud Computing: Principles and Paradigms (Wiley Series on Parallel and Distributed Computing),** Wiley Publishing ©2011

REFERENCES:
1. Raluca Ada Popa, Catherine M.S. Redfield, Nickolai Zeldovich, and Hari Balakrishnan, "**CryptDB: Protecting Confidentiality with encrypted Query Processing**"23rd ACM Symposium on Operating Systems Principles (SOSP 2011), Cascais, Portugal October 2011.
2. Craig Gentry,"**A Fully Homomorhic Encryption Scheme**", September 2009.
3. David Marshall, Wade A. Reynolds, "**Advanced Server Virtualization: VMware and Microsoft Platform in the Virtual Data Center**", Auerbach Publications, 2006.

E-RESOURCES
1. http://www.motc.gov.qa/sites/default/files/cloud_computing_ebook.pdf
2. http://ndl.iitkgp.ac.in/document/zyMnqgZQXCJME6wgSqrU87VCGcelOw5mZ-5ybmrhKBj79VQPP0_ZQHLqcOopPDoaFWhZybCrPg_joTbBU8ZpGA
3. http://www.springer.com/computer/communication+networks/journal/13677
4. http://nptel.ac.in/courses/106106129/28

Course Outcomes:

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

CO	Course Outcome	Blooms Taxonomy Level
CO1	Understand the cloud enabling technologies and the Cloud service models	Understand
CO2	Choose the levels of virtualization and tools for resource provisioning	Analyze
CO3	Compare the cloud platform architectures of virtualized data centers and Inter- cloud Resource Management.	Analyze
CO4	Analyze the principlesof Security and Trust management to protect confidentiality of data in the Cloud.	Analyze
CO5	Propose the standards of Parallel and Distributed Programming Paradigms for improving user Access to Cloud Computing.	Apply

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

2021-22 Onwards (MR21)	Malla Reddy Engineering College (Autonomous)	B. Tech. VII Semester		
Code: B0545	Blockchain Technologies [Professional Elective - V]	L	T	P
Credits: 3		3	-	-

Prerequisites: NIL

Course Objectives:

This course provides a broad overview of the essential concepts of blockchain technology – by initially exploring the Bitcoin protocol followed by the Ethereum protocol – to lay the foundation necessary for developing applications and programming.

1. To understand the history, types and applications of Blockchain
2. To acquire knowledge about cryptography and consensus algorithms.
3. Deploy projects using Web3j and design blockchain based applications.

Module I: Introduction to Blockchain   **[9 Periods]**

Distributed DBMS–Limitations of Distributed DBMS, Introduction to Block chain–History, Definition, Distributed Ledger, Blockchain Categories–Public, Private, Consortium, Blockchain Network and Nodes, Peer-to-Peer Network, Mining Mechanism, Generic elements of Blockchain, Features of Blockchain, and Types of Blockchain.

Module II: Blockchain Architecture   **[9 Periods]**

Operation of Bitcoin Blockchain, Blockchain Architecture – Block, Hash, Distributer P2P, Structure of Blockchain- Consensus mechanism: Proof of Work (PoW), Proof of Stake (PoS), Byzantine Fault Tolerance (BFT), Proof of Authority (PoA) and Proof of Elapsed Time (PoET)

Module III: Blockchain-Based Futures System   **[8 Periods]**

Project presentation- Futures smart contract: Blockchain oracles- Web3j: Setting up the Web3J- Installing web3j- Wallet creation, Java client: The wrapper generator- Initializing web3j- Setting up
Ethereum accounts- Deploying the contract

Module IV: Blockchain in Business and Creating ICO   **[10 Periods]**

Public versus private and permissioned versus permission less blockchains- Privacy and anonymity in Ethereum- Why are privacy and anonymity important? - The Ethereum Enterprise Alliance- Blockchain-as-a-Service- Initial Coin Offering (ICO): Project setup for ICO implementation- Token contracts- Token sale contracts-Contract security and testing the code

Module V: Distributed Storage IPFS and Swarm   **[8 Periods]**

Ethereum Virtual Machine- Swarm and IPFS: Installing IPFS, Hosting our frontend: Serving your frontend using IFPS, Serving your frontend using Swarm, IPFS file uploader project: Project setup the web page

Text Books:

1. Imran Bashir, "Mastering Blockchain: Distributed Ledger Technology, decentralization, and smart contracts explained", 2nd Edition, Packt Publishing Ltd, March 2018.
2. Bellaj Badr, Richard Horrocks, Xun (Brian) Wu, "Blockchain By Example: A

developer's guide to creating decentralized applications using Bitcoin, Ethereum, and Hyperledger", Packt Publishing Limited, 2018.

Reference Books:

1. Andreas M. Antonopoulos, "Mastering Bitcoin: Unlocking Digital Cryptocurrencies", O'Reilly Media Inc, 2015
2. Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller and Steven Goldfeder, "Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction", Princeton University Press, 2016.

E-References:

1. https://www.velmie.com/practical-blockchain-study
2. https://www.udemy.com/course/build-your-blockchain-az/
3. https://blockchainhub.net/blockchains-and-distributed-ledger-technologies-in-general/
4. https://blog.todotnet.com/2019/03/solving-real-world-problems-with-distributed-ledger-technology/

Course Outcome:

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

CO	Course Outcome	Blooms Taxonomy Level
CO1	Contentedly discuss and describe the history, types and applications of Blockchain	Understand
CO2	Gains familiarity with cryptography and Consensus algorithms.	Analyze
CO3	Create and deploy projects using Web3j.	Understand
CO4	Implement an ICO on Ethereum	Apply
CO5	Design blockchain based application with Swarm and IPFS	Analyze

