

**MR 24 Regulations**  
**Course Structure for B Tech UG PROGRAMME**

<b>I B.Tech I Semester</b>			<b>Hours</b>			<b>Credits</b>	<b>Marks</b>		
<b>Category</b>	<b>Course Code</b>	<b>Subject</b>	<b>L</b>	<b>T</b>	<b>P</b>		<b>CIE</b>	<b>SEE</b>	<b>TOT</b>
BSC	D0B01	Matrices and Calculus	3	1	-	4	40	60	100
BSC	D0B08	Applied Physics	3	1	-	4	40	60	100
BSC	D0B10	Engineering Chemistry	3	1	-	4	40	60	100
ESC	D0305	Engineering Drawing	3	-	-	3	40	60	100
ESC	D0501	Programming for Problem Solving	3	-	-	3	40	60	100
BSC	D0B09	Applied Physics Lab	-	-	2	1	40	60	100
BSC	D0B11	Engineering Chemistry Lab	-	-	2	1	40	60	100
ESC	D0502	Programming for Problem Solving Lab	-	-	2	1	40	60	100
<b>Total</b>			<b>15</b>	<b>3</b>	<b>6</b>	<b>21</b>			<b>800</b>

<b>I B.Tech II Semester</b>			<b>Hours</b>			<b>Credits</b>	<b>Marks</b>		
<b>Category</b>	<b>Course Code</b>	<b>Subject</b>	<b>L</b>	<b>T</b>	<b>P</b>		<b>CIE</b>	<b>SEE</b>	<b>TOT</b>
BSC	D0B02	Ordinary Differential Equations and Vector Calculus	3	1	-	4	40	60	100
HSMC	D0H01	English for Skill enhancement	3	1	-	4	40	60	100
PCC	D0203	Basic Electrical and Electronics Engineering	3	-	-	3	40	60	100
PCC	D0503	Python Programming	3	-	-	3	40	60	100
HSMC	D0H02	English Language and Communication Skills Lab	-	-	2	1	40	60	100
PCC	D0204	Basic Electrical and Electronics Engineering Lab	-	-	2	1	40	60	100
PCC	D0504	Python Programming Lab	-	-	2	1	40	60	100
ESC	D1201	Engg and IT Workshop Lab	-	-	4	2	40	60	100
<b>Total</b>			<b>12</b>	<b>2</b>	<b>10</b>	<b>19</b>			<b>800</b>

II B.Tech I Semester			Hours			Credits	Marks		
Category	Course Code	Subject	L	T	P		CIE	SEE	TOT
PCC	D0508	Digital Logical Design	3	0	0	3	40	60	100
PCC	D0510	Data Structures	3	0	0	3	40	60	100
BSC	D0B22	Statistics for Data Science	3	1	0	3	40	60	100
PCC	D0509	Computer Organization and Architecture	3	0	0	3	40	60	100
PCC	D0511	Object Oriented Programming through Java	3	0	0	3	40	60	100
PCC	D0512	Data Structures Lab	0	0	3	1.5	40	60	100
PCC	D0513	Object Oriented Programming through Java Lab	0	0	3	1.5	40	60	100
MC	D00M1	Gender Sensitization	0	0	2	0	-	-	-
PCC	D0514	Skill Development Course (Data visualization- R Programming / Power BI)	0	1	2	2	40	60	100
<b>Total</b>			<b>15</b>	<b>2</b>	<b>10</b>	<b>20</b>			<b>800</b>

II B.Tech II Semester			Hours			Credits	Marks		
Category	Course Code	Subject	L	T	P		CIE	SEE	TOT
HSMC	D0H08	Business Economics & Financial Analysis	3	0	0	3	40	60	100
PCC	D0507	Discrete Mathematics	3	0	0	3	40	60	100
PCC	D0516	Operating Systems	3	0	0	3	40	60	100
PCC	D0515	Database Management Systems	3	0	0	3	40	60	100
PCC	D6701	Data Preparation and Analysis	3	1	0	4	40	60	100
PCC	D0520	Operating Systems Lab	0	0	2	1	40	60	100
PCC	D0519	Database Management Systems Lab	0	0	2	1	40	60	100
PCC	D67P1	Real-time Research Project/ Societal Related Project	0	0	2	1	40	60	100
MC	D00M2	Environmental Science	3	0	0	0	-	-	-
PCC	D0522	Skill Development Course (Node JS/ React JS/Django)	0	0	2	1	40	60	100
<b>Total</b>			<b>18</b>	<b>1</b>	<b>8</b>	<b>20</b>			<b>900</b>

III B.Tech I Semester			Hours			Credits	Marks		
Category	Course Code	Subject	L	T	P		CIE	SEE	TOT
PCC	D0517	Design and Analysis of Algorithm	3	0	0	3	40	60	100
PCC	D6703	Introduction to Data Science	3	1	0	4	40	60	100
PCC	D6201	Computer Networks	3	0	0	3	40	60	100
PEC-I	D6711	Data Warehousing and Business Intelligence	3	0	0	3	40	60	100
	D6637	Artificial Intelligence							
	D1203	Web Technologies							
	D6713	Introduction to Digital Image Processing							
	D0523	Computer Graphics							
PEC-II	D6714	Spatial and Multimedia Databases	3	0	0	3	40	60	100
	D1222	Information Retrieval Systems							
	D6715	Software Project Management							
	D0520	DevOps							
	D6609	Computer Vision and Robotics							
PCC	D1204	Design and Analysis of Algorithm Lab	0	0	2	1	40	60	100
PCC	D6202	Computer Networks Lab	0	0	2	1	40	60	100
PCC	D0H03	Advanced English Communication Skills Lab	0	0	2	1	40	60	100
MC	D00M5	Constitution of India	3	0	0	0	-	-	-
PCC	D6704	Skill Development Course (ETL-Kafka/Talend)	0	0	2	1	40	60	100
MC	D00M3	Quantitative Aptitude and Verbal Reasoning - I	2	0	0	0	-	-	-
<b>Total</b>			20	1	8	20			900

