

# ACADEMIC REGULATIONS, COURSE STRUCTURE AND DETAILED SYLLABUS

**Effective from the Academic Year 2022-23 onwards**



**Course Structure and Syllabus  
for  
B.Tech. Computer Science and Engineering (CSE) Programme.  
(MR22 Regulations – Effective from Academic Year 2022-23 onwards)**



**For  
B.Tech. - Four Year Degree Programme**

## **MALLA REDDY ENGINEERING COLLEGE**

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

**MALLA REDDY ENGINEERING COLLEGE**  
**COURSE STRUCTURE – B.Tech. Computer Science and Engineering**  
**(CSE)Programme.**  
**(MR22 Regulations - Effective from Academic Year 2022 – 23 onwards)**

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

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

III SEMESTER MR22							
S. No	Category	Course Code	Course Title	Contact hours/week			Credits
				L	T	P	
1	PCC	C0507	Discrete Mathematics	3	-	-	3
2	PCC	C0508	Digital Logic Design	3	-	-	3
3	PCC	C0509	Computer Organization and Architecture	3	-	-	3
4	PCC	C0510	Data Structures	3	-	-	3
5	PCC	C0511	Object Oriented Programming through Java	3	-	-	3
6	PCC	C0512	Data Structures Lab	-	-	3	1.5
7	PCC	C0513	Object Oriented Programming through Java Lab	-	-	3	1.5
8	PCC	C0514	Data visualization- R Programming/ Power BI	-	1	2	2
9	MC	C00M2	Environmental Science	2	-	-	-
Total				17	1	8	20
Total Contact Hours				26			

IV SEMESTER MR22							
S. No	Category	Course Code	Course Title	L	T	P	Credits
1	BSC	C0B07	Applied Statistics and Optimization Techniques	4	-	-	4
2	PCC	C0515	Database Management Systems	3	-	-	3
3	PCC	C0516	Operating Systems	3	-	-	3
4	PCC	C0517	Design and Analysis of Algorithms	3	-	-	3
5	PCC	C0518	Software Engineering & Modeling	3	-	-	3
6	PCC	C0519	Database Management Systems Lab	-	-	2	1
7	PCC	C0520	Operating Systems Lab	-	-	2	1
8	PCC	C0521	Real-time Research Project/ Societal Related Project	-	-	2	1
9	PCC	C0522	Node JS/ React JS/ Django Lab			2	1
10	MC	C00M1	Gender Sensitization	-	-	2	-
Total				16	-	10	20
Total Contact Hours				26			

V SEMESTER							
S. No.	Category	Course Code	Name of the Course	Contact Hours / week			Credits
				L	T	P	
1	PCC	C0532	DevOps	3	-	-	3
2	PCC	C6201	Computer Networks	3	-	-	3
3	PCC	C6627	Artificial Intelligence	3	-	-	3
4	Professional Elective –I						
	PEC-I	C0523	Quantum Computing	3	-	-	3
		C0524	Advanced Computer Architecture				
		C6711	Data Analytics				
		C0525	Computer Graphics				
		C0526	Principles of Programming Languages				
5	Professional Elective –II						
	PEC-II	C0527	Image Processing	3	-	-	3
		C0528	Embedded Systems				
		C1222	Information Retrieval Systems				
		C0529	Distributed Databases				
		C6608	Natural Language Processing				
6	PCC	C6202	Computer Networks Lab	-	-	2	1
7	PCC	C6628	Artificial Intelligence Laboratory	-	-	4	2
8	PCC	C0530	UI design- Flutter	-	-	2	1
9	PCC	C0537	DevOps Lab	-	-	2	1
10	MC	C00M3	Quantitative Aptitude and Verbal Reasoning - I	2	-	-	-
11	MC	C00M6	Intellectual Property Rights	3	-	-	-
Total				20	-	10	20
Total Contact Hours				30			

VI SEMESTER							
S. No.	Category	Course Code	Name of the Course	Contact Hours / week			Credits
				L	T	P	
1	HSMC	C0531	Formal Languages and Automata Theory	3	-	-	3
2	PCC	C6625	Machine Learning	3	-	-	3
3	HSMC	C0H08	Business Economics and Financial Analysis	3	-	-	3
4	Professional Elective -III						
	PEC-III	C0533	Full Stack Development	3	-	-	3
		C6917	Internet of Things				
		C0534	Scripting Languages				
		C0535	Mobile Application Development				
		C0536	Software Testing Methodologies				
5	OEC-I		Open Elective-I	3	-	-	3
6	PCC	C6626	Machine Learning Lab	-	-	2	1
7	HSMC	C0H03	Advanced English Communication Skills Lab	-	-	2	1
8	Professional Elective-III Lab						
	PEC-III	C0538	Full Stack Development Lab	-	-	2	1
		C6918	Internet of Things Lab				
		C0539	Scripting Languages Lab				
		C0540	Mobile Application Development Lab				
		C0541	Software Testing Methodologies Lab				
9	PRJ	C00P1	Industrial Oriented Mini Project/ Internship/ Skill Development Course (Big data-Spark)	-	-	4	2
10	MC	C00M5	Constitution of India	3	-	-	-
11	MC	C00M4	Quantitative Aptitude and Verbal Reasoning – II	2	-	-	-
Total				20	-	10	20
Total Contact Hours				30			

# Courses in PE - III and PE - III Lab must be in 1-1 correspondence.

VII SEMESTER							
S. No.	Category	Course Code	Name of the Course	Contact Hours / week			Credits
				L	T	P	
1	PCC	C0542	Compiler Design	3	-	-	3
2	PCC	C6203	Cryptography and Network Security	3	-	-	3
3	Professional Elective -IV						
	PEC-IV	C0543	Graph Theory	3	-	-	3
		C0544	Advanced Operating Systems				
		C0545	Soft Computing				
		C0546	Cloud Computing				
		C0547	Ad hoc & Sensor Networks				
4	Professional Elective-V						
	PEC-V	C0548	Advanced Algorithms	3	-	-	3
		C0549	Agile Methodology				
		C0550	Blockchain Technology				
		C0551	Robotic Process Automation				
		C0552	Software Process & Project Management				
5	OEC-II		Open Elective-II	3	-	-	3
6	PCC	C6204	Cryptography and Network Security Lab	-	-	2	1
7	PCC	C0557	Compiler Design Lab	-	-	2	1
8	PRJ	C00P2	Project Stage - I	-	-	6	3
Total				1	2	1	20
Total Contact Hours				27			

VIII SEMESTER							
S. No.	Category	Course Code	Name of the Course	Contact Hours / week			Credits
				L	T	P	
1	HSMC	C0H09	Organizational Behavior	3	-	-	3
2	Professional Elective-VI						
	PEC-VI	C0558	Computational Complexity	3	-	-	3
		C6627	Deep Learning				
		C0559	Distributed Systems				
		C0560	Human Computer Interaction				
		C0561	Cyber Forensics				
3	OEC-III		Open Elective-III	3	-	-	3
4	PRJ	C00P3	Project Stage – II including Seminar	-	-	22	11
Total				9	-	22	20
Total Contact Hours				31			

Open Elective -1:

1	ESC	C0510	Data Structures	3	-	-	3
2	ESC	C0515	Database Management Systems	3	-	-	3

OPEN ELECTIVE -2:

3	ESC	C0516	Operating Systems	3	-	-	3
4	ESC	C0518	Software Engineering & Modeling	3	-	-	3

OPEN ELECTIVE -3:

5	ESC	C0503	Algorithms Design and Analysis	3	-	-	3
6	ESC	C0505	Introduction to Computer Networks	3	-	-	3
7	ESC	C0563	Fundamentals of Python Programming	3	-	-	3

Other department offered PCCs:

1	PCC	C0562	Cloud Computing Lab	3	-	-	3
2	ESC	C0553	Basic Python Programming Lab	-	1	2	2
3	ESC	C0554	Fundamentals of Data Structures Lab	-	1	2	2
4	ESC	C0555	Object Oriented Programming Lab	-	1	2	2
5	ESC	C0556	Fundamentals of Database Management Systems Lab	-	1	2	2

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

**Prerequisites:** Matrices, Differentiation and Integration.

**Course Objectives:**

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

**MODULE I: Matrix Algebra**

**[12 Periods]**

Vector Space, basis, linear dependence and independence (Only Definitions)

Matrices: Types of Matrices, Symmetric; Hermitian; Skew-symmetric; Skew- 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; Singular Value Decomposition.

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

**MODULE III: Algebraic & Transcendental equations**

**[12 Periods]**

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

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

**MODULE IV: Interpolation**

**[12 Periods]**

Introduction- Errors in Polynomial Interpolation – Finite differences- Forward Differences- Backward differences -Central differences - Symbolic relations and separation of symbols. Differences of a polynomial-Newton's formulae for interpolation; Central 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 solution of Ordinary Differential Equations:** Introduction-Solution of Ordinary Differential Equation by Taylor's series method - Picard's Method of successive Approximations - Euler's Method-Modified Euler's Method – Runge-Kutta Methods.