CO-PO Mapping (3/2/1 Indicates Strength of Correlation) 3-Strong, 2-Medium, 1-Weak														
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO-1	3	3	2	-	1	1	-	-	1	1	-	3	2	3	-
CO-2	3	3	3	2	2	2	-	-	1	2	-	3	2	3	-
CO-3	3	3	3	1	2	2	-	1	2	2	1	3	2	3	2
CO-4	3	3	3	1	2	2	-	1	2	2	1	3	2	3	2
CO-5	3	3	3	-	2	2	-	1`	2	2	1	3	2	3	2

2021-22 Onwards (MR21)	**Malla Reddy Engineering College** (Autonomous)	**B. Tech. VII Semester**		
Code: B1217	**Augmented Reality and Virtual Reality** [Professional Elective - V]	**L**	**T**	**P**
Credits: 3		**3**	**-**	**-**

Prerequisites: Fundamentals of Image Processing

Course Objectives:

1. To describes the fundamentals of sensation, perception, technical and engineering aspects of virtual
2. reality systems.
3. To explore the concepts of Virtual reality and develop 3D virtual environment.
4. To foundation to the fast growing field of AR and make the students aware of the various AR devices.
5. To help students build various types of VR experiences and use Unity to develop VR applications.
6. To expose students to the world of research, technology and innovation.

Module-I   **[10 Periods]**
Introduction: The three I's of virtual reality, commercial VR technology and the five classic components of a VR system.
Input Devices: Trackers, Navigation and Gesture Interfaces, Three-dimensional position trackers, navigation and manipulation, interfaces and gesture interfaces.

Module -II   **[9 Periods]**
Output Devices: Graphics displays, sound displays & haptic feedback.
Modeling: Geometric modeling, kinematics modeling, physical modeling, behavior modeling, model management

Module -III   **[10 Periods]**
Human Factors: Methodology and terminology, user performance studies, VR health and safety issues.
Applications: Medical applications, military applications, robotics applications.

Module -IV   **[10 Periods]**
VR Programming-I: Introducing Java 3D, loading and manipulating external models, using a lathe to make shapes.

Module -V   **[9 Periods]**
VR Programming-II: 3D Sprites, animated 3D sprites, particle systems.

Text Books:

1. Virtual Reality Technology, Second Edition, Gregory C. Burdea & Philippe Coiffet, John Wiley & Sons, Inc.,
2. Killer Game Programming in Java, Andrew Davison, Oreilly-SPD, 2005.

References:

1. Understanding Virtual Reality, interface, Application and Design, William R.Sherman, Alan Craig, Elsevier(Morgan Kaufmann).
2. 3D Modeling and surfacing, Bill Fleming, Elsevier(Morgan Kauffman).
3. 3D Game Engine Design, David H.Eberly, Elsevier.

4. Virtual Reality Systems, John Vince, Pearson Education.

E-Resources:

1. http://lavalle.pl/vr/book.html
2. https://nptel.ac.in/courses/106/106/106106138
3. https://www.coursera.org/learn/introduction-virtual-reality
4. https://www.vttresearch.com/sites/default/files/pdf/science/2012/S3.pdf
5. https://docs.microsoft.com/en-us/windows/mixed-reality/
6. https://docs.microsoft.com/en-us/archive/msdnmagazine/2016/november/hololensintroduction-to- the-hololens

Course Outcomes:

CO	Course Outcome	Blooms Taxonomy Level
CO1	Apply the describe how VR systems work and list the applications of VR.	Analyze
CO2	Understand the system of human vision and its implication on perception and rendering.	Analyze
CO3	Create and deploy a VR application.	Create
CO4	Identify the describe how AR systems work and list the applications of AR	Identify
CO5	Construct the acquire knowledge in VR and AR technologies in terms of used devices, building of the virtual environment and modalities of interaction and modeling.	Analyze

CO'S	Contribution to Program Outcomes														
	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						2			1	1	
CO2	1	2	2		3			1					1	1	
CO3	2	2	2			3			2		1	4	1	1	
CO4	2	2	2							2				2	2
CO5	1	2	1				2						1		

2021-22 Onwards (MR21)	**Malla Reddy Engineering College** (Autonomous)		**B. Tech.** VII Semester	
Code: B1218	**Software Project Management** [Professional Elective-V]	**L**	**T**	**P**
Credits: 3		**3**	**-**	**-**

Course Objectives & Outcomes

The objectives of the course are:

1. To study how to plan and manage projects at each stage of the software development life cycle (SDLC)
2. To train software project managers and other individuals involved in software project planning and tracking and oversight in the implementation of the software project management process.
3. To understand successful software projects that support   organization's strategic goals

MODULE I: Introduction Project **[10 Periods]**

 Management, Software Project Management activities, Challenges in software projects, Stakeholders, Objectives & goals

Project Planning: Step-wise planning, Project Scope, Project Products& deliverables, Project activities, Effort estimation, Infrastructure

MODULE II: **[9 Periods]**

Project Approach, Lifecycle models, Choosing Technology, Prototyping
Iterative & incremental Process

Framework: Lifecycle phases, Process Artifacts, Process workflows.

MODULE III: **[9 Periods]**

 Effort estimation & activity Planning, Estimation techniques, Function Point analysis, SLOC, COCOMO, Use case-based estimation , Activity Identification Approaches, Network planning models, Critical path analysis

Risk Management, Risk categories, Identification, Assessment, Planning and management, PERT technique, Monte Carlo approach

MODULE IV: **[9 Periods]**

Project Monitoring &Control, Resource Allocation

Creating a framework for monitoring & control, Progress monitoring, Cost monitoring, Earned value Analysis, Defects Tracking, Issues Tracking, Status reports, Types of Resources, Identifying resource requirements, Resource scheduling

MODULE V: **[10 Periods]**

 Software Quality, Planning Quality, Defining Quality - ISO 9016, Quality Measures, Quantitative Quality Management Planning, Product Quality & Process Quality
Metrics, Statistical Process Control Capability Maturity Model, Enhancing software Quality.