III B.Tech II Semester			Hours			Credits	Marks		
Category	Course Code	Subject	L	T	P		CIE	SEE	TOT
HSMC	D1213	Automata Theory and Compiler Design	3	0	0	3	40	60	100
PCC	D6620	Machine Learning	3	0	0	3	40	60	100
PCC	D6705	Big Data Analytics	3	0	0	3	40	60	100
PEC-III	D0534	Software Testing Methodologies	3	0	0	3	40	60	100
	D6707	Data Visualization Techniques							
	D0532	Scripting Languages							
	D0533	Mobile Application Development							
	D6203	Cryptography and Network Security							
OEC-I		Open Elective - I	3	0	0	3	40	60	100
PCC	D6626	Machine Learning Lab	0	0	2	1	40	60	100
PCC	D6714	Big Data Analytics Lab	0	0	2	1	40	60	100
PEC-III	D6708	Data Visualization Techniques Lab	0	0	2	1	40	60	100
MC	D00M6	Intellectual Property Rights	3	0	0	0	-	-	-
PRJ	D00P1	Industrial Oriented Mini Project/ Summer Internship/(UI design- Flutter)	0	0	4	0	40	60	100
MC	D00M4	Quantitative Aptitude and Verbal Reasoning - II	2	0	0	0	-	-	-
<b>Total</b>			18	0	10	20			900

IV B.Tech I Semester			Hours			Credits	Marks		
Category	Course Code	Subject	L	T	P		CIE	SEE	TOT
PCC	D6706	Predictive Analytics	3	0	0	3	40	60	100
PCC	D0543	Cloud Computing	3	0	0	3	40	60	100
PEC-IV	D0521	Quantum Computing	3	0	0	3	40	60	100
	D6707	Web and Social Media Analytics							
	D6611	Natural Language Processing							
	D6610	Robotic & Process Automations							
PEC-V	D6917	Internet of Things	3	0	0	3	40	60	100
	D6714	Cognitive Computing							
	D6211	Database Security							
	D6708	Data Science Applications							
OEC-II		Open Elective – II	3	0	0	3	40	60	100
PCC	D6715	Cloud Computing Lab	0	0	2	1	40	60	100
PCC	D6710	Predictive Analytics Lab	0	0	2	1	40	60	100
PRJ	D00P2	Project Stage – I	0	0	6	3	40	60	100
		<b>Total</b>	15	0	10	20			800

IV B.Tech II Semester			Hours			Credits	Marks		
Category	Course Code	Subject	L	T	P		CIE	SEE	TOT
HSMC	D0H09	Organizational Behavior	3	0	0	3	40	60	100
PEC-VI	D0531	Full Stack Development	3	0	0	3	40	60	100
	D6716	Pattern Recognition							
	D6718	Video Analytics							
	D0547	Blockchain Technology							
	D0554	Cyber Forensics							
OEC-III		Open Elective – III	3	0	0	3	40	60	100
PRJ	D00P3	Project Stage – II including Seminar	0	0	22	11	40	60	100
		<b>Total</b>	9	0	22	20			400

<b>2024-25 Onwards (MR-24)</b>	<b>MALLA REDDY ENGINEERING COLLEGE (Autonomous)</b>	<b>B.Tech. I Semester</b>		
<b>Code:D0B01</b>	<b>MATRICES AND CALCULUS</b>	<b>L</b>	<b>T</b>	<b>P</b>
<b>Credits:4</b>	<b>(Common to All)</b>	<b>3</b>	<b>1</b>	<b>-</b>

**Prerequisites:** Mathematics Knowledge at pre-university level

**Course Objectives:** To learn

- 1) The types of matrices, finding the inverse of a matrix, rank of a matrix, and applying the concept of rank to know the consistency of linear equations and to find all possible solutions, if any exist.
- 2) Eigen values and Eigen vectors of a matrix, Diagonalization of a matrix, the Cayley Hamilton theorem, and reducing a quadratic form into a canonical form through an orthogonal transformation.
- 3) Concept of mean value theorems and their applications to the mathematical problems and Evaluation of improper integrals using beta and gamma functions.
- 4) Partial differentiation, Jacobian, maxima and minima, and Taylor series expansion of functions of two variables.
- 5) Evaluation of multiple integrals and their applications in the allied fields.

### **MODULE I: Matrices**

**[8 Periods]**

Matrices: Types of Matrices, Symmetric, Skew-symmetric, Hermitian, Skew-Hermitian, orthogonal and 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, Linearly independent and dependent set of vectors, LU – Decomposition Method.

### **MODULE II: Eigen Values and Eigen Vectors**

**[8 Periods]**

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

**Quadratic Forms:** Nature, rank, index and signature of the Quadratic form, Reduction of Quadratic form to Canonical forms by Orthogonal Transformation method.

### **MODULE III: Calculus**

**[10 Periods]**

**(A) Mean value theorems:** Rolle's Theorem and Lagrange's Mean value theorem with their Geometrical Interpretation and its applications, Cauchy's mean value theorem. Taylor's Series. (All theorems without proof)

#### **(B) Beta and Gamma Functions**

Introduction to Improper Integrals, Definition of Beta and Gamma Functions, Properties and Other Forms. Relation between beta and gamma functions. Evaluation of improper integrals using beta and gamma functions.