**Numerical Integration:** Trapezoidal Rule, Simpson's  $1/3^{\text{rd}}$  Rule, Simpson's  $3/8$  Rule.

### **TEXT BOOKS**

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
3. 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, 5<sup>th</sup> Edition, PHI Learning Private Limited

### **REFERENCES**

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

### **E – RESOURCES**

1. [https://www.youtube.com/watch?v=sSjB7ccnM\\_I](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](https://www.youtube.com/watch?v=9y_HcckJ96o) (Quadratic forms)
4. [https://www.youtube.com/watch?v=3j0c\\_FhOt5U](https://www.youtube.com/watch?v=3j0c_FhOt5U) (Bisection Method)
5. <https://www.youtube.com/watch?v=6vs-pymcsqk> (Regula Falsi Method and Newton Raphson Method )
6. <https://www.youtube.com/watch?v=1pJYZX-tgi0> (Interpolation)
7. <https://www.youtube.com/watch?v=Atv3IsQsak8&pbjreload=101> (Numerical Solution of ODE)
8. <https://www.youtube.com/watch?v=iviiGB5vxLA> (Numerical Integration)

## NPTEL

1. [https://www.youtube.com/watch?v=NEpvTe3pFlk&list=PLLy\\_2iUCG87BLKl8eISe4fHKdE2\\_j2B\\_T&index=5](https://www.youtube.com/watch?v=NEpvTe3pFlk&list=PLLy_2iUCG87BLKl8eISe4fHKdE2_j2B_T&index=5) (Matrices – System of linear Equations)
2. <https://www.youtube.com/watch?v=wrSJ5re0TAw> (Eigen values and Eigen vectors)
3. <https://www.youtube.com/watch?v=yuE86XeGhEA> (Quadratic forms)
4. <https://www.youtube.com/watch?v=WbmLBRbp0zA> (Bisection Method)
5. <https://www.youtube.com/watch?v=0K6olBTdcSs> (Regula Falsi and Newton Raphson Method)
6. <https://www.youtube.com/watch?v=KSFnfUYcxoI> (Interpolation)
7. <https://www.youtube.com/watch?v=QugqSa3Gl-w&t=2254s> (Numerical Solution of ODE)
8. [https://www.youtube.com/watch?v=NihKCpJx2\\_0&list=PLbMVogVj5nJRILpJJO7KrZa8Ttj4\\_ZAgl](https://www.youtube.com/watch?v=NihKCpJx2_0&list=PLbMVogVj5nJRILpJJO7KrZa8Ttj4_ZAgl) (Numerical Solution of ODE)
9. <https://www.youtube.com/watch?v=hizXlwJO1Ck> (Numerical Integration)

## Course Outcomes:

1. The student will be able to find rank of a matrix and analyze solutions of system of linear equations.
2. The student will be able to find Eigen values and Eigen vectors of a matrix, diagonalization a matrix, verification of Cayley Hamilton theorem and reduce a quadratic form into a canonical form through a linear transformation.
3. The student will be able to find the root of a given equation by various methods.
4. The student will be able to estimate the value for the given data using interpolation.
5. The student will be able to find the numerical solutions for a given ODE's and evaluations of integrals using numerical techniques.

## CO- PO Mapping

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

<b>2022-23 Onwards (MR-22)</b>	<b>MALLA REDDY ENGINEERING COLLEGE (Autonomous)</b>	<b>B.Tech. I Semester</b>		
<b>Code: C0H01</b>	<b>ENGLISH</b>	<b>L</b>	<b>T</b>	<b>P</b>
<b>Credits: 3</b>	<b>(Common for CE, EEE, ME, ECE, CSE, CSE (AIML), CSE (DS), CSE (CS), CSE(IOT), IT and Min.E)</b>	<b>3</b>	<b>-</b>	<b>-</b>

**Course Objectives:** This course will enable the students to:

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

**Course Outcomes:** Students will be able to:

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

### **MODULE – I**

Chapter entitled ‘*Toasted English*’ by **R.K.Narayan** from “*English: Language, Context and Culture*” published by Orient BlackSwan, Hyderabad.

**Poem:** “Mother to Son” by Langston Hughes

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

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

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

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

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

### **MODULE – II**

Chapter entitled ‘*ApproJRD*’ by **Sudha Murthy** from “*English: Language, Context and Culture*” published by Orient BlackSwan, Hyderabad.

**Vocabulary:** Words Often Misspelt - Homophones, Homonyms and Homographs

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

**Reading:** Sub-Skills of Reading – Skimming and Scanning – Exercises for Practice

**Writing:** Nature and Style of Writing- Defining /Describing People, Objects, Places and Events  
– Classifying- Providing Examples or Evidence.

### Module – III

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

**Poem:** “Father Returning Home” by Dilip Chitre

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

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

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

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

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

### MODULE – IV

Chapter entitled ‘**Art and Literature**’ by **Abdul Kalam** from “**English: Language, Context and Culture**” published by Orient BlackSwan, Hyderabad.

**Vocabulary:** Standard Abbreviations in English

**Grammar:** Redundancies and Clichés in Oral and Written Communication.

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

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

### MODULE – V

Chapter entitled “After Twenty Years” by O’ Henry

**Vocabulary:** Technical Vocabulary and their Usage

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

**Reading:** Reading Comprehension-Exercises for Practice

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

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

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

handouts based on the needs of the students in their respective colleges for effective teaching/learning in the class.

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

#### TEXTBOOK:

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

#### Reference Books:

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

#### Related Websites:

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

#### Course Outcomes:

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

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

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

<b>2022-23 Onwards (MR-22)</b>	<b>MALLA REDDY ENGINEERING COLLEGE (Autonomous)</b>	<b>B.Tech. I Semester</b>		
<b>Code: C0201</b>	<b>BASIC ELECTRICAL AND ELECTRONICS ENGINEERING</b> (Common for CE, EEE, ME, ECE, CSE, CSE (AIML), CSE (DS), CSE (CS), CSE(IOT), IT and Min.E)	<b>L</b>	<b>T</b>	<b>P</b>
<b>Credits: 3</b>		<b>3</b>	<b>-</b>	<b>-</b>

**Prerequisites: NIL**

**Course Objectives:**

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

**MODULE I: DC Circuits**

**[09 Periods]**

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

**MODULE II: AC Circuits**

**[09 Periods]**

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

**MODULE III: Introduction to Electrical Machines**

**[10 Periods]**

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

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

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

**[10 Periods]**

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

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

**Filters:** Filters – Inductor Filters, Capacitor Filters, L- section Filters,  $\pi$ - section Filters.

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

**[10 Periods]**

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

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

### TEXT BOOKS

1. M.Surya Kalavathi, Ramana Pilla, Ch. Srinivasa Rao, Gulinindala Suresh, “Basic Electrical and Electronics Engineering”, S.Chand and Company Limited, New Delhi, 1<sup>st</sup> 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”, 3rd edition, Tata McGraw Hill, New Delhi.
3. Thomas L. Floyd and R. P. Jain, “Digital Fundamentals”, Pearson Education, 2009.
4. David A. Bell, “Electronic Devices and Circuits”, Oxford University Press, 2008.
5. Nagrath I.J. and D. P. Kothari, “Basic Electrical Engineering”, Tata McGraw Hill, 2001.
6. Mittle N., “Basic Electrical Engineering”, Tata McGraw Hill Education, New Delhi, 2<sup>nd</sup> Edition, 2005.

### E - RESOURCES

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

### Course Outcomes:

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

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

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

<b>2022-23 Onwards (MR-22)</b>	<b>MALLA REDDY ENGINEERING COLLEGE (Autonomous)</b>	<b>B.Tech. I Semester</b>		
<b>Code: C0501</b>	<b>Programming for Problem Solving (Common for CE, EEE, ME, ECE, CSE, CSE (Cyber Security), CSE (AI and ML), CSE (DS), CSE (IOT), AI, IT and Mi.E)</b>	<b>L</b>	<b>T</b>	<b>P</b>
<b>Credits: 3</b>		<b>3</b>	<b>-</b>	<b>-</b>

**Prerequisites:** NIL

**Course Objectives:**

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

### **MODULE I: Introduction to Programming**

**[10 Periods]**

Compilers, compiling and executing a program.