Text Books:
1.   Software Project Management, Bob Hughes & Mike Cotterell, TATA Mcgraw-Hill
2.   Software Project Management, Walker Royce: Pearson Education, 2005.
3.   Software Project Management in practice, PankajJalote, Pearson.

Reference Book:
1.   Software Project Management, Joel Henry, Pearson Education.

Course Outcomes:

Upon completion of the course, students will be able to

Course Outcomes

After completing this Course, the student should be able to:
1. To match organizational needs to the most effective software development model
2. To understand the basic concepts and issues of software project management
3. To effectively Planning the software projects
4. To implement the project plans through managing people, communications and change
5. To select and employ mechanisms for tracking the software projects
6. To conduct activities necessary to successfully complete and close the Software projects
7. To develop the skills for tracking and controlling software deliverables
8. To create project plans that address real-world management challenges

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

2021-22 Onwards (MR21)	**Malla Reddy Engineering College** (Autonomous)	**B. Tech.** **VII Semester**		
Code: B1219	**Mobile Communication**	L	T	P
Credits: 3	[Professional Elective -V]	3	-	-

Prerequisites: NIL.

Course objectives:

The student should be made to:

1. Understand the basic concepts of mobile computing
2. Understand Wireless LAN, Bluetooth and WiFi Technologies
3. Be familiar with the network protocol stack
4. Learn the basics of mobile telecommunication system
5. Be exposed to Ad-Hoc networks

Module I: Introduction [09 Periods]

Introduction to Mobile Computing, Applications of Mobile Computing- Generations of Mobile Communication Technologies

MAC Protocols: SDMA, TDMA, FDMA, CDMA

Module-II: **Mobile Telecommunication System** [09 Periods]

GSM, Architecture, Protocols, Connection Establishment, Frequency Allocation, Routing, Mobility Management, Security, GPRS, UMTS Architecture

Module-II: **III**: **Wireless Networks** [09 Periods]

Wireless LANs and PANs, IEEE 802.11 Standard, Architecture, Services: Bluetooth, Wi-Fi, WiMAX

Module-IV: **Mobile Network Layer** [09 Periods]

Mobile IP, DHCP, AdHoc, Proactive and Reactive Routing Protocols, Multicast Routing, Vehicular Ad Hoc networks (VANET), MANET Vs VANET, Security

Module-V: Mobile Transport and Application Layer [10 Periods]

Mobile TCP, WAP Architecture, WDP, WTLS, WTP, WSP, WAE, WTA Architecture, WML

Text Books:

1. Jochen Schiller, "Mobile Communications', PHI, Second Edition, 2003.
2. Prasant Kumar Pattnaik, Rajib Mall, "Fundamentals of Mobile Computing", PHI Learning Pvt.Ltd, New Delhi – 2012.

References:

1. Dharma Prakash Agarval, Qing and An Zeng, "Introduction to Wireless and Mobile systems",Thomson Asia Pvt Ltd, 2005.
2. Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas Stober, ―Principles of Mobile Computing‖, Springer, 2003.
3. William.C.Y.Lee,―Mobile Cellular Telecommunications-Analog and Digital Systems‖, Second Edition,Tata Mc Graw Hill Edition ,2006.
4. C.K.Toh, ―AdHoc Mobile Wireless Networks‖, First Edition, Pearson Education, 2002.

5. Android Developers: http://developer.android.com/index.html
6. Apple Developer: https://developer.apple.com/
7. Windows Phone Dev Center: http://developer.windowsphone.com
8. BlackBerry Developer: http://developer.blackberry.com
9. www.padeepz.net

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

CO	Course Outcome	Blooms Taxonomy Level
CO1	Explain the basics of mobile telecommunication system	Understand
CO2	Illustrate the generations of telecommunication systems in wireless network	Analyze
CO3	Understand the architecture of Wireless LAN technologies	Understand
CO4	Determine the functionality of network layer and Identify a routing protocol for a given Ad hoc networks	Apply
CO5	Explain the functionality of Transport and Application layer	Analyze

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

2021-22 Onwards (MR21)	**Malla Reddy Engineering College** (Autonomous)		**B. Tech.** VII Semester	
Code: B6917	**Internet of Things** [Professional Elective -V]	**L**	**T**	**P**
Credits: 3		3	-	-

Prerequisites: Basic knowledge of computer architecture, programming and communication protocols

Course Objectives:
1. Understand the basics of Embedded System, IoT and the development model.
2. Understand the architecture, Instruction set and work on ARM microcontroller using hands-on experience.
3. Ability to select appropriate hardware and microcontrollers based on need of application.
4. Understand the Internet of Things Standards, Frameworks and Techniques.
5. Apply the tools, techniques and skills acquired towards development of Projects.

Module-I: Introduction to Embedded Systems and Internet of Things   [09 Periods]
Architecture of Embedded Systems, Embedded Systems Development process, Architecture of Internet of Things, Applications of Embedded Systems and IoT, Design Methodology for IOT Products

Module-II: Overview of Open-Source Hardware and Its relevance to IOT   [09 Periods]
Introduction and Programming Arduino Development Board , Working with Sensor Integration, Interfacing Input / Output devices (Pot, LDR, LCD, etc), Introduction to Network Connectivity, Concepts of IP based communication, Client – Server model of communication, Introduction to Wi-Fi communication using ESP8266, ESP8266 in Station & Access Point Mode

Module-III: Fundamentals of Python Programming & Raspberry PI   [10 Periods]
Introduction to python programming, working with functions, classes, REST full Web Services, Client Libraries, Introduction & programming Raspberry Pi3, Integrating Input Output devices with Raspberry Pi3