### **MODULE –IV: Multivariable Calculus**

**[10 Periods]**

Definitions of Limit and Continuity. Partial Differentiation: Euler's Theorem, Total Derivative, Jacobian, Functional dependence and independence. Taylor's Series for functions of two variables, Applications: Maxima and Minima of function two variables and three variables using Method of Lagrange Multipliers.

**MODULE - V: Multiple Integrals****[12 Periods]**

Evaluation of Double Integrals (Cartesian and polar coordinates); change of order of integration (only Cartesian form). Evaluation of Triple Integrals. Change of variables (Cartesian to polar) for double and (Cartesian to spherical and cylindrical polar coordinates) for triple integrals. Finding areas using double integrals and volumes using double and triple integrals.

**TEXT BOOKS:**

- 1) B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.
- 2) D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005.
- 3) Richard Bellman, Introduction to matrix Analysis, Siam, second Edition.
- 4) R.K.Jain and S.R.K.Iyengar, Advanced Engineering Mathematics, Narosa Publications, 5<sup>th</sup> Edition 2016.

**REFERENCES:**

- 1) Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
- 2) G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
- 3) N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
- 4) V. Krishnamurthy, V.P. Mainra and J.L. Arora, An introduction to Linear Algebra, Affiliated East–West press, Reprint 2005.
- 5) Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.

**Course Outcomes:** After completion of the course, the student should be able to

- 1) Find the Rank of a matrix, inverse of a matrix and analyse the solution of system of linear equations.
- 2) Find the Eigen values and Eigen vectors of a matrix, Diagonalization of a matrix, verification of Cayley Hamilton theorem and Reduce the quadratic form to canonical form.
- 3) Verify mean value theorems; expand the given function using Taylor's series and Evaluate Improper Integrals using Beta and Gamma Functions.
- 4) Find the Jacobian, maxima and minima, Taylor series expansion of functions of two variables and partial derivatives.
- 5) Evaluate multiple integrals and its applications in areas and volumes.

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

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1		2	2	3	3							2
CO2	3	2	2								2	
CO3	3			3	2						3	2
CO4		2	2	2	3						2	2
CO5	2	2	2	3	3							2

<b>2024-25 Onwards (MR-24)</b>	<b>MALLA REDDY ENGINEERING COLLEGE (Autonomous)</b>	<b>B. Tech. I Semester</b>		
<b>Code: D0B08</b>	<b>Applied Physics Common to: CE, ME, IT, CSM, CSD</b>	<b>L</b>	<b>T</b>	<b>P</b>
<b>Credits: 4</b>		<b>3</b>	<b>1</b>	<b>0</b>

Pre-requisites: 10 + 2 Physics

### Course Objectives:

The objectives of this course for the student are to:

1. Understand the basic principles of quantum physics and band theory of solids.
2. Understand the underlying mechanism involved in construction and working principles of various semiconductor devices.
3. Study the fundamental concepts related to the dielectric, magnetic and energy materials.
4. Identify the importance of nanoscale, quantum confinement and various fabrications techniques.
5. Study the characteristics of lasers and optical fibres.

### Course Outcomes:

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

1. Understand physical world from fundamental point of view by the concepts of Quantum mechanics and visualize the difference between conductor, semiconductor, and an insulator by classification of solids.
2. Identify the role of semiconductor devices in science and engineering Applications.
3. Explore the fundamental properties of dielectric, magnetic materials and energy for their applications.
4. Appreciate the features and applications of Nanomaterials.
5. Understand various aspects of Lasers and Optical fiber and their applications in diverse fields.

### MODULE - I: QUANTUM PHYSICS AND SOLIDS

Quantum Mechanics: Introduction to quantum physics, blackbody radiation — Stefan-Boltzmann's law, Wein's and Rayleigh-Jean's law, Planck's radiation law - photoelectric effect - Davisson and Germer experiment — Heisenberg uncertainty principle - Born interpretation of the wave function — time independent Schrodinger wave equation - particle in one dimensional potential box.

Solids: Symmetry in solids, free electron theory (Drude & Lorentz, Sommerfeld) - Fermi-Dirac distribution - Bloch's theorem - Kronig-Penney model — E-K diagram- effective mass of electron-origin of energy bands- classification of solids.

### MODULE - II: SEMICONDUCTORS AND DEVICES

Intrinsic and extrinsic semiconductors — Hall effect - direct and indirect band gap semiconductors - construction, principle of operation and characteristics of P-N Junction diode, Zener diode and bipolar junction transistor (BJT LED, PIN diode, avalanche photo diode (APD) and solar cells, their structure, materials, working principle and characteristics.

### MODULE - III: DIELECTRIC, MAGNETIC AND ENERGY MATERIALS

Dielectric Materials: Basic definitions- types of polarizations (qualitative) - ferroelectric, piezoelectric, and pyroelectric materials — applications — liquid crystal displays (LCD) and crystal oscillators.



Magnetic Materials: Hysteresis - soft and hard magnetic materials - magnetostriction, magnetoresistance - applications - bubble memory devices, magnetic field sensors and multiferroics. Energy Materials: Conductivity of liquid and solid electrolytes- superionic conductors - materials and electrolytes for super capacitors - rechargeable ion batteries, solid fuel cells.

#### **MODULE - IV: NANOTECHNOLOGY**

Nanoscale, quantum confinement, surface to volume ratio, bottom-up fabrication: sol-gel, precipitation, combustion methods — top-down fabrication: ball milling - physical vapor deposition (PVD) - chemical vapor deposition (CVD) - characterization techniques - XRD, SEM & TEM - applications of nanomaterials.