Representation of Algorithm - Algorithms for finding roots of a quadratic equations, finding minimum and maximum numbers of a given set, finding if a number is prime number

Flowchart/Pseudocode with examples, Program design and structured programming

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

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

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

### **MODULE II: Arrays, Strings, Structures and Pointers:**

**[09 Periods]**

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

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

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

### **MODULE III: Preprocessor and File handling in C:**

**[10 Periods]**

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

### **MODULE IV: Function and Dynamic Memory Allocation:**

**[09 Periods]**

**Functions:** Designing structured programs, Declaring a function, Signature of a function,



Parameters and return type of a function, passing parameters to functions, call by value, Passing arrays to functions, passing pointers to functions, idea of call by reference, Some C standard functions and libraries

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

## MODULE V: Searching and Sorting:

[10 Periods]

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

## TEXTBOOKS

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

## REFERENCES

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

## E-RESOURCES

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

## Outcomes:

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

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

CO- PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
Cos	Programme Outcomes (POs)												PSOs		
	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			17	1	1	1	2	3	2	1

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

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

#### **COURSE OBJECTIVES:**

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

#### **Listening Skills:**

##### **Objectives:**

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

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

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

#### **Speaking Skills:**

##### **Objectives:**

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

The following course content is prescribed for the **English Language and Communication**

### **Skills Lab.Exercise – I**

#### **CALL Lab:**

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

#### **ICS Lab:**

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

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

### **Exercise –**

#### **II CALL Lab:**

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

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

#### **ICS Lab:**

*Understand:* Features of Good Conversation – Strategies for Effective Communication.

*Practice:* Situational Dialogues – Role Play- Expressions in Various Situations –Making Requests and Seeking Permissions - Telephone Etiquette.

### **Exercise - III**

#### **CALL Lab:**

*Understand:* Errors in Pronunciation-Neutralising Mother Tongue Interference (MTI).

*Practice:* Common Indian Variants in Pronunciation – Differences between British and American Pronunciation -Testing Exercises

#### **ICS Lab:**

*Understand:* Descriptions- Narrations- Giving Directions and Guidelines – Blog Writing

*Practice:* Giving Instructions – Seeking Clarifications – Asking for and Giving Directions – Thanking and Responding – Agreeing and Disagreeing – Seeking and Giving Advice – Making Suggestions.

### **Exercise – IV**

#### **CALL Lab:**

*Understand:* Listening for General Details.

*Practice:* Listening Comprehension Tests - Testing Exercises

**ICS Lab:**

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

Practice: Making a Short Speech – Extempore- Making a Presentation.

**Exercise – V**

**CALL Lab:**

Understand: Listening for Specific Details.

Practice: Listening Comprehension Tests -Testing Exercises

**ICS Lab:**

Understand: Group Discussion

Practice: Group Discussion

**Minimum Requirement of infrastructural facilities for ELCS Lab:**

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

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

**System Requirement (Hardware component):**

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

- i) Computers with Suitable Configuration
- ii) High Fidelity Headphones

**2. Interactive Communication Skills (ICS) Lab :**

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

**Source of Material (Master Copy):**

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

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

**Suggested Software:**

- Cambridge Advanced Learners' English Dictionary with CD.
- Grammar Made Easy by Darling Kindersley.
- Punctuation Made Easy by Darling Kindersley.
- Oxford Advanced Learner's Compass, 10<sup>th</sup> Edition.

- English in Mind (Series 1-4), Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge.
- English Pronunciation in Use (Elementary, Intermediate, Advanced) Cambridge University Press.
- English Vocabulary in Use (Elementary, Intermediate, Advanced) Cambridge University Press. TOEFL & GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS).
- Digital All
- Orell Digital Language Lab (Licensed Version)

### Reference Books:

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

### Websites:

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

### Course Outcomes:

**Course Outcomes:** Students will be able to:

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

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

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

**Prerequisites: NIL**

**Course Objectives:**

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

**List of Experiments:**

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

**Course Outcomes:**

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

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

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

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

**Prerequisites:** NIL

**Software Requirements:** C

*[Note: The programs may be executed using any available Open Source/ Freely available IDE. Some of the Tools available are:*

*CodeLite: <https://codelite.org/>*

*CodeBlocks:*

*<http://www.codeblocks.org/>*

*DevCpp :*

*<http://www.bloodshed.net/devcpp.htm>*

*IEclipse: <http://www.eclipse.org>*

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

**Objectives:** The students will learn the following:

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

**List of Programs:**

**PRACTICE SESSIONS:**

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

**SIMPLE NUMERIC PROBLEMS:**

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

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

#### **EXPRESSION EVALUATION:**

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

#### **ARRAYS, POINTERS AND FUNCTIONS:**

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



using the array.

- l. Write a program for display values reverse order from an array using a pointer.
- m. Write a program through a pointer variable to sum of n elements from an array.

#### **FILES:**

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

#### **STRINGS:**

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

#### **MISCELLANEOUS:**

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

- b. Write a C program to construct a pyramid of numbers as follows:

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

**SORTING AND SEARCHING:**

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

**TEXT BOOKS:**

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

**REFERENCES:**

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

**Outcomes:**

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

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

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

<b>2022-23 Onwards (MR-22)</b>	<b>MALLA REDDY ENGINEERING COLLEGE (Autonomous)</b>	<b>B.Tech. I Semester</b>		
<b>Code: C1201</b>	<b>Engineering and IT Workshop (Common for CSE and IT)</b>	<b>L</b>	<b>T</b>	<b>P</b>
<b>Credits: 2</b>		<b>-</b>	<b>1</b>	<b>2</b>

**Pre requisites:** NIL

**Course Objectives:**

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

**Engineering Workshop:**

**Problem 1: Trades for Exercises**

**At least two exercises from each trade**

1. House-wiring
2. Soldering

**Problem 2: Trades for Demonstration & Exposure**

1. Carpentry
2. Wood working lathe

**PC Hardware:**

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

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

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

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

**Internet & World Wide Web**

**Task1: Orientation & Connectivity Boot Camp:** Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally students should demonstrate, to the instructor, how to access the websites and email. If there is no internet connectivity preparations need to be made by the instructors to simulate the WWW on the LAN.

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

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

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

### **LaTeX and WORD**

**Task 1 – Word Orientation:** The mentor needs to give an overview of LaTeX and Microsoft (MS) office or equivalent (FOSS) tool word: Importance of LaTeX and MS office or equivalent (FOSS) tool Word as word Processors, Details of the four tasks and features that would be covered in each, Using LaTeX

and word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter in word.

**Task 2: Using LaTeX and Word** to create a project certificate. Features to be covered:- Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in both LaTeX and Word.

**Task 3: Creating project abstract** Features to be covered:-Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

**Task 4: Creating a Newsletter:** Features to be covered:- Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphsand Mail Merge in word.

### **Excel**

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

**Task 1: Creating a Scheduler -** Features to be covered: Gridlines, Format Cells, Summation, auto fill,Formatting Text

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

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

## POWERPOINT

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

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

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

## REFERENCE BOOKS:

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

## Course Outcomes:

- Perform Hardware troubleshooting
- Understand Hardware components and inter dependencies
- Safeguard computer systems from viruses/worms
- Document/ Presentation preparation
- Perform calculations using spreadsheets
- Perform Engineering workshop practice.

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

<b>2022-23 Onwards (MR-22)</b>	<b>MALLA REDDY ENGINEERING COLLEGE (Autonomous)</b>	<b>B.Tech II Semester</b>		
<b>Code: C0B17</b>	<b>Engineering Chemistry</b> (Common for CE, EEE, ME, ECE, CSE, CSE (AIML), CSE (DS), CSE (CS), CSE (IOT), IT, AI and Min.E))	<b>L</b>	<b>T</b>	<b>P</b>
<b>Credits: 4</b>		<b>3</b>	<b>1</b>	<b>-</b>

### Course objectives:

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

### Module I: Water and its treatment

[10 Periods]

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

### Module II: Molecular structure and Theories of Bonding:

[10 Periods]

Introduction to Molecular orbital Theory. Linear Combination of Atomic Orbital's (LCAO), significance of bonding and anti-bonding molecular orbital, Conditions for the formation of molecular orbital's. Molecular orbital energy level diagrams of diatomic molecules -, N<sub>2</sub>, O<sub>2</sub> and F<sub>2</sub>. 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<sub>6</sub>]<sup>3-</sup> and [Co(CN)<sub>6</sub>]<sup>3-</sup> ) and tetrahedral ([NiCl<sub>4</sub>]<sup>2-</sup> and [Ni (CO)<sub>4</sub>] ) fields - magnetic properties of complexes. Band structure of solids and effect of doping on conductance.

### Module III: Electrochemistry and Corrosion

#### A. Electrochemistry:

[7 Periods]

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

**B. Corrosion:****[7 Periods]**

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

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

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

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

**UNIT-V Fuels and Combustion****[08 Periods]**

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

**Text Books:**

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

**Reference Books:**

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

**e-Resources:****a) Concerned Website links:**

- 1) <https://books.google.co.in/books?isbn=0070669325> (Engineering chemistry by Sivasankar).
- 2) <https://www.youtube.com/watch?v=yQUD2vzfgh8> (Hot dipping Galvanization).
- 3) [https://archive.org/stream/VollhardtOrganicChemistryStructureFunction6th/Vollhardt\\_Organic\\_Chemistry\\_Structure\\_Function\\_6th\\_djvu.txt](https://archive.org/stream/VollhardtOrganicChemistryStructureFunction6th/Vollhardt_Organic_Chemistry_Structure_Function_6th_djvu.txt).