Module-IV: IOT and Cloud Computing Platforms for IOT Development (IBM Cloud) [10 Periods]
IOT Platform Architecture (IBM Internet of Things & Watson Platforms), API Endpoints for Platform Services, Devices Creation and Data Transmission, Introduction to NODE-RED and Application deployment

Module-V: IOT Use-cases: Smart city Project & Industrial Use cases   [10   Periods]
Introduction to Smart City Project & IOT Use cases, Development of Smart city Applications, Project Work -1 (Smart city Use case), Project Work-2 (Industrial Use case)

Text Books
1. Internet of Things: A Hands-On Approach by by Arsheep Bahga, Vijay Madisetti
2. The Internet of Things: Key applications and Protocols" Wiley Publications 2nd Edition

References
1. Embedded Systems: Real-Time Interfacing to Arm(r) Cortex -M Microcontrollers: Volume-1&2 by Jonathan W. Valvano
2. Designing the Internet of Things‖ by Adrian McEwen, Hakim Cassimally, Wiley Publications, 2012
3. Embedded Real Time Systems: Concepts, Design and Programming by

Dr.K.V.K.K.Prasad, Dream Tech Publication, 2003.

E-Resources

1. http://www.itu.int/en/ITU-T/gsi/iot/Pages/default.aspx
2. http://electronicdesign.com/embedded/understanding-protocolsbehind-internet-things
3. http://eclipse.org/community/eclipse_newsletter/2014/february/article2.php
4. http://iot.eclipse.org/protocols.html
5. http://www.slideshare.net/paolopat/internet-ofthingsprotocolswar
6. http://www.slideshare.net/RealTimeInnovations/io-34485340
7. https://thingsboard.io/docs/iot-video-tutorials/
8. https://thenewboston.com/videos.php?cat=98&video=20109

Course Outcomes:

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

CO	Course Outcome	Blooms Taxonomy Level
CO1	**Describe** the fundamental concepts of IoT and its applications	Understand
CO2	**Illustrate** M2M concepts with protocols	Analyze
CO3	**Develop** applications using Python Scripting Language.	Understand
CO4	**Build** real world applications by applying Raspberry PI.	Apply
CO5	**Examine** web-based services.	Analyze

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

2021-22 Onwards (MR21)	Malla Reddy Engineering College (Autonomous)	B. Tech. VII Semester		
Code: B0544	**Data Mining Lab**	**L**	**T**	**P**
Credits: 2		**-**	**1**	**2**

Prerequisite: NIL

Course Objectives:

This course provides the students to understand stages in building a Data Warehouse, identify the need and importance of preprocessing techniques, implement similarity and dissimilarity techniques, analyze and evaluate performance of algorithms for Association Rules, analyze Classification and Clustering algorithms.

Software Requirements: WEKA TOOL

List of Programs:

1. Demonstration of preprocessing on dataset student.arff.
2. Implementation of preprocessing on dataset labor.arff.
3. Demonstration of Association rule process on dataset contact lenses.arff using Apriori Algorithm.
4. Implement Association rule process on dataset test.arff using apriori algorithm.
5. Apply classification rule process on dataset student.arff using j48algorithm.
6. Perform classification rule process on dataset employee.arff using j48algorithm.
7. Use classification rule process on dataset employee.arff using id3algorithm.
8. Deploy classification rule process on dataset employee.arff using naïve bayes Algorithm.
9. Implement clustering rule process on dataset iris.arff using simple k-means.
10. Make use of clustering rule process on dataset student.arff using simple k-means.
11. Design a decision tree by pruning the nodes on your own. Convert the decision trees into "if-then- else rules". The decision tree must consist of 2-3 levels and convert it into a set of rules.
12. Generate Association rules for the following transactional database using Apriori algorithm.

TID	List of Items
T100	I1,I2,I5
T200	I2,I4
T300	I2,I3
T400	I1,I2,I4
T500	I1,I3
T600	I2,I3
T700	I1,I3
T800	I1,I2,I3,I5

TEXT BOOKS

1. Pang-Ning Tan & Michael Steinbach, "**Introduction to Data Mining**", Vipin Kumar, Pearson.
2. Jiawei Han, Michel Kamber," Data **Mining concepts and Techniques**", 3rd Edn, 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.

Course Outcomes:

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

CO	Course Outcome	Blooms Taxonomy Level
CO1	**Analyze** the classification rules on various databases	Understand
CO2	**Deploy** association rules for any kind of databases.	Analyze
CO3	**Develop** clustering rules for applications.	Create

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

2021-22 Onwards (MR21)	Malla Reddy Engineering College (Autonomous)	B. Tech. VII Semester		
Code: B1220	DEVOPS Lab	L	T	P
Credits: 1		-	-	2

Course Objectives:
1. Describe the agile relationship between development and IT operations.
2. Understand the skillsets and high-function in gteams involved in DevOps and related methods to reach a continuous delivery capability
3. Implement automated system update and DevOps lifecycle

List of Experiments:
1. Write code for a simple user registration form for an event.
2. Explore Git and GitHub commands.
3. Practice Source code management on GitHub. Experiment with the source code in exercise 1.
4. Jenkins installation and setup, explore the environment.
5. Demonstrate continuous integration and development using Jenkins.
6. Explore Docker commands for content management.
7. Develop a simple containerized application using Docker.
8. Integrate Kubernetes and Docker
9. Automate the process of running containerized application for exercise 7 using Kubernetes.
10. Install and Explore Selenium for automated testing.
11. Write a simple program in JavaScript and perform testing using Selenium.
12. Develop test cases for the above containerized application using selenium.