#### **MODULE - V: LASER AND FIBER OPTICS**

Lasers: Laser beam characteristics-three quantum processes-Einstein coefficients and their relations- lasing action - pumping methods- ruby laser, He-Ne laser, CO<sub>2</sub> laser, Argon ion Laser, Nd:YAG laser- semiconductor laser-applications of laser.

Fiber Optics: Introduction to optical fiber- advantages of optical Fibers - total internal reflection- construction of optical fiber - acceptance angle - numerical aperture-classification of optical fibers- losses in optical fiber - optical fiber for communication system - applications.

#### **TEXT BOOKS:**

1. M. N. Avadhanulu, P.G. Kshirsagar & TVS Arun Murthy” A Text book of Engineering Physics”- S. Chand Publications, 11<sup>th</sup> Edition 2019.
2. Engineering Physics by Shatendra Sharma and Jyotsna Sharma, Pearson Publication, 2019
3. Semiconductor Physics and Devices- Basic Principle – Donald A, Neamen, Mc Graw Hill, 4<sup>th</sup> Edition, 2021.
4. B.K. Pandey and S. Chaturvedi, Engineering Physics, Cengage Learning, 2<sup>nd</sup> Edition, 2022
5. Essentials of Nanoscience & Nanotechnology by Narasimha Reddy Katta, Typical Creatives NANO DIGEST, 1<sup>st</sup> Edition, 2021.
6. P K Palanisamy, “Engineering Physics”, SciTech Publication, 6<sup>th</sup> Edition, 2018.

#### **REFERENCE BOOKS:**

1. Quantum Physics, H.C. Verma, TBS Publication, 2<sup>nd</sup> Edition 2012.
2. Fundamentals of Physics – Halliday, Resnick and Walker, John Wiley & Sons, 11<sup>th</sup> Edition, 2018.
3. Introduction to Solid State Physics, Charles Kittel, Wiley Eastern, 2019.
4. Elementary Solid State Physics, S.L. Gupta and V. Kumar, Pragathi Prakashan, 2019.
5. A.K. Bhandhopadhyaya - Nano Materials, New Age International 1<sup>st</sup> Edition, 2007.
6. Energy Materials a Short Introduction to Functional Materials for Energy Conversion and Storage Aliaksandr S. Bandarenka, CRC Press Taylor & Francis Group
7. Energy Materials, Taylor & Francis Group, 1<sup>o\*</sup> Edition, 2022.

### **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.livescience.com/33816-quantum-mechanics-explanation.html>
3. <https://nptel.ac.in/courses/115/102/115102025/>

### **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://nptel.ac.in/courses/108/108/108108122/>
4. <https://nptel.ac.in/courses/115/101/115101005/>

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

<b>2024-25 Onwards (MR-24)</b>	<b>MALLA REDDY ENGINEERING COLLEGE (Autonomous)</b>	<b>B. Tech. I Semester</b>		
<b>Code: D0B10</b>	<b>Engineering Chemistry Common to: CE, ME, IT, CSM, CSD</b>	<b>L</b>	<b>T</b>	<b>P</b>
<b>Credits: 4</b>		<b>3</b>	<b>1</b>	<b>-</b>

### Course objectives:

1. To bring adaptability to new developments in Engineering Chemistry and to acquire the skills required to become a perfect engineer.
2. To include the importance of water in industrial usage, fundamental aspects of battery chemistry, significance of corrosion it's control to protect the structures.
3. To acquire the knowledge about polymeric materials.
4. To imbibe the basic concepts of petroleum and its products.
5. To acquire required knowledge about engineering materials like Smart materials, and lubricants.

### Module I: Water and its treatment

[10 Periods]

Introduction to hardness of water – causes of hardness, expression of hardness, units and types of hardness-Numerical Problems–Estimation of hardness of water by complexometric method and related numerical problems. Potable water and its specifications - Steps involved in the treatment of potable water - Disinfection of potable water by chlorination and break - point chlorination. Boiler troubles: Sludges, Scales and Caustic embrittlement. Internal treatment of Boiler feed water - Calgon conditioning - Phosphate conditioning - Colloidal conditioning, External treatment methods - Softening of water by ion- exchange process. Desalination of water-Reverse osmosis.

### Module II: Polymeric materials

[10 Periods]

Definition – Classification of polymers with examples – Types of polymerization – addition (free radical addition) and condensation polymerization with examples – Nylon 6:6, Terylene.

**Plastics:** Definition and characteristics- thermoplastic and thermosetting plastics, Preparation, Properties and engineering applications of PVC and Bakelite, Teflon, Fiber reinforced plastics (FRP). Compounding– fabrication of plastics by injection moulding method.

**Elastomers:** Natural rubber and its vulcanization, Characteristics –preparation – properties and applications of Buna-S, Butyl and Thiokol rubber.

**Biodegradable polymers:** Concept and advantages - Polylactic acid and poly vinyl alcohol and their applications.

### Module III: Battery Chemistry & Corrosion

[14 Periods]

- A. Battery Chemistry:** Introduction to Electrochemistry - Classification of batteries- primary (dry cell), secondary (Lead-acid battery) and reverse batteries (Fused electrolyte cells) with examples. Basic requirements for commercial batteries. Construction, working and applications of Lithium ion battery, Applications of Li-ion battery to electrical vehicles. Fuel Cells- Differences between battery and a fuel cell, Construction and applications of

Hydrogen-Oxygen fuel cell

**B. Corrosion:** Causes and effects of corrosion – theories of chemical and electrochemical corrosion – mechanism, Types of corrosion: Galvanic, Pitting and water-line corrosion. Factors affecting rate of corrosion, Corrosion control methods- Cathodic protection – Sacrificial anode and impressed current methods. Metallic coatings: Hot dipping (Galvanization).