**b) Concerned Journals/Magazines links:**

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

**c) NPTEL Videos:**

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

**Course Outcomes:**

After completion of the course students will be able to:

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

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



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

**Prerequisites:** Basic Probability

**Course Objectives:**

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

### **MODULE I: Probability:**

**[12 Periods]**

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

### **MODULE II: Random variables:**

**[12 Periods]**

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

### **MODULE III: Sampling Distributions:**

**[14 Periods]**

- (A) Definitions of population-sampling-statistic, parameter. Types of sampling, expected values of Sample mean and variance, sampling distribution, Standard error, Sampling distribution of means and sampling distribution of variance. Parameter estimations – likelihood estimate, point estimation and interval estimation
- (B) **Testing of hypothesis:** Null hypothesis, Alternate hypothesis, type I, & type II errors – critical region, confidence interval, and Level of significance. One sided test, two-sided test.

#### **Large sample tests:**

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

### **MODULE IV: Small sample tests:**

**[12 Periods]**

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

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](http://www.stat.pitt.edu/stoffer/tsa4/intro_prob.pdf) (Random variables and its distributions)
3. <http://users.wfu.edu/Cottrell/ecn215/sampling.pdf> (Notes on Sampling and hypothesis testing)

**b) Concerned Journals/ Magazines links:**

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

**c) NPTEL Videos:**

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

**Course Outcomes:**

1. The students will understand and appreciate the role of P&S in data analytics and big data analysis.
2. Students would be able to find the Probability in certain realistic situation
3. Students would be able to identify distribution in certain realistic situation. It is mainly useful for circuit as well as non-circuit branches of engineering. Also able to differentiate among many random variables Involved in the probability models. It is quite useful for all branches of engineering.

4. The student would be able to calculate mean and proportions (large and small sample) and to make Important decisions from few samples which are taken out of unmanageably huge populations.
5. Students will understand how to forecast the future observations.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	3	3		3		2	2			1
CO2	3	3	3		2			2	1	1	1
CO3	3	2	3		2	1	1	1			1
CO4	3	2	2	2	2	2		3	1	1	3
CO5	3	3	2	1	3	1	2	2	1	1	3

<b>2022-23 Onwards (MR-22)</b>	<b>MALLA REDDY ENGINEERING COLLEGE (Autonomous)</b>	<b>B.Tech. II Semester</b>		
<b>Code: C0B09</b>	<b>Semiconductor Physics (Common for CSE, CSE (Cyber Security), CSE (AI and ML), CSE (DS), CSE (IOT), AI and IT)</b>	<b>L</b>	<b>T</b>	<b>P</b>
<b>Credits: 4</b>		<b>3</b>	<b>1</b>	<b>-</b>

**Prerequisites:** Fundamentals of Physics

**Course Objectives:**

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

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

Introduction, Plank's theory of black body radiation, deduction of Wien's law and Rayleigh'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.

**Course Outcomes:**

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

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

**Text Books:**

1. K Vijaya Kumar, S Chandralingam, “Modern Engineering Physics” Volume I & II, S. Chand, 1<sup>st</sup> 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, 4<sup>th</sup> 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, 3<sup>rd</sup> edition, 2015.
4. D K Bhattacharya, Poonam Tandon, “**Engineering Physics**”, Oxford University Press, 1<sup>st</sup> Edition, 2015.
5. P Bhattacharya, “**Semiconductor Optoelectronic Devices**”, Prenticehall of India, 1997

**e-RESOURCES**

1. [https://www.researchgate.net/publication/259574083\\_Lecture\\_Notes\\_on\\_Engineering\\_Physics](https://www.researchgate.net/publication/259574083_Lecture_Notes_on_Engineering_Physics)
2. [https://www.researchgate.net/publication/292607115\\_Applied\\_Physics](https://www.researchgate.net/publication/292607115_Applied_Physics)
3. <https://www.livescience.com/33816-quantum-mechanics-explanation.html>

**Journals :**

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

**NPTEL VIDEOS:**

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

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	3	3		3		2	2			1
CO2	3	3	3		2			2	1	1	1
CO3	3	2	3		2	1	1	1			1
CO4	3	2	2	2	2	2		3	1	1	3
CO5	3	3	2	1	3	1	2	2	1	1	3

<b>2022-23 Onwards (MR-22)</b>	<b>MALLA REDDY ENGINEERING COLLEGE (Autonomous)</b>	<b>B.Tech. II Semester</b>		
<b>Code: C0504</b>	<b>Python Programming (Common for CSE, IT, CSE (Cyber Security), CSE (AI and ML), CSE (Data Science), CSE (IoT) and AI)</b>	<b>L</b>	<b>T</b>	<b>P</b>
<b>Credits: 4</b>		<b>3</b>	<b>1</b>	<b>-</b>

**Prerequisites:** Nil

**Course Objectives:** This course will enable students to

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

## **MODULE - I**

**[10 Periods]**

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

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

## **MODULE - II**

**[9 Periods]**

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

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

## **MODULE - III**

**[10 Periods]**

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

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

Delegation and Wrapping.

#### **MODULE – IV**

**[10 Periods]**

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

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

#### **MODULE - V**

**[9 Periods]**

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

#### **TEXT BOOKS**

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

#### **REFERENCE BOOKS**

1. Allen B. Downey, “Think Python, How to think like a Computer Scientist”, First Edition, O’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.
4. Reema Thareja, Python Programming: Using Problem Solving Approach, OUP, 2017.

#### **E–RESOURCES**

1. “Learn Python - Free Interactive Python Tutorial”, <https://www.learnpython.org/>
2. “Free Python Tutorial - Python For Beginner,” <https://www.udemy.com/share/101EfoBUcccV1SQHw>
3. “Basics of Python for Data Science”, <https://olympus.greatlearning.in/courses/11265>
4. “Beginners Guide / Programmers - Python Wiki”, <https://wiki.python.org/moin/BeginnersGuide/Programmers>
5. “Introduction to Python”, <https://www.datacamp.com/courses/intro-to-python-for-data-science>

#### **Course Outcomes**

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

1. Learn syntax and semantics along with the basic data structures of Python
2. Handle modules, files and exceptions in Python.



3. Understand regular expressions and multithreaded programming in Python
4. Implement Object Oriented Programming concepts in Python.
5. Implement regular expressions and exemplary applications related to GUI Programming in Python.

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

<b>2022-23 Onwards (MR-22)</b>	<b>MALLA REDDY ENGINEERING COLLEGE (Autonomous)</b>	<b>B.Tech. II Semester</b>		
<b>Code: C0305</b>	<b>ENGINEERING DRAWING (Common for CSE, IT, CSE (Cyber Security), CSE (AI and ML), CSE (Data Science), CSE (IoT) and AI)</b>	<b>L</b>	<b>T</b>	<b>P</b>
<b>Credits: 3</b>		<b>2</b>	<b>-</b>	<b>2</b>

PREREQUISITES: NIL

### Course Objectives:

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

### MODULE I:

**10 Periods**

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

**Geometrical Constructions:** Regular polygons only. Conic Sections: Ellipse, Parabola, Hyperbola– General method only Cycloid and Involutess.

**Scales:** Plane Scale, Diagonal scale.

### MODULE II:

**10 Period**

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

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

**Projection of Lines:** Projection of Lines - parallel, perpendicular, inclined to one reference plane.

### MODULE III:

**9 Periods**

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

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

### MODULE IV:

**10 Periods**

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

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

### MODULE V:

**9 Periods**

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

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

## TEXT BOOKS

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

## REFERENCES

1. K.L.Narayana, P.Kannaiah, “**Engineering Drawing**”, SciTech Publishers. 2<sup>nd</sup> Edition, 2017
2. K.Venugopal, “**Engineering Drawing**”, NewAge International Publishers, 3<sup>rd</sup> 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, 3<sup>rd</sup> Edition, 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://freevidelectures.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-\(EG-MECI102\)](http://road.issn.org/issn/2344-4681-journal-of-industrial-design-and-engineering-graphics-nit-jalandhar-(EG-MECI102))

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	3	3		3		2	2			1
CO2	3	3	3		2			2	1	1	1
CO3	3	2	3		2	1	1	1			1
CO4	3	2	2	2	2	2		3	1	1	3
CO5	3	3	2	1	3	1	2	2	1	1	3

<b>2022-23 Onwards (MR-22)</b>	<b>MALLA REDDY ENGINEERING COLLEGE (Autonomous)</b>	<b>B.Tech. I Semester</b>		
<b>Code: C0B18</b>	<b>Engineering Chemistry Lab (Common for CE, EEE, ME, ECE, CSE, CSE(AIML), CSE(DS), CSE (CS), CSE(IOT), IT and Min.E)</b>	<b>L</b>	<b>T</b>	<b>P</b>
<b>Credits: 1</b>		<b>-</b>	<b>-</b>	<b>2</b>

### 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<sup>H</sup> metry.
4. Estimation of alkalinity of water.
5. Estimation of strength of an acid by Conductometry.
6. Estimation of strength of an acid by Potentiometry.
7. Estimation of Mn<sup>+2</sup> ion in KMnO<sub>4</sub> by Colorimetry.
8. Determination of viscosity of given liquids by Ostwald's viscometer.
9. Determination of surface tension of given sample using stalagmometer.
10. Estimation of iron (II) by dichrometry.
11. Determination of rate constant of hydrolysis of methyl acetate.
12. Preparation of Aspirin.