TEXTBOOKS:
1. JoakimVerona. PracticalDevops,Second Edition. Ingramshorttitle; 2nd edition (2018). ISBN-10: 1788392574
2. DeepakGaikwad,ViralThakkar.DevOpsToolsfromPractitioner'sViewpoint.Wiley publications. ISBN: 9788126579952

REFERENCEBOOKS/LEARNINGRESOURCES:
1. LenBass,IngoWeber,LimingZhu.DevOps:ASoftwareArchitect'sPerspective.Addison Wesley EdurekaDevOpsFullCourse-https://youtu.be/S_0q75eD8Yc

Course Outcomes:

CO	Course Outcome	Blooms Taxonomy Level
CO1	Understand the need of DevOps tools	Understand
CO2	Understand the environment for a software application development	Analyze
CO3	Apply different project management, integration and development tools	Apply

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

2021-22 Onwards (MR21)	Malla Reddy Engineering College (Autonomous)		B. Tech. VII Semester	
Code: B00P1	**Mini Project**	L	T	P
Credits: 2		-	-	4

Objectives:

The objective of Project Stage-I is to enable the student take up investigative study in the broad field of Engineering / Technology, either fully theoretical/practical or involving both theoretical and practical work to be assigned by the Department on an individual basis or two/three students in a group, under the guidance of a supervisor. This is expected to provide a good initiation for the student(s) towards R&D.

The work should contain:

1. Survey and study of published literature on the assigned /selected topic.
2. Working out a initial Method to the Problem relating to the assigned topic;
3. Conducting preliminary Analysis/Modeling/Simulation/Experiment/Design/Feasibility.
4. Preparing a Written Report on the Study conducted for Presentation to the Department.
5. Final Seminar, as oral Presentation before a departmental Committee.

Table: Guidelines for the Award of Marks

Evaluator	Max. Marks	Evaluation Criteria
Guide/ Supervisor	20	Project Review
	5	Report
Project Review Committee	5	Relevance of the Topic
	5	PPT Preparation
	5	Presentation
	5	Question and Answers
	5	Report
	5	Preparation

2021-22 Onwards (MR21)	Malla Reddy Engineering College (Autonomous)	B.Tech. VIII Semester		
Code: B0548	**Software Testing Methodologies**	L	T	P
Credits: 3	[Professional Elective-VI]	3	-	-

Prerequisites: Software Engineering
Course Objectives:
This Course enables the students to understand the principles and need for various types of testing test adequacy assessment using: data flow, transaction flow and path testing, describe strategies for generating system test cases, apply the essential characteristics of path product and regular expressions, and explain about the people and organizational issues in Testing.

MODULE I: Introduction to Software Testing and Defects   [08 Periods]
Introduction-Purpose of testing-Dichotomies-Software Testing Principles- Bugs, consequences of bugs, Taxonomy of bugs -The Tester's Role in a Software Development Organization-Black box testing and white box testing.
Defects- Cost of defects- Defect Classes- Defect Examples, software testing life cycle.

MODULE II : Testing Techniques   [10 Periods]
Flow graphs and Path Testing- Basics concepts of path testing-predicates-path predicates and achievable paths- path sensitizing- path instrumentation, application of path testing.
Transaction and Data Flow Testing- Transaction flows- transaction flow testing techniques, Basics of dataflow testing - strategies in data flow testing–application of dataflow testing.

MODULE III: Test Case Approaches and Testing Types   [11 Periods]
A: Test Case Design Strategies
Using Black Box Approach to Test Case Design -Random Testing – Requirements based testing – Boundary Value Analysis – Equivalence Class Partitioning– Compatibility testing – User documentation testing – Domain testing.
B: Testing Types
Alpha, Beta Tests, Usability and Accessibility testing – Configuration testing - Compatibility testing – Testing the documentation.

MODULE IV: Path Testing and Applications   [10 Periods]
Paths, Path products and Regular Expressions- Path products and path expression- reduction procedure- applications- regular expressions and flow anomaly detection.
Logic Based Testing, State Graphs and Transition Testing- Overview decision tables path expressions, k-v charts, state, State graphs, transition testing, good and bad state graphs, state testing, testability tips.

MODULE V: Software Testing Tools and Graph Matrices   [09 Periods]
Graph Matrices and Applications- Motivational over view, matrix of graph, relations, power of matrix, node reduction algorithm. Software Testing Tools- Taxonomy of Testing tools. Methodology to evaluate automated testing tools, Load Runner, Win runner and Rational Testing Tools, Java Testing Tools, JMetra, JUNIT and Cactus.

Textbooks:
   1. Van Nostrand Reinhold, "Software Testing Techniques", Boris Beizer, 2nd Edition,

New York,1990.
2. Srinivasan Desikan and Gopalaswamy Ramesh, "Software Testing Principles and Practices", Pearson Education,2006.

References:
1. Sams Publishing, "Software Testing", Ron Patton, Second Edition, Pearson education,2007.
2. Renu Rajani, Pradeep Oak, "Software Testing – Effective Methods, Tools and Techniques", Tata McGraw Hill,2004.
3. Edward Kit, "Software Testing in the Real World – Improving the Process", Pearson Education,1995.
4. Aditya P. Mathur, "Foundations of Software Testing – Fundamental algorithms and techniques", Dorling Kindersley (India) Pvt. Ltd., Pearson Education,2008

E -Resources
1. https://books.google.co.in/books?isbn=8177222600
2. https://books.google.co.in/books?isbn=817758121X
3. http://www.uta.fi/sis/reports/index/R31_2014.pdf
4. http://nptel.ac.in/courses/106101061/18#

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

CO	Course Outcome	Blooms Taxonomy Level
CO1	Analyze the Conventional Blooms Taxonomy Level Software Management	**Analyze**
CO2	Demonstrate the principles of conventional software Engineering, Life cycle Phases, and Artifacts of the process.	**Apply**
CO3	Apply the Software testing Work Flows of the process, Checkpoints of the process and Iterative Process Planning.	**Apply**
CO4	Develop automation Process, Project Control and Process instrumentation, tailoring the process in software testing	**Apply**
CO5	Evaluate the project organizations and responsibilities, future software project management with case study.	**Analyze**