#### **Module IV:Energy Sources**

**[10 Periods]**

Introduction, Calorific value of fuel – HCV, LCV- Dulong's formula–numerical problems. 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. Hydrogen as fuel-production, storage and applications.

#### **Module V: Engineering Materials:**

**[10 Periods]**

**Cement:** Portland cement, its composition, setting and hardening of Portland cement.

#### **Smart materials and their engineering applications**

Shape memory materials- Poly L- Lactic acid. Thermoresponse materials- Polyacryl amides, Poly vinylamides.

**Lubricants:** Classification of lubricants with examples-characteristics of a good lubricants–mechanism of lubrication (thick film, thin film and extreme pressure)-properties of lubricants: viscosity, cloud point, pour point, flash point and fire point.

#### **Text Books:**

1. Engineering Chemistry by B. Rama Devi, P. Aparna and Prasanta Rath, Cengage learning.
2. P. C. Jain and Monica Jain, “A Text Book of Engineering Chemistry”, Dhanpat Rai Publications, New Delhi, 16th Edition 2014.
3. S.S. Dara and S.S. Umare, “A Text Book of Engineering Chemistry”, S Chand Publications, New Delhi, 12th Edition 2010.
4. A text book of Engineering Chemistry by M. Thirumala Chary, E. Laxminarayana and K. Shashikala, Pearson Publications, 2021.

#### **Reference Books:**

1. Engineering Chemistry by Shikha Agarwal, Cambridge University Press, Delhi (2015)
2. Engineering Chemistry by Shashi Chawla, Dhanpatrai and Company (P) Ltd. Delhi (2011)

#### **Course Outcomes with BLOOM's**

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

	<b>Course Outcome</b>	<b>Bloom's Taxonomy Level</b>
CO1	Understand the basic properties of water and its usage in domestic, industrial purposes and purification of water by various methods.	Understand(L2)
CO2	Acquire knowledge on electrochemical procedures related to corrosion and apply in its control methods, fuel cells, batteries and their applications.	Apply(L3)
CO3	Learn the fundamentals of preparation, properties and engineering applications of polymeric materials in daily life.	Apply(L3)
CO4	Acquire the knowledge on various fuels; identify a better fuel source based on calorific value.	Analyze (L4)
CO5	Acquire basic knowledge on usages of important engineering materials like cement and lubricants.	Apply(L3)

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

<b>2024-25 Onwards (MR-24)</b>	<b>MALLAREDDYENGINEERINGCOLLEGE (Autonomous)</b>	<b>B.Tech. I Semester</b>		
<b>Code:D0305</b>	<b>ENGINEERINGDRAWING (Common for CSE-AIML, CSE-DS and IT)</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:** 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 Involutés.

Scales: Plane Scale, Diagonal scale.

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

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

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

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

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

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

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

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

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

Introduction to AutoCAD: Basic Display, construction, Editing and dimensioning commands.

**TEXTBOOKS**

1. K.L.Narayana, S. Bheemanjaneyulu “Engineering Drawing with Auto CAD-2016” New Age InternationalPublishers,1st Edition, 2018.
2. N.D.Bhat,“EngineeringDrawing”,CharotarPublishingHouse,53rdEdition,2014.

## REFERENCES

1. K.L.Narayana,P.Kannaiah,“EngineeringDrawing”,SciTechPublishers.2ndEdition,2017
2. K. Venugopal,“EngineeringDrawing”,NewAgeInternationalPublishers,3rdEdition,2014.
3. K.V.Natarajan, “AtextbookofEngineeringGraphics”,DhanalakshmiPublishers,2015.
4. M.S.Kumar,“EngineeringGraphics”,D.D.Publications,2011.
5. Trymbaka Murthy, “Computer Aided Engineering Drawing”, I.K. international Publishing House, 3rdEdition, 2011.

## E-RESOURCES

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

## Course Outcomes:

At the end of the course students will be able to

1. Apply the concept of engineering drawing for geometrical construction of curves and scaling of dimensions.
2. Apply the principles of orthographic projection for solving the problems of projections of points and lines.
3. Solve the problems of projection of planes and solids with concept of orthographic projections.
4. Solve the problems of projection of solids and construction for development of solid surfaces.
5. Convert the orthographic views to isometric projection and transformation of Isometric to orthographic views and to know basic commands of AutoCAD.

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





<b>2024-25 Onwards (MR-24)</b>	<b>MALLA REDDY ENGINEERING COLLEGE (Autonomous)</b>	<b>B.Tech I Semester</b>		
<b>Code: D0501</b>	<b>Programming for Problem Solving (Common for CE, EEE, ME, ECE, CSE, CSE (AI &amp; ML), CSE (DS), 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:**

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

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

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

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

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

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

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

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

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

**Arrays:** Basic Concepts, Types of arrays, applications- Selection sort, Bubble sort, Linear search method, arrays and functions.

**MODULE IV: Strings and Pointers [09 Periods]**

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

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

## **MODULE V: Structures and File Handling**

**[10 Periods]**

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

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

### **TEXTBOOKS**

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

### **REFERENCES**

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

### **E-RESOURCES**

1. [http://oxford.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>

### **Course Outcomes:**

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

1. Write algorithms and to draw flowcharts for solving problems and translate the algorithms/flowcharts to programs (in C language).
2. Apply different types of control structures to code and test a given logic in C programming language.
3. Decompose a problem into functions and to develop modular reusable code and Use arrays to formulate algorithms and programs for Searching and sorting problems.
4. Develop programs that make use of concepts such as strings, pointers.
5. Analyse structures, file operations and command line arguments.