### Course outcomes:

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

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

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

<b>2022-23 Onwards (MR-22)</b>	<b>MALLA REDDY ENGINEERING COLLEGE (Autonomous)</b>	<b>B.Tech. II Semester</b>		
<b>Code: C0B11</b>	<b>Applied Physics Lab (Common for CSE, CSE (AI &amp; ML), CSE (CS), CSE (IoT), CSE (Data Science), IT, ECE and EEE)</b>	<b>L</b>	<b>T</b>	<b>P</b>
<b>Credits: 1</b>		-	-	<b>2</b>

### Course objectives:

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

### List of Experiments:

#### **1. Planck's constant**

To determine Planck's constant using Photo electric effect.

#### **2. Energy band –gap of a semiconductor**

To determine the energy band gap of a semiconductor.

#### **3. V-I and P-I characteristics of light emitting diode**

Plot V-I and P-I characteristics of light emitting diode.

#### **4. Laser diode**

To study the Characteristics of Laser diode.

#### **5. Solar Cell**

To study the V-I Characteristics of solar cell.

#### **6. LCR Circuit**

To determination of resonant frequency, bandwidth and quality factor of RLC circuit.

#### **7. Numerical Aperture of an Optical fiber**

To determine the Numerical aperture of the given fiber.

#### **8. Bending Loss of a Fiber**

To determine the bending loss of the given fiber.

#### **9. Light Dependent Resistance (LDR)**

To determine the characteristics of a LDR.

#### **10. Stewart and Gee's experiment**

Determination of Magnetic field along the axis of current carrying circular coil.

#### **11. B-H Curve**

To study the magnetization of ferromagnetic material in presence of magnetic field.

#### **12. Sonometer**

To verify the frequency of AC Supply.

#### **13. Construction of fundamental logic gates using discrete components and verification of truth tables**

#### **14. Verification of truth tables of fundamental logic gates using ICs**

#### **15. Construction of fundamental logic gates using universal logic gates.**

**Course Outcomes:**

1. At the end of the course, students will able to
2. Develop skills to impart practical knowledge in real time solution.
3. Understand principle, concept, working, application and comparison of results with theoretical calculations.
4. Design new instruments with practical knowledge.
5. Understand measurement technology.
6. Use new instruments and real time applications in engineering studies.

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

<b>2022-23 Onwards (MR-22)</b>	<b>MALLA REDDY ENGINEERING COLLEGE (Autonomous)</b>	<b>B.Tech. II Semester</b>		
<b>Code: C0506</b>	<b>Python Programming Lab</b> (Common for CSE, IT, CSE (Cyber Security), CSE (AI and ML), CSE (Data Science), AIML, CSIT and CSE (IoT))	<b>L</b>	<b>T</b>	<b>P</b>
<b>Credits: 2</b>		<b>-</b>	<b>1</b>	<b>2</b>

**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 demonstrate different number data types in Python
  - b) Write a program to purposefully raise Indentation Error and correct it.
  - c) Write a program to compute distance between two points taking input from the user (Pythagorean Theorem).
- 2
  - a) Write a program to perform different Arithmetic Operations on numbers in Python.
  - b) Write a program to create, concatenate and print a string and accessing sub-string from a given string
- 3
  - a) Write a program to count the numbers of characters in the given string and store them in a dictionary data structure
  - b) Write a program to combine two lists into a dictionary.
- 4
  - a) Write a Program for checking whether the given number is even number or not.
  - b) Write a Python script that prints prime numbers less than N (N to be taken from user), and print the sum of all primes.
- 5
  - a) Write a program using a while loop that asks the user for a number, and prints a countdown from that number to zero.
  - b) write a program, that prints out the decimal equivalents of 1/2, 1/3, 1/4, . . . , 1/10, using for loop.
- 6
  - a) Write a python program to define a module to find Fibonacci Numbers and import the module to another program.
  - b) Write a python program to define a module and import a specific function of that module to another program.
- 7
  - a) Write a function dups to find all duplicates in the list.
  - b) Write a function unique to find all the unique elements of a list.
  - c) Write a function reverse to reverse a list. Without using the reverse function.
- 8
  - a) Write a script named copyfile.py. This script should prompt the user for the names of two text files. The contents of the first file should be input and written to the second file.
  - b) Write a program to print each line of a file in reverse order.

- c) Write a program add.py that takes 2 numbers as command line arguments and prints its sum.
- 9 a) Write a program to compute the number of characters, words and lines in a file.  
b) Find mean, median, mode for the given set of numbers in a list.
  - 10 a) Write a program to perform addition of two square matrices  
b) Write a program to perform multiplication of two square matrices
  - 11 Write a python program to simulate the banking operations using Class.
  - 12 Write a GUI for an Expression Calculator using tk

### TEXT BOOKS

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

### REFERENCE BOOKS

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

### Course Outcomes

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

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

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



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

**Prerequisites:** NIL

**Course Objectives:**

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

**MODULE I: [10 Periods]**

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

**MODULE II: [09 Periods]**

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

**MODULE III: [09 Periods]**

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

**MODULE IV: [10 Periods]**

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

**MODULE V: [10 Periods]**

**Graph Theory:** Basic Concepts, Isomorphism and Subgraphs, Trees and their Properties, Spanning Trees, Directed Trees, Binary Trees, Planar Graphs, Euler's Formula, Multi-graphs and Euler Circuits, Hamiltonian Graphs, Chromatic Numbers, The Four-Color Problem.

**TEXT BOOKS:**

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

**REFERENCES:**

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

**E-RESOURCES:**

1. <http://www.cse.iitd.ernet.in/~bagchi/courses/discrete-book/fullbook.pdf>
2. <http://www.medellin.unal.edu.co/~curmat/matdiscretas/doc/Epp.pdf>
3. <http://ndl.iitkgp.ac.in/document/yVCWqd6u7wgye1qwH9xY7xPG734QA9tMJN2ncqS12ZbN7pUSSIWcxSgPOZJEokyWJlxQLYsrFyeITA70W9C8Pg>
4. <http://nptel.ac.in/courses/106106094/>

**Course Outcomes:**

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

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

CO- PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COs	Programme Outcomes (POs)												PSOs		
	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	

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

Prerequisites: Nil

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

### **MODULE - I:** **[10 PERIODS]**

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

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

### **MODULE - II:** **[9 PERIODS]**

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

### **MODULE - III:** **[10 PERIODS]**

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

### **MODULE - IV:** **[9 PERIODS]**

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

### **MODULE – V:** **[10 PERIODS]**

**MEMORIES AND ASYNCHRONOUS SEQUENTIAL LOGIC:** Introduction, Random-Access Memory, Memory Decoding, Error Detection and correction Read-only memory, Programmable logic Array programmable Array logic, Sequential Programmable Devices. Introduction, Analysis Procedure, Circuits with Latches, Design Procedure, Reduction of state and FlowTables, Race-Free state Assignment Hazards, Design Example.

**TEXT BOOKS:**

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

**REFERENCE BOOKS:**

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

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														

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

**Prerequisites:** A Course on “DLD”.

### Objectives

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

### MODULE – I

**[10 Periods]**

**Digital Computers:** Introduction, Block diagram of Digital Computer, Definition of Computer Organization, Computer Design and Computer Architecture. Register Transfer Language and Micro operations: Register Transfer language, Register Transfer, Bus and memory transfers, Arithmetic Micro operations, logic micro operations, shift micro operations, Arithmetic logic shift unit.

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

### MODULE – II

**[10 Periods]**

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

### MODULE – III

**[9 Periods]**

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

### MODULE – IV

**[10 Periods]**

**Input-Output Organization:** Input-Output Interface, Asynchronous data transfer, Modes of Transfer, Priority Interrupt Direct memory Access. Memory Organization: Memory Hierarchy, Main Memory, Auxiliary memory, Associate Memory, Cache Memory.