CO-PO,PSO Mapping (3/2/1indicatesstrengthofcorrelation)3-Strong,2-Medium,1-Weak															
CO	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	-	-	-	-	-	-	-	-	3	3	-	-	3	-	3
CO2	2	3	-	-	-	-	-	-		3	-	-	3	2	-
CO3	-	-	3	3	-	-	-	-	-	2	-	-		3	-
CO4	-	-	-	2	3	-	-	-	-	-	-	-	2		-
CO5	-	-	-	-	-	2	3	3		-	-	-	3	3	-

2021-22 Onwards (MR21)	**Malla Reddy Engineering College** (Autonomous)	**B.Tech. VIII Semester**		
Code: B0550	**Deep Learning**	L	T	P
Credits: 3	**[Professional Elective - VI]**	3	-	-

Course Objectives

In this course students will be given an exposure to the details of neural networks as well as deep learning architectures and to develop end-to-end models for such tasks. Students will learn to implement, train and debug their own neural networks. Every student has to develop a complete working model to solve some real-world problem**.**

Module-I: Artificial Neural Networks (ANN)   **[9 Periods]**

Basics of Artificial Neural Networks (ANN): Artificial neurons, Computational models of neurons, Structure of neural networks, Functional units of ANN for pattern recognition tasks

Feedforward Neural Networks: Pattern classification using perceprton, Multilayer feedforward neural networks (MLFFNNs), Backpropagation learning, Empirical risk minimization, Regularization, Autoencoders

Module-II: Deep Neural Networks (DNNs)   **[8 Periods]**

Deep Neural Networks (DNNs): Difficulty of training DNNs, Greedy layer wise training, Optimization for training DNNs, Newer optimization methods for neural networks (AdaGrad, RMSProp, Adam), Second order methods for training, Regularization methods (dropout, drop connect, batch normalization)

Module-III: Convolution Neural Networks (CNNs)   **[10 Periods]**

Convolution Neural Networks (CNNs): Introduction to CNNs – convolution, pooling, Deep CNNs, Different deep CNN architectures – LeNet, AlexNet, VGG, PlacesNet,

Training CNNs: Weights Initialization, Batch Normalization, Hyperparameter Optimization, Understanding and Visualizing CNNs.

Module-IV: Recurrent Neural Networks (RNNs)   **[9 Periods]**

Recurrent Neural Networks (RNNs): Sequence modeling using RNNs, Back propagation through time, Long Short-Term Memory (LSTM), Bidirectional LSTMs, Bidirectional RNNs, Gated RNN Architecture

Module-V: Auto Encoders and Generative Adversarial Networks   **[9 Periods]**

Auto Encoders: Types of Auto Encoders and its applications

Generative Adversarial Networks: Generative Adversarial Network, Deep Convolutional Generative Adversarial Networks

Applications: Applications in vision, speech and natural language processing

Text Books:

1. Goodfellow, I., Bengio,Y., and Courville, A., Deep Learning, MIT Press, 2016.
2. Aston Zhang, Zachary C. Lipton, Mu Li, and Alexander J. Smola, Dive into Deep Learning, 2020

References Books

1. S. Haykin, Neural Networks and Learning Machines, Prentice Hall of India, 2010
2. Satish Kumar, Neural Networks - A Class Room Approach, Second Edition, Tata McGraw-Hill, 2013
3. Yegnanarayana, Artificial Neural Networks, Prentice- Hall of India, 1999
4. C.M. Bishop, Pattern Recognition and Machine Learning, Springer, 2006

E-Resources:
1. https://www.deeplearningbook.org
2. https://d2l.ai/

Course Outcomes:

By the end of this deep learning course with TensorFlow, the student will be able to

CO	Course Outcome	Blooms Taxonomy Level
CO1	Understand the concepts of TensorFlow, its main functions, operations and the execution pipeline	Understand
CO2	Implement deep learning algorithms, understand neural networks and traverse the layers of data abstraction which will empower the student to understand data more precisely.	Analyze
CO3	Learn topics such as convolutional neural networks, recurrent neural networks,	Analyze
CO4	Understand the language and fundamental concepts of artificial neural networks	Apply
CO5	Training deep networks and high-level interfaces and build deep learning models and interpret the results	Understand

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
Co-Po Mapping (3/2/1 Indicates Strength Of Correlation) 3-Strong, 2-Medium, 1-Weak															
CO-1	3	3	2	-	1	1	-	-	1	1	-	3	2	3	-
CO-2	3	3	3	2	2	2	-	-	1	2	-	3	2	3	-
CO-3	3	3	3	1	2	2	-	1	2	2	1	3	2	3	2
CO-4	3	3	3	1	2	2	-	1	2	2	1	3	2	3	2
CO-5	3	3	3	-	2	2	-	1`	2	2	1	3	2	3	2

Pre-requisites: Basics of AI

Course Objectives:

- To develop semantic-based and context-aware systems to acquire, organize process, share and use the knowledge embedded in multimedia content.
- Research will aim to maximize automation of the complete knowledge lifecycle and achieve semantic interoperability between Web resources and services.
- The field of Robotics is a multi-disciplinary as robots are amazingly complex system comprising mechanical, electrical, electronic H/W and S/W and issues germane to all these.

Module I - Problem solving and Scope of AI [10 Periods]

Introduction to Artificial Intelligence: Applications- Games, theorem proving, natural language processing, vision and speech processing, robotics, expert systems. AI techniques- search knowledge, abstraction.

Problem Solving

State space search-Production systems, search space control: depth-first, breadth-first search. Heuristic search - Hill climbing, best-first search, branch and bound. Problem Reduction, Constraint Satisfaction End, Means-End Analysis. LA* Algorithm, L(AO*) Algorithm.