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

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

<b>2024-25 Onwards (MR-24)</b>	<b>MALLA REDDY ENGINEERING COLLEGE (Autonomous)</b>	<b>B. Tech. I Semester</b>		
<b>Code: D0B09</b>	<b>Applied Physics Lab Common to: CE, ME, IT, CSM, CSD</b>	<b>L</b>	<b>T</b>	<b>P</b>
<b>Credits: 1</b>		-	-	2

**Course Objectives:** The objectives of this course for the student to

1. Capable of handling instruments related to the Hall effect and photoelectric effect experiments and their measurements.
2. Understand the characteristics of various devices such as PN junction diode, Zener diode, BJT, LED, solar cell, lasers and optical fiber and measurement of energy gap and resistivity of semiconductor materials.
3. Able to measure the characteristics of dielectric constant of a given material.
4. Study the behavior of B-H curve of ferromagnetic materials.
5. Understanding the method of least squares fitting.

**Course Outcomes:** The students will be able to:

1. Know the determination of the Planck's constant using Photo electric effect and identify the material whether it is n-type or p-type by Hall experiment.
2. Appreciate quantum physics in semiconductor devices and optoelectronics.
3. Gain the knowledge of applications of dielectric constant.
4. Understand the variation of magnetic field and behavior of hysteresis curve.
5. Carried out data analysis.

**LIST OF EXPERIMENTS:**

1. Determination of work function and Planck's constant using photoelectric effect.
2. Determination of Hall co-efficient and carrier concentration of a given semiconductor.
3. Characteristics of series and parallel LCR circuits.
4. V-I characteristics of a p-n junction diode and Zener diode
5. Input and output characteristics of BJT (CE, CB & CC configurations)
6. a) V-I and L-I characteristics of light emitting diode (LED)  
b) V-I Characteristics of solar cell
7. Determination of Energy gap of a semiconductor.
8. Determination of the resistivity of semiconductor by two probe method.
9. Study B-H curve of a magnetic material.
10. Determination of dielectric constant of a given material
11. a) Determination of the beam divergence of the given LASER beam  
b) Determination of Acceptance Angle and Numerical Aperture of an optical fiber.
12. Understanding the method of least squares — torsional pendulum as an example.

*Note: Any 8 experiments are to be performed.*

**REFERENCE BOOK:**



<b>2024-25 Onwards (MR-24)</b>	<b>MALLA REDDY ENGINEERING COLLEGE (Autonomous)</b>	<b>B. Tech. I Semester</b>		
<b>Code: D0B11</b>	<b>Engineering Chemistry Lab Common to: CE, ME, IT, CSM, CSD</b>	<b>L</b>	<b>T</b>	<b>P</b>
<b>Credits: 1</b>		-	-	<b>2</b>

**Course objectives:** The course consists of experiments related to the principles of chemistry required for engineering student. The student will learn:

- Estimation of hardness and alkalinity in water to check its suitability for domestic and industrial purpose.
- Students are able to perform the estimations of acids and bases using conductometry, potentiometry and pH metry methods.
- Students will learn skills related to the lubricant properties such as saponification value, surface tension and viscosity of oils.
- Students will learn to prepare polymers such as Bakelite in the laboratory.
- Construction of fuel cell and its applications virtually.

**List of Experiments:**

1. Calibration of Volumetric apparatus.
2. Estimation of Total Hardness of water by EDTA Method.
3. Estimation of an acid by pHmetry.
4. Estimation of strength of an acid by Conductometry.
5. Estimation of strength of an acid by Potentiometry.
6. Determination of viscosity of given liquids by Ostwald's Viscometer.
7. Determination of surface tension of given sample using Stalagmometer.
8. Estimation of iron (II) by Dichrometry.
9. Estimation of acid value of given lubricant oil.
10. Preparation of Bakelite rubber.

**Virtual lab experiments:**

11. Construction of fuel cell and it's working.
12. Smart materials for biomedical applications.

**Reference Books:**

1. Lab manual for Engineering chemistry by B. Ramadevi and P. Aparna, S Chand Publications, New Delhi (2022).
2. Vogel's text book of practical organic chemistry 5<sup>th</sup> edition.
3. College Practical Chemistry by V. K. Ahluwalia, Narosa Publications Ltd. New Delhi (2007).



<b>2024-25 Onwards (MR-24)</b>	<b>MALLA REDDY ENGINEERING COLLEGE (Autonomous)</b>	<b>B.Tech. I Semester</b>		
<b>Code: D0502</b>	<b>Programming for Problem Solving Lab</b>	L	T	P
<b>Credits: 1</b>	<b>(Common for ALL)</b>			2

[Note: The programs may be executed using any available Open Source/ Freely available IDE

Some of the Tools available are:

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

Code:Blocks: <http://www.codeblocks.org/>

DevCpp : <http://www.bloodshed.net/devcpp.html>

Eclipse: <http://www.eclipse.org>

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

**Prerequisites: NIL**

### **Course Objectives:**

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

### **Simple Basic problems:**

- a. Write sample examples of C programs to implement basic operations.
- b. Write a C program to find smallest and largest of given three numbers
- c. Write a C program to find the roots of a quadratic equation.
- 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:  
 $5 \times 1 = 5$   
 $5 \times 2 = 10$   
 $5 \times 3 = 15$
- e. Write a C program to find the sum of individual digits of a positive integer

### **Numeric problems:**

- a. Write a C program to generate the first 'n' terms of the sequence. [A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence.]
- b. Write a C program to find whether the given number is palindrome.
- c. Write a C program to find whether the given number is perfect or not.
- d. Write a C program to find whether the given number is Armstrong or not.
- e. Write a C program to find whether the given number is strong or not.