### MODULE – V

**[9 Periods]**

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

**Textbook:**

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

**References:**

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

**E-Resources:**

1. <https://books.google.co.in/books?isbn=8131700704>
2. [http://ndl.iitkgp.ac.in/document/yVCWqd6u7wgye1qwH9xY7Eh9eBOsT1ELoYpKlg\\_xngrkluevXOJLs1TbxS8q2icgUs3hL4\\_KAi5So5FgXcVg](http://ndl.iitkgp.ac.in/document/yVCWqd6u7wgye1qwH9xY7Eh9eBOsT1ELoYpKlg_xngrkluevXOJLs1TbxS8q2icgUs3hL4_KAi5So5FgXcVg)
3. [http://ndl.iitkgp.ac.in/document/yVCWqd6u7wgye1qwH9xY7xAYUzYSIXl4zudlsolr-e7wQNrNXLxbgGFxbkoyx1iN3YbHuFrzI2jc\\_70rWMEwQ](http://ndl.iitkgp.ac.in/document/yVCWqd6u7wgye1qwH9xY7xAYUzYSIXl4zudlsolr-e7wQNrNXLxbgGFxbkoyx1iN3YbHuFrzI2jc_70rWMEwQ)
4. <http://nptel.ac.in/courses/106106092/>

**Outcomes:**

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

CO- PO, PSO Mapping (3/2/1 indicates strength 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														

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

**Prerequisites:** A course on “Programming for Problem Solving “

**Course Objectives:**

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

**MODULE-I:**

**[10 Periods]**

Introduction to Data Structures, abstract data types, Linear list – singly linked list 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, B- Trees, B+ Trees, AVL Trees, Definition, Height of an AVL Tree, Operations – Insertion, Deletion and Searching, Red –Black, Splay Trees.

**MODULE-IV:**

**[10 Periods]**

**Graphs:** Graph Implementation Methods. Graph Traversal Methods.

**Sorting:** Quick Sort, Heap Sort, External Sorting- Model for external sorting, Merge Sort.

**MODULE-V:**

**[09 Periods]**

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

**TEXT BOOKS:**

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

**REFERENCES:**

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

**E-RESOURCES:**

1. <http://gvpce.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

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

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	

trees.



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

**Prerequisites:** Computer Programming

**Course Objectives:**

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

**MODULE-I:**

**[10 Periods]**

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

**Module II:**

**[10 Periods]**

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

**MODULE III:**

**[09 Periods]**

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

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

**MODULE IV:****[10 Periods]**

**Event Handling:** Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes. The AWT class hierarchy, user interface components- labels, button, canvas, scrollbars, text components, check box, checkbox groups, choices,

**lists panels** – scrollpane, dialogs, menubar, graphics, layout manager – layout manager types – border, grid, flow, card and grid bag.

**MODULE V:****[09 Periods]**

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

**TEXT BOOKS:**

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

**REFERENCES:**

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

**E-RESOURCES:**

1. [http://ndl.iitkgp.ac.in/document/xttk-4kfhvUwVIXBW-RPf64\\_TFk2i4LJhgQFPQ WAEt-Zobbm3twyubjRA1YOe9WVwkN2qGcxBwdHaPdi\\_mMQ](http://ndl.iitkgp.ac.in/document/xttk-4kfhvUwVIXBW-RPf64_TFk2i4LJhgQFPQ WAEt-Zobbm3twyubjRA1YOe9WVwkN2qGcxBwdHaPdi_mMQ)
2. [https://ndl.iitkgp.ac.in/result?q={\"t\":\"search\",\"k\":\"object%20oriented%20programming\", \"s\":\[\"type=\\\"video\\\"\"\],\"b\":{\"filters\":\[\]}}](https://ndl.iitkgp.ac.in/result?q={\)
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

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

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

<b>2022-23 Onwards (MR-22)</b>	<b>MALLA REDDY ENGINEERING COLLEGE (Autonomous)</b>	<b>B.Tech. III Semester</b>		
<b>Code: C0512</b>	<b>Data Structures Lab</b> (Common for CSE, CSE (Cyber Security), CSE (AI and ML), CSE (DS), CSE (IOT), AI and IT)	<b>L</b>	<b>T</b>	<b>P</b>
<b>Credits: 1.5</b>		-	-	<b>3</b>

**Prerequisites:** A Course on “Programming for problem solving”

**Objectives:**

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

**Software Requirements: Turbo C / C++**

**List of Programs:**

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

**TEXT BOOKS**

1. Fundamentals of Data Structures in C, 2<sup>nd</sup> Edition, E. Horowitz, S. Sahni and Susan AndersonFreed, 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, 2nd Edition, R. F. Gilberg and B. A. Forouzan, Cengage Learning.

## Outcomes:

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

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

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

- Ability to Implement searching and sorting algorithms

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

**Prerequisites: NIL**

**Software Requirements: JDK**

**Course Objectives:**

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

Note:

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

**List of Programs:**

1. Use Eclipse or Net bean platform and acquaint yourself with the various menus. Create a test project, add a test class, and run it. See how you can use auto suggestions, auto fill. Try code formatter and code refactoring like renaming variables, methods, and classes. Try debug step by step with a small program of about 10 to 15 lines which contains at least one if else condition and a for loop.
2. Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -, \*, % operations. Add a text field to display the result. Handle any possible exceptions like divided by zero.
3. A) Develop an applet in Java that displays a simple message.  
B) Develop an applet in Java that receives an integer in one text field, and computes its factorial Value and returns it in another text field, when the button named "Compute" is clicked.
4. Write a Java program that creates a user interface to perform integer divisions. The user enters two numbers in the text fields, Num1 and Num2. The division of Num1 and Num 2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw a Number Format Exception. If Num2 were Zero,

the program would throw an Arithmetic Exception. Display the exception in a message dialog box.

5. Write a Java program that implements a multi-thread application that has three threads. First thread generates a random integer every 1 second and if the value is even, the second thread computes the square of the number and prints. If the value is odd, the third thread will print the value of the cube of the number.
6. Write a Java program for the following:  
  
Create a doubly linked list of elements.  
Delete a given element from the above list.  
Display the contents of the list after deletion.
7. Write a Java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green with radio buttons. On selecting a button, an appropriate message with “Stop” or “Ready” or “Go” should appear above the buttons in the selected color. Initially, there is no message shown.
8. Write a Java program to create an abstract class named Shape that contains two integers and an empty method named print Area (). Provide three classes named Rectangle, Triangle, and Circle such that each one of the classes extends the class Shape. Each one of the classes contains only the method print Area () that prints the area of the given shape.
9. Suppose that a table named Table.txt is stored in a text file. The first line in the file is the header, and the remaining lines correspond to rows in the table. The elements are separated by commas.  
Write a java program to display the table using Labels in Grid Layout.
10. Write a Java program that handles all mouse events and shows the event name at the center of the window when a mouse event is fired (Use Adapter classes).
11. Write a Java program that loads names and phone numbers from a text file where the data is organized as one line per record and each field in a record are separated by a tab (\t). It takes a name or phone number as input and prints the corresponding other value from the hash table (hint: use hash tables).
12. Write a Java program that correctly implements the producer – consumer problem using the concept of inter thread communication.
13. Write a Java program to list all the files in a directory including the files present in all its subdirectories.

#### **TEXT BOOKS:**

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

#### REFERENCES:

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

#### Course Outcomes:

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

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

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



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

### Course Objectives:

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

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

### LAB PROBLEMS:

1. Understanding Data, What is data, where to find data, Foundations for building Data Visualizations, Creating Your First visualization?
2. Getting started with Tableau Software using Data file formats, connecting your Data to Tableau, creating basic charts (line, bar charts, Tree maps), Using the Show me panel.
3. Tableau Calculations, Overview of SUM, AVG, and Aggregate features, Creating custom calculations and fields.
4. Applying new data calculations to your visualizations, Formatting Visualizations, Formatting Tools and Menus, Formatting specific parts of the view.
5. Editing and Formatting Axes, Manipulating Data in Tableau data, Pivoting Tableau data.
6. Structuring your data, Sorting and filtering Tableau data, Pivoting Tableau data.
7. Advanced Visualization Tools: Using Filters, Using the Detail panel, using the Size panels, customizing filters, Using and Customizing tooltips, Formatting your data with colors.
8. Creating Dashboards & Storytelling, creating your first dashboard and Story, Design for different displays, adding interactivity to your Dashboard, Distributing & Publishing your Visualization.
9. Tableau file types, publishing to Tableau Online, Sharing your visualizations, printing, and Exporting.
10. Creating custom charts, cyclical data and circular area charts, Dual Axis charts.

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

- Understand How to import data into Tableau.
- Understand Tableau concepts of Dimensions and Measures.
- Develop Programs and understand how to map Visual Layouts and Graphical Properties.
- Create a Dashboard that links multiple visualizations.
- Use graphical user interfaces to create Frames for providing solutions to real world problems.

**REFERENCE BOOKS:**

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

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

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

**Pre-Requisites:** NIL

### **Objectives**

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

#### **Module I: Ecosystems**

**5 Periods**

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

Activity: Plantation.

#### **Module II: Natural resources, Biodiversity and Biotic resources:**

##### **A: Natural Resources:**

**5 Periods**

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

##### **B: Biodiversity and Biotic resources:**

**4 Periods**

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

Activity: case studies.

#### **Module III: ENVIRONMENTAL POLLUTION AND CONTROL:**

**7 Periods**

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

**B:** Soil Pollution, Soil as sink for pollutants, Impact of modern agriculture on soil, degradation of soil. Marine Pollution: Misuse of International water for dumping of

hazardous waste, Coastal pollution due to sewage and marine disposal of industrial effluents.

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

#### **Module IV: Global Environmental**

**6 Periods**

##### **Problems and Global effects:**

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

Activity: Poster Making.