Module II - Knowledge Representation [9 Periods]

Knowledge Representation issues, first order predicate calculus, Horn Clauses, Resolution, Semantic Nets, Frames, Partitioned Nets, Procedural Vs Declarative knowledge, Forward Vs Backward Reasoning.

Module III - Understanding Natural Languages [10 Periods]

Introduction to NLP, Basics of Syntactic Processing, Basics of Semantic Analysis, Basics of Parsing techniques, context free and transformational grammars, transition nets, augmented transition nets, Shanks Conceptual Dependency, Scripts, Basics of grammar free analyzers, Basics of sentence generation, and Basics of translation.

Module IV- Expert Systems [8 Periods]

Expert System: Need and justification for expert systems, knowledge acquisition, Case Studies: MYCIN, R1

Programming Language: Introduction to programming Language, LISP and PROLOG.

Handling Uncertainties: Non-monotonic reasoning, Probabilistic reasoning, use of certainty factors, Fuzzy logic.

Module V - Introduction to Robotics [9 Periods]

Fundamentals of Robotics, Robot Kinematics: Position Analysis, Dynamic Analysis and Forces, Robot Programming languages & systems: Introduction, the three levels of robot programming, requirements of a robot programming language, problems peculiar to robot programming languages

Text & References:

1. Russell Stuart, Norvig Peter, "Artificial Intelligence Modern Approach", Pearson Education series in AI, 3rd Edition, 2010.
2. Dan.W. Patterson, "Introduction to Artificial Intelligence and Expert Systems", PHI Learning, 2009.
3. Donald.A. Waterman, "A guide to Expert Systems", Pearson, 2002.

Course Outcomes:

The student will be able to:

CO	Course Outcome	Blooms Taxonomy Level
CO1	Describe human intelligence and AI Explain how intelligent system works.	Understand
CO2	Apply basics of Fuzzy logic and neural networks.	Analyze
CO3	Apply Knowledge representation and semantic	Analyze
CO4	Apply Knowledge representation and semantic in Knowledge representation.	Apply
CO5	Develop some familiarity with current research problems and research methods in AI.	Understand

CO-PO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak												
	Programme Outcomes (POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1					1					2		2
CO2										1		2
CO3		1		1						2		2
CO4					1	1			1	2		2
CO5				1	1				1	2		2
CO6	3			3	1				2			

2021-22 Onwards (MR21)	**Malla Reddy Engineering College** (Autonomous)	**B.Tech.** **VIII Semester**		
Code: B0537	**NATURAL LANGUAGE PROCESSING**	**L**	**T**	**P**
Credits: 3	[Professional Elective - VI]	**3**	**-**	**-**

Prerequisites: Formal Languages and Automata Theory

Course Objectives:

This course provides a broad introduction to NLP to determine whether the algorithm answers the goals of its designers, or if the system meets the needs of its users. And to demonstrate NLP with regular expression, Python programming, demonstrate Context Free Grammar, Probability theory to analyze various models of language, implement Naive Bayes, HMM, explore in detail about Probabilistic Context Free Grammars, Models, parsers and classifiers, grammar and techniques.

Module I: Introduction and Regular Expressions   [10 Periods]

Natural Language Processing (NLP) - Introduction to NLP, Hands-on demonstrations, Ambiguity and uncertainty in language, Turing test, Chomsky hierarchy, regular languages, and limitations, Finite-state automata, Practical regular expressions for finding and counting language phenomena.

Programming in Python - Programming in Python and String Edit Distance and Alignment: An introduction to programming in Python, Variables, numbers, strings, arrays, dictionaries, conditionals, iteration. NLTK, String Edit Distance and Alignment Key algorithmic tool: Dynamic programming, String edit operations, Edit distance, and examples of use in spelling correction, and machine translation.

Module II: Context Free Grammars and Probability   [09 Periods]

CFG - Constituency, CFG definition, use and limitations. Chomsky Normal Form. Top-downand Bottom-up parsing, Non-probabilistic Parsing Efficient CFG parsing with CYK, Dynamic programming algorithms, Early parser, Designing a little grammar, and parsing with testdata.

Probability - Introduction to probability theory, Joint and conditional probability, marginal, independence, Bayes rule, combining evidence. Example applications. Information Theory: "Shannon game", Entropy, cross entropy, information gain, Application to language phenomena.

Module III: Language Models   [10 Periods]

A: Language Modeling and Naive Bayes - Probabilistic language modeling and its applications, Markov models, N-grams, Estimating probability of a word, and smoothing. Generative models of language.

B: Part of Speech Tagging and Hidden Markov Models - Viterbi Algorithm for Finding Most Likely HMM Path, Dynamic programming with HMM, Use for part-of- speech tagging, Chinese word segmentation, prosody, Information extraction.

Module IV: Probabilistic and Classifiers   [10 Periods]

Probabilistic Context Free Grammars - Weighted context free grammars, Weighted CYK, Pruning and beam search, Parsing with PCFG, Probabilistic version of CYK, Human parsing, Experiments with Eye-Tracking.

Parsers and Classifiers - Modern parsers, Maximum Entropy Classifiers-The maximum entropy principle and its relation to maximum likelihood, Maximum entropy classifiers and their application to document classification, sentence segmentation, and other language tasks.

Module V: Grammar and Techniques   [09 Periods]

Grammar - Maximum Entropy Markov Models & Conditional Random Fields, Part-of-

speech tagging, Noun-phrase Segmentation and Information Extraction Models, Finite- state machines.

Models and Techniques - Lexical Semantics Mathematics of Multinomial and Dirichlet distributions, Information Extraction & Reference Resolution - Various methods including HMMs, Models of Anaphora Resolution, Machine Learning Methods for Co- reference.