- f. Write a C program to generate all the prime numbers between n1 and n2, where n1 and n2 are values supplied by the user.

**Arrays and Stings:**

- a. Write a C program to perform Addition of Two Matrices
- b. Write a C program to perform Multiplication of Two Matrices
- c. Write a C program to find both the largest and smallest number in a list of integers
- d. Write a C program to search for a key value in a given list of integers using linear search.
- e. Write a C program that implements the Bubble sort method to sort a given array of integers in ascending order
- f. Write a C program To insert a sub-string into given main string from a given position.
- g. Write a C program To delete n characters from a given position in a given string
- h. Write a C program To find substring in a given string
- i. Write a C program to determine if the given string is a palindrome or not
- j. Write a C program to count the lines, words and characters in a given text

**Functions, Pointers and Structures:**

- a. Write C programs that use both recursive and non-recursive functions to find the factorial of a given integer.
- b. Write C programs that use both recursive and non-recursive functions to find the GCD (greatest common divisor) of two given integers.
- c. Write a C program to swap two numbers, which implement call by value and call by reference.
- d. Write a C program to display the below student details using structures

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

- e. Write a C program to find grade of a student using structures

**Files and Command Line Arguments:**

- a. Write a C program to display contents of a file
- b. Write a C program which copies one file to another.
- c. Write a C program to find sum of two numbers using command line arguments

**Miscellaneous:**

- a. Write a C program to construct number Patterns of numbers as follows:

```

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

```

b. Write a C program to construct star Patterns of numbers as follows:

```

*           * * * * *
*  *       * * * *
*  *   *   * * * *
*  *   *   * * * *
*           * * * *
*           * * *
*           * *
*           *

```

c. Write a C program to construct alphabets Patterns of numbers as follows:

```

A           A           A
A  B       B  C       B  B
A  B  C   D  E  F   C  C  C

```

**Mini Project:**

- a. Develop a mini project which implement the Library Management System
- b. Develop a mini project which implement the Student Record System

**Course Outcomes:**

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

1. Analyse concepts in problem solving and write diversified solutions for a given problem.
2. Identify situations where computational methods and computers would be useful.
3. Understand the programming tasks using techniques learned and write pseudo-code.
4. Compare the program on a computer, edit, compile, debug, correct, recompile and execute it.
5. Identify tasks in which the numerical techniques learned are applicable and apply them to write programs, and hence use computers effectively to solve the task

**TEXT BOOKS:**

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

**REFERENCES:**

- a. C Programming & Data Structures, B.A. Forouzan and R.F. Gilberg, Third Edition, Cengage Learning.
- b. C for Engineers and Scientists, H. Cheng, Mc. Graw-Hill International Edition

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

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

<b>2024-25 Onwards (MR-24)</b>	<b>MALLA REDDY ENGINEERING COLLEGE (Autonomous)</b>	<b>B.Tech.II Semester</b>		
<b>Code:D0B02</b>	<b>ORDINARY DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS (Common to All)</b>	<b>L</b>	<b>T</b>	<b>P</b>
<b>Credits:4</b>		<b>3</b>	<b>1</b>	<b>-</b>

**Pre-requisites:** Mathematics knowledge at pre -University level

**Course Objectives:** To Learn

- 1) Methods of Solving First order Ordinary Differential Equations and its applications.
- 2) Methods of Solving Higher order Ordinary Differential Equations and its applications.
- 3) Laplace Transforms and its applications.
- 4) Gradient, Divergence, curl and Scalar potential function.
- 5) Line, Surface and volume integrals, and vector integral theorems.

**MODULE I: First Order and First Degree Ordinary Differential Equations [8 Periods]**

Exact Differential Equations, Non-Exact Differential Equations, Linear Differential Equations, Bernoulli's Differential Equations.

**Applications:** Orthogonal trajectories (Cartesian and polar form), Newton's law of cooling, Law of natural growth and decay.

**MODULE II: Higher Order Ordinary Differential Equations with Constant Coefficients**

**[12 Periods]**

Introduction-Homogenous, Non-homogeneous differential equations. Complementary function and Particular integral, Non-Homogeneous terms of the type  $e^{ax}$ ,  $\sin(ax)$ ,  $\cos(ax)$ , polynomial in  $x$ ,  $e^{ax} V(x)$ ,  $x^k V(x)$ , Method of variation of parameters.

**Applications:** LCR Circuit.

**MODULE III: Laplace Transforms**

**[10 Periods]**

**(A)**Laplace Transforms: Laplace transform of standard functions, First shifting theorem, Unit step function, Dirac delta function, second shifting theorem, Laplace transform of functions when multiplied and divided by  $t$ . Laplace transforms of derivatives and integrals of functions, Evaluation of integrals using Laplace transforms, Laplace transform of Periodic functions.

**(B)** Inverse Laplace transform by different methods, Convolution Theorem, Applications: Solving Initial value problems by Laplace transform method. (All the theorems without proof).

**MODULE-IV: Vector Differentiation**

**[8 Periods]**

Vector point functions and scalar point functions. Gradient, Divergence and Curl. Directional derivatives, Vector Identities, Solenoidal and Irrotational vectors, Scalar potential function.

**MODULE-V: Vector Integration****[10 Periods]**

Line, Surface and Volume Integrals. Greens Theorem, Gauss Divergence Theorem and Stokes Theorem (without proofs) and their applications.