#### **Module V: Towards sustainable future:**

**5 Periods**

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

##### **Text Books:**

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

##### **Reference Books:**

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

##### **E-Resources:**

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

**Course Outcomes:**

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

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

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

<b>2022-23 Onwards (MR-22)</b>	<b>MALLA REDDY ENGINEERING COLLEGE (Autonomous)</b>	<b>B.Tech. IV Semester</b>		
<b>Code: C0B07</b>	<b>Applied Statistics and Optimization Techniques (Common for CSE, CSE (Cyber Security), CSE (AI and ML), CSE (DS), CSE (IOT), AIML and IT)</b>	<b>L</b>	<b>T</b>	<b>P</b>
<b>Credits: 3</b>		<b>3</b>	<b>-</b>	<b>-</b>

### **Module – I** **[12 Periods]**

#### **Analysis of Variance & Analysis of Co-variance**

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

### **Module – II** **[12 Periods]**

#### **Design of Experiments**

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

### **Module III** **[13 Periods]**

#### **Transportation and Assignment**

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

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

### **Module IV: Game Theory** **[13 Periods]**

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

### **Method V: Queuing Theory** **[10 Periods]**

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

**Deterministic queuing Models (M/M/1):** ( $\infty$ : FIFO) Model, (M/M/1): (N: FIFO) Model.

#### **Proposed Text Books:**

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

#### **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. ,Kolkata.

3. V.K. Kapoor and S.C. Gupta: “Fundamentals of Mathematical Statistics”, Sultan Chand & Sons, New Delhi

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

<b>2022-23 Onwards (MR-22)</b>	<b>MALLA REDDY ENGINEERING COLLEGE (Autonomous)</b>	<b>B.Tech. IV Semester</b>		
<b>Code: C0515</b>	<b>Database Management Systems (Common for CSE, CSE (Cyber Security), CSE (AI and ML), CSE (DS), CSE (IOT), AI and IT)</b>	<b>L</b>	<b>T</b>	<b>P</b>
<b>Credits: 3</b>		<b>3</b>	<b>-</b>	<b>-</b>

### Prerequisites

1. A course on “Data Structures”

### The purpose of learning this course is to:

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

### MODULE I:

**[10 Periods]**

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

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

.

### MODULE II:

**[09 Periods]**

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

Relational Algebra, Tuple relational Calculus, Domain relational calculus.

### MODULE III:

**[10 Periods]**

**SQL: QUERIES, CONSTRAINTS, TRIGGERS:** form of basic SQL query, UNION, INTERSECT, and EXCEPT, Nested Queries, aggregation operators, NULL values, complex integrity constraints in SQL, triggers and active databases.

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

### MODULE IV:

**[10 Periods]**

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

### MODULE V:

**[09 Periods]**

Data on External Storage, File Organization and Indexing, Cluster Indexes, Primary and Secondary Indexes, Index data Structures, Hash Based Indexing, Tree based Indexing,



Comparison of File Organizations, Indexes- Intuitions for tree Indexes, Indexed Sequential Access Methods (ISAM),  
B+ Trees: A Dynamic Index Structure.

### TEXT BOOKS:

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

### REFERENCES:

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

### E-RESOURCES:

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

### Course Outcomes:

- Gain knowledge of fundamentals of DBMS, database design and normal forms
- Master the basics of SQL for retrieval and management of data.
- Be acquainted with the basics of transaction processing and concurrency control.
- Familiarity with database storage structures and access techniques

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

<b>2022-23 Onwards (MR-22)</b>	<b>MALLA REDDY ENGINEERING COLLEGE (Autonomous)</b>	<b>B.Tech. IV Semester</b>		
<b>Code: C0516</b>	<b>Operating Systems (Common for CSE, CSE (Cyber Security), CSE (AI and ML), CSE (DS), CSE (IOT), AI and IT)</b>	<b>L</b>	<b>T</b>	<b>P</b>
<b>Credits: 3</b>		<b>3</b>	<b>-</b>	<b>-</b>

**Prerequisites:**

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

**Course Objectives:**

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

**MODULE I:**

**[10 Periods]**

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

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

**MODULE II:**

**[9 Periods]**

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

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

**MODULE III:**

**[10 Periods]**

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

**MODULE IV:**

**[10 Periods]**

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

**MODULE V:****[08 Periods]**

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

**TEXT BOOKS:**

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

**REFERENCES:**

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

**Course outcomes**

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

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

<b>2022-23 Onwards (MR-22)</b>	<b>MALLA REDDY ENGINEERING COLLEGE (Autonomous)</b>	<b>B.Tech. IV Semester</b>		
<b>Code: C0517</b>	<b>Design and Analysis of Algorithms (Common for CSE, CSE (Cyber Security), CSE (AI and ML), CSE (DS), CSE (IOT), AI and IT)</b>	<b>L</b>	<b>T</b>	<b>P</b>
<b>Credits: 3</b>		<b>3</b>	<b>-</b>	<b>-</b>

**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, Huffman coding.

**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, Longest Common Subsequence.

**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://comsci.files.wordpress.com/2015/12/horowitz-and-sahani-fundamentals-of-computer-algorithms-2nd-edition.pdf>
2. <https://books.google.co.in/books?id=7qKXCzF1XC8C&printsec=frontcover&dq=T.H.Cormen,C.E.Leiserson,+R.L.Rivest,and+C.Stein,+%22Introduction+to+Algorithms%22,+second+edition,+PHI+Pvt.+Ltd./+Pearson+Education,ebook,pdf&hl=en&sa=X&ved=0ahUKEWjFupORxdXTAhXLQo8KHU7FC5cQ6AEIKjAB#v=onepage&q&f=false>
3. [http://en.cnki.com.cn/Article\\_en/CJFDTOTAL-JFYZ200208019.htm](http://en.cnki.com.cn/Article_en/CJFDTOTAL-JFYZ200208019.htm)
4. <http://nptel.ac.in/courses/106101060/>

**Course Outcomes:**

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

1. **Analyze** performance of algorithms using asymptotic notations, performance analysis, disjoint sets, spanning trees and connected components
2. **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.
3. **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.
4. **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
5. **Apply** algorithm design techniques to solve certain NP-complete problems.

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	

<b>2022-23 Onwards (MR-22)</b>	<b>MALLA REDDY ENGINEERING COLLEGE (Autonomous)</b>	<b>B.Tech. IV Semester</b>		
<b>Code: C0518</b>	<b>Software Engineering &amp; Modeling</b>	<b>L</b>	<b>T</b>	<b>P</b>
<b>Credits: 3</b>		<b>3</b>	<b>-</b>	<b>-</b>

**Prerequisites:** NIL.

**Course Objectives:**

- The aim of the course is to provide an understanding of the working knowledge of the techniques for estimation, design, testing and quality management of large software development projects.
- Topics include process models, software requirements, software design, software testing, software process/product metrics, risk management, quality management and UML diagrams

**Module I:** [09 Periods]

**Introduction to Software Engineering:** The evolving role of software, changing nature of software, software myths. A Generic view of process: Software engineering- a layered technology, a process framework, the capability maturity model integration (CMMI).

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

**Module II:** [09Periods]

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

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

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

**Module III:** [09 Periods]

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

**Module IV:** [09 Periods]

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

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

**Module V:****[09Periods]**

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

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

**TEXT BOOKS:**

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

**REFERENCES:**

1. The unified modeling language user guide Grady Booch, James Rumbaugh, Ivar Jacobson, Pearson Education.
2. Software Engineering, an Engineering approach- James F. Peters, Witold Pedrycz, John Wiley.
3. Software Engineering principles and practice- Waman S Jawadekar, The McGraw-Hill Companies.
4. Fundamentals of object-oriented design using UML Meiler page-Jones: Pearson Education.