TEXT BOOKS
1. Jurafsky and Martin, "Speech and Language Processing", PrenticeHall
2. Manning and Schutze, "Statistical Natural Language Processing", MITPress

REFERENCES
1. Cover, T. M. and J. A. Thomas, "Elements of Information Theory",Wiley.
2. James Allen, "Natural Language Understanding", The Benajmins/Cummings PublishingCompany

E-RESOURCES
1. https://www.cl.cam.ac.uk/teaching/2002/NatLangProc/revised.pdf
2. https://hpi.de/fileadmin/user_upload/fachgebiete/plattner/teaching/NaturalLanguageP rocessing/NLP2016/NLP01_IntroNLP.pdf
3. http://www.sciencedirect.com/science/article/pii/S1532046401910299
4. http://citeseerx.ist.psu.edu/viewdoc/summary?doi=10.1.1.34.1r036
5. http://nptel.ac.in/courses/106101007/
6. http://nptel.ac.in/courses/106105158/

Course Outcomes:

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

COs	Statement	Blooms Taxonomy Level
1	Evaluate language technology component use of probabilistic context free grammars	Evaluate
2	Elaborate the interaction between Grammar	Create

CO-PO,PSOMapping (3/2/1indicatesstrengthofcorrelation)3-Strong,2-Medium,1-Weak															
CO	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO1	3	2											1		
CO 2	2	3		1									1	2	1

Prerequisites: Data structures, finite automata and probability theory
Course Objectives:
- Introduce to some of the problems and solutions of NLP and their relation to linguistics andstatistics.

Course Outcomes:
- Show sensitivity to linguistic phenomena and an ability to model them with formal grammars.
- Understand and carry out proper experimental methodology for training and evaluatingempirical NLP systems
- Able to manipulate probabilities, construct statistical models over strings and trees, andestimate parameters using supervised and unsupervised training methods.
- Able to design, implement, and analyze NLP algorithms
- Able to design different language modeling Techniques.

MODULE - 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
MODULE - 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
MODULE - III
Semantic Parsing: Introduction, Semantic Interpretation, System Paradigms, Word Sense Systems, Software.
MODULE - IV
Predicate-Argument Structure, Meaning Representation Systems, Software.
MODULE - 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 ModelingProblems, Multilingual and Crosslingual 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,

PearsonPublications

CO-PO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak												
	Programme Outcomes (POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1						2					1	
CO2		3						1				1
CO3	2				1					2		
CO4			3					2				
CO5		2				3				3		
CO6				1					2			

2021-22 Onwards (MR21)	Malla Reddy Engineering College (Autonomous)	B.Tech. VIII Semester		
Code: B00P2	**Major Project**	**L**	**T**	**P**
Credits: 12		-	-	24

Course Objectives:
1. Enable the student extend further the investigative study, either fully theoretical/practical orinvolving both theoretical and practical work.
2. The work shall be carried out under the guidance of a Supervisor from the department alone orjointly with a supervisor drawn from R&D laboratory/Industry.
3. Preparing an action plan for conducting the research by team members

Course Outcomes:

CO	Statement	Blooms Taxonomy Level
CO1	Identify, Formulate a problem and design and implement a viable solution	Analyze
CO2	Ability to learn and use modern tools to solve problems efficiently.	Create
CO3	Identify the requirements for the real world problems	Analyze
CO4	Demonstrate and build the project successfully by hardware requirements, coding, emulating and testing.	Evaluate
CO5	Demonstrate an ability to work in teams and manage the conduct of the research study	Analyze

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

Note: Students are instructed to
1. Conduct detailed Analysis//Simulation/Design/Problem Solving/Experiment as needed
2. Submit the project report in the specified format.
3. Attend the project seminars as per given schedule.
4. **Publish a paper** in Conference/Journal/Patent before external viva voce

Guidelines for awarding CIE marks: (Max. Marks: 60)

Evaluator	Max. Marks	Parameter
Department Review Committee	10	Review-I
	10	Review-II
	10	Pre-Submission Review
Supervisor	5	Regularity and Punctuality
	5	Progress of the Work
	5	Quality of the work
	5	Report Writing
	10	Analytical/Programming/Experimental Skills

Guidelines for awarding SEE marks: (Max. Marks: 140)

Evaluator	Max. Marks	Parameter
Internal and External Examiners	10	Idea / Innovations
	10	Applications
	10	Live Research Projects
	10	Scope for future enhancement
	10	Application to Society
	20	PPT Presentation
	40	Thesis Evaluation
	30	Viva-Voce

2021-22 Onwards (MR21)	**Malla Reddy Engineering College** (Autonomous)	**B.Tech. VIII Semester**		
Code: B00P3	**Seminar**	**L**	**T**	**P**
Credits: 1		**-**	**-**	**2**

Objectives:

The goal of a seminar is to introduce students to critical reading, understanding, summarizing, explaining and preparing report on state of the art topics in a broad area of his/her specialization. Seminar topics may be chosen by the students with advice from the faculty members and the student shall read further relevant articles in the domain.

Course Outcomes:

CO	Statement	Blooms Taxonomy Level
CO1	Study the literature of emerging technologies to organize, analyze and consolidate theinformation.	Analyze
CO2	Exhibit effective communication skills, stage courage, and confidence.	Create
CO3	Demonstrate intrapersonal skills.	Analyze
CO4	Explain new innovations/inventions in the relevant field.	Evaluate
CO5	Prepare Seminar Report in a prescribed format.	Analyze

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

Table: Guidelines for awarding marks
(Max.Marks:100)

S.No	Parameter	Max. Marks
1	Relevance to Problem	10
2	Preparation of PPT	10
3	Presentation Skills in Reviews	20
4	Questions and Answers	10
5	Report preparation in a prescribed format	20
6	Final Seminar Presentation	30