**TEXT BOOKS:**

- 1) B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.
- 2) R.K.Jain and S.R.K.Iyengar , Advanced Engineering Mathematics , Narosa Publications, 5<sup>th</sup> Edition 2016.

**REFERENCES:**

- 1) Erwin Kreyszig, Advanced Engineering Mathematics, 9<sup>th</sup> Edition, Jogn Wiley & Sons,2006.
- 2) G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9<sup>th</sup> Ed, Pearson, Reprint, 2002.
- 3) N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
- 4) Alan Jeffrey, Mathematics for Engineers and Scientists, 6<sup>th</sup> Edition, 2013, Chapman & Hall.
- 5) Kanti. B.Datta, Mathematical Methods of Science and Engineering, Cengage Learning.

**Course Outcomes:** After learning the contents of this course the student must be able to

1. Solve exact and linear differential equations and find orthogonal trajectories of given family of curves.
2. Understand complementary function, particular integral, and solve second and higher order Ordinary Differential Equations.
3. Find Laplace transform of given functions, inverse Laplace transform by convolution theorem and Solution of ordinary differential equations.
4. Find Gradient, Divergence, curl and Scalar potential function.
5. Evaluate Line, Surface and volume integrals and verify Vector integral theorems.

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

2024-25 Onwards (MR-24)	<b>MALLA REDDY ENGINEERING COLLEGE</b> (Autonomous)	<b>B. Tech.</b> <b>II Semester</b>		
<b>Code:</b> <b>D0H01</b>	<b>ENGLISH FOR SKILL ENHANCEMENT</b> (Common for All branches)	<b>L</b>	<b>T</b>	<b>P</b>
<b>Credits: 3</b>		<b>3</b>	<b>0</b>	<b>0</b>

### ENGLISH FOR SKILL ENHANCEMENT

**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.

#### UNIT - I

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

**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.

#### UNIT - II

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

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

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

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

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

#### UNIT - III

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

**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.

#### UNIT - 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.

#### UNIT - V

Chapter entitled ‘**Go, Kiss the World**’ by **Subroto Bagchi** from “*English: Language, Context and Culture*” published by Orient BlackSwan, Hyderabad.

**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 NEP 2020, 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.

#### TEXT BOOK:

1. “English: Language, Context and Culture” by Orient Black Swan Pvt. Ltd,

Hyderabad. 2022.Print.

**REFERENCE BOOKS:**

1. Effective Academic Writing by Liss and Davis (OUP)
2. Richards, Jack C. (2022) Interchange Series. Introduction, 1,2,3. Cambridge University Press
3. Wood,F.T. (2007). Remedial English Grammar. Macmillan.
4. 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.
5. (2019). Technical Communication. Wiley India Pvt. Ltd.
6. Vishwamohan, Aysha. (2013). English for Technical Communication for Engineering Students.Mc Graw-Hill Education India Pvt. Ltd.
7. Swan, Michael. (2016). Practical English Usage. Oxford University Press. Fourth Edition.

**Course Outcomes with BLOOM's**

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

	<b>Course Outcomes</b>	<b>Bloom's Taxonomy</b>
CO1	Understand the importance of vocabulary and sentence structures.	Understand (L3)
CO2	Choose appropriate vocabulary and sentence structures for their oral and written communication.	Apply (L3)
CO3	Demonstrate their understanding of the rules of functional grammar.	Understand (L2)
CO4	Develop comprehension skills from the known and unknown passages.	Apply (Level3)
CO5	Take an active part in drafting paragraphs, letters, essays, abstracts, précis and reports in various contexts.	Apply (Level4)
CO6	Acquire basic proficiency in reading and writing modules of English.	Apply (Level3)



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

COs	Programme Outcomes (Pos)													PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	<b>2</b>	<b>2</b>	<b>3</b>	-	<b>2</b>	-	-	-
CO2	-	-	-	-	-	-	-	-	-	<b>3</b>	<b>2</b>	-	-	-	-
CO3	-	<b>1</b>	<b>1</b>	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	<b>1</b>	<b>2</b>	-	<b>2</b>	-	<b>2</b>	-	-	-
CO5	-	<b>1</b>	<b>1</b>	-	-	-	<b>1</b>	-	-	<b>2</b>	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	<b>1</b>	<b>1</b>	-	-	-	-	-

<b>2024-25 Onwards (MR-24)</b>	<b>MALLA REDDY ENGINEERING COLLEGE (Autonomous)</b>	<b>B.Tech. II Semester</b>		
<b>Code: D0203</b>	<b>BASIC ELECTRICAL AND ELECTRONICS ENGINEERING ( Common for CSM, CSD, IT, CE &amp; ME )</b>	<b>L</b>	<b>T</b>	<b>P</b>
<b>Credits: 3</b>		<b>3</b>	<b>-</b>	<b>-</b>

**Prerequisites:** Mathematics

**Course Objectives:**

- To understand concept of electrical circuits and its components.
- To understand Single phase AC circuits.
- To study and understand DC & AC machines .
- To import the knowledge of various Characteristics of various Diodes & Dectifiers
- To import the knowledge of various Characteristics of Transistors and their Operations.

**MODULE I: DC Circuits**

**[10 Periods]**

**D.C.Circuits:** Electrical Circuit Elements(R, L and C), Ohms law , Star -Delta & Delta –Star Transformation, Types of Energy Sources, KVL & KCL, Analysis of Simple Circuits (Mesh and Nodal Analysis) with DC excitation only. Superposition, Thevenins and Maximum Power Transfer Theorems with DC excitation only.

**MODULE II:**

**AC Circuits :**

**[10 Periods]**

Representation of sinusoidal waveforms, Average & 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)-Simple problems.

**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 –simple problems

**B: AC Machines