**E RESOURCES:**

1. [https://books.google.co.in/books?id=bL7QZHtWvaUC&printsec=frontcover&dq=software+engineering+by+roger+pressman+vth+edition+free+download&hl=en&sa=X&ved=0ahUKEwiLkOz-pL\\_TAhWiuI8KHZSxD2cQ6AEIMDAC#v=onepage&q&f=false](https://books.google.co.in/books?id=bL7QZHtWvaUC&printsec=frontcover&dq=software+engineering+by+roger+pressman+vth+edition+free+download&hl=en&sa=X&ved=0ahUKEwiLkOz-pL_TAhWiuI8KHZSxD2cQ6AEIMDAC#v=onepage&q&f=false)
2. [https://books.google.co.in/books?id=PqsWaBkFh1wC&printsec=frontcover&dq=software+engineering+by+ian+sommerville+FREE+download&hl=en&sa=X&ved=0ahUKEwjv5fhpb\\_TAhUHOo8KHY5OAC4Q6AEIKjAB#v=onepage&q=software%20engineering%20by%20ian%20sommerville%20FREE%20download&f=false](https://books.google.co.in/books?id=PqsWaBkFh1wC&printsec=frontcover&dq=software+engineering+by+ian+sommerville+FREE+download&hl=en&sa=X&ved=0ahUKEwjv5fhpb_TAhUHOo8KHY5OAC4Q6AEIKjAB#v=onepage&q=software%20engineering%20by%20ian%20sommerville%20FREE%20download&f=false)
3. <http://ieeexplore.ieee.org/document/4807670/>
1. <https://link.springer.com/search?facet-journalid=40411&package=openaccessarticles&query=&facet-sub-discipline=%22Software+Engineering%22>
2. <http://freevideolectures.com/Course/2318/Software-Engineering>
3. <http://freevideolectures.com/Course/2318/Software-Engineering/5>

**Course Outcomes:**

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

- Ability to translate end-user requirements into system and software requirements, using e.g.UML, and structure the requirements in a Software Requirements Document (SRD).
- Identify and apply appropriate software architectures and patterns to carry out high level design of a system and be able to critically compare alternative choices.
- Will have experience and/or awareness of testing problems and will be able to develop a simple testing report

	<b>CO- PO, PSO Mapping</b> <b>(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak</b>														
CO's	Programme Outcomes(POs)												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C01									3	3			3		3
C02	2	3								3			3	2	
C03			3	3						2				3	
C04				2	3								2		
C05						2	3	3					3	3	



<b>2022-23 Onwards (MR-22)</b>	<b>MALLA REDDY ENGINEERING COLLEGE (Autonomous)</b>	<b>B.Tech. IV Semester</b>		
<b>Code: C0519</b>	<b>Database Management Systems Lab (Common for CSE, CSE (Cyber Security), CSE (AI and ML), CSE (DS), CSE (IOT), AI and IT)</b>	<b>L</b>	<b>T</b>	<b>P</b>
<b>Credits: 1</b>		<b>-</b>	<b>-</b>	<b>2</b>

**Co-requisites:** “Database Management Systems”

**Course Objectives:**

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

**Software Requirements: MySQL**

**LIST OF EXPERIMENTS:**

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

**Course Outcomes:**

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

**TEXT BOOKS:**

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

**REFERENCE BOOKS:**

1. Database Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7<sup>th</sup> Edition.
2. Fundamentals of Database Systems, Elmasri Navrate, Pearson Education
3. Introduction to Database Systems, C.J. Date, Pearson Education
4. Oracle for Professionals, The X Team, S. Shah and V. Shah, SPD.

5. Database Systems Using Oracle: A Simplified guide to SQL and PL/SQL, Shah, PHI.
6. Fundamentals of Database Management Systems, M. L. Gillenson, Wiley Student Edition.

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

<b>2022-23 Onwards (MR-22)</b>	<b>MALLA REDDY ENGINEERING COLLEGE (Autonomous)</b>	<b>B.Tech. IV Semester</b>		
<b>Code: C0520</b>	<b>Operating Systems Lab (Common for CSE, CSE (Cyber Security), CSE (AI and ML), CSE (DS), CSE (IOT), AI and IT)</b>	<b>L</b>	<b>T</b>	<b>P</b>
<b>Credits: 1</b>		<b>-</b>	<b>-</b>	<b>2</b>

**Prerequisites:** A course on “Programming for Problem Solving”, A course on “Computer Organization and Architecture”.

**Co-requisite:** A course on “Operating Systems”.

**Course Objectives:**

- To provide an understanding of the design aspects of operating system concepts through simulation
- Introduce basic Unix commands, system call interface for process management, interprocess communication and I/O in Unix

**Software Requirements:** UNIX/LINUX Operating System, Windows and Turbo C / C++

**List of Experiments:**

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

**Course Outcomes:**

- Simulate and implement operating system concepts such as scheduling, deadlock management, file management and memory management.

- Able to implement C programs using Unix system calls

#### TEXT BOOKS:

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

#### REFERENCE BOOKS:

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

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

<b>2022-23 Onwards (MR-22)</b>	<b>MALLA REDDY ENGINEERING COLLEGE (Autonomous)</b>	<b>B.Tech. IV Semester</b>		
<b>Code: C0521</b>	<b>Real-time Research Project/ Societal Related Project</b>	<b>L</b>	<b>T</b>	<b>P</b>
<b>Credits: 1</b>		<b>-</b>	<b>-</b>	<b>2</b>

<b>2022-23 Onwards (MR-22)</b>	<b>MALLA REDDY ENGINEERING COLLEGE (Autonomous)</b>	<b>B.Tech. IV Semester</b>		
<b>Code: C0522</b>	<b>NODE JS/ REACT JS/ DJANGO LAB</b>	<b>L</b>	<b>T</b>	<b>P</b>
<b>Credits: 1</b>	<b>(Common for CSE, CSE (Cyber Security), CSE (AI and ML), CSE (DS), CSE (IOT), AI and IT)</b>	<b>-</b>	<b>-</b>	<b>2</b>

**Prerequisites:** Object Oriented Programming through Java, HTML Basics

**Course Objectives:**

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

**Software Requirements: JDK, Tomcat Server, PHP and WAMP Server.**

**Exercises:**

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

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

- Build a custom website with HTML, CSS, and Bootstrap and little JavaScript.
- Demonstrate Advanced features of JavaScript and learn about JDBC
- Develop Server – side implementation using Java technologies like
- Develop the server – side implementation using Node JS.
- Design a Single Page Application using React.

**REFERENCE BOOKS:**

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

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

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

**Prerequisites:** NIL

### **COURSE DESCRIPTION**

This course offers an introduction to Gender Studies, an interdisciplinary field that asks critical

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

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

### **Objectives of the Course:**

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

### **MODULE I: UNDERSTANDING GENDER**

**[06 Periods]**

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

### **MODULE II: GENDER ROLES AND RELATIONS**

**[06 Periods]**

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

### **MODULE III: GENDER AND LABOUR**

**[07 Periods]**

Division and Valuation of Labour-Housework: The Invisible Labor- "My Mother doesn't Work." "Share the Load."-Work: Its Politics and Economics -Fact and Fiction. Unrecognized



and Unaccounted work.-Gender Development Issues-Gender, Governance and Sustainable Development-Gender and Human Rights-Gender and Mainstreaming.

#### **MODULE IV: GENDER - BASED VIOLENCE [07 Periods]**

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

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

#### **MODULE V: GENDER AND CULTURE [06 Periods]**

Gender and Film-Gender and Electronic Media-Gender and Advertisement-Gender and Popular Literature- Gender Development Issues-Gender Issues-Gender Sensitive Language-Gender and Popular Literature - Just Relationships: Being Together as Equals  
Mary Kom and Onler. Love and Acid just do not Mix. Love Letters. Mothers and Fathers. Rosa Parks-The Brave Heart.

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

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

#### **ASSESSMENT AND GRADING:**

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

#### **TEXT BOOKS:**

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

#### **REFERENCES:**

1. Sen, Amartya. "More than One Million Women are Missing.' New York Review of Books 37.20 (20 December 1990). Print. We Were Making History...' Life Stories of Women in the ToIrmgana People's Struggle. New Delhi: Kali for Women, 1989.
2. Tripti Lahiri. "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](http://blogs.visj.com/India%20real%20time/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 <http://harooreollins.co.in/BookDetail.asp?FlookCndet,3732>

4. Vimata. "Vantillu (The Kitchen)". Women Writing in India: 600 BC to the Present. Volume II: The 20th Century. Ed. Susie Thaw and K. Lalita. Delhi: Oxford University Press 1995. 599-601.
5. Shatrughna, Veena et al. Women's Work and its Impact on Child Health and Nutrition, Hyderabad, National Institute of Nutrition, Indian Council of Medical Research. 1993.
6. Stree Shakti Sanghatana. 'We Were Making History ....' Life Stories of Women in the Telangana People's Struggle. New Delhi: Kali for Women, 1989.

#### E-RESOURCES:

1. [http://www.actforyouth.net/resources/rf/rf\\_gender1\\_1213.cfm](http://www.actforyouth.net/resources/rf/rf_gender1_1213.cfm) (UNDERSTANDING GENDER)
2. <https://www.simplypsychology.org/gender-biology.html> (GENDER AND BIOLOGY)
3. <http://www.yourarticlelibrary.com/essay/essay-on-gender-issues-in-labour-market-in-india/40442/> (GENDER AND LABOUR)
4. <http://journals.sagepub.com/doi/abs/10.1177/1077801200006007004> (ISSUES OF VIOLENCE)
5. <http://www.nordiclabourjournal.org/emner/likestilling> (GENDER AND BIOLOGY)

#### Course Outcomes:

At the end of the course,

- Students will have developed a better understanding of important issues related to gender in contemporary India.
- Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.
- Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
- Students will acquire insight into the gendered division of labour and its relation to politics and economics.
- Men and women students and professionals will be better equipped to work and live together as equals.
- Students will develop a sense of appreciation of women in all walks of life.
- Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women, the textbook will empower students to understand and respond to gender violence.

CO- PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COs	Programme Outcomes (POs)												PSOs		
	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		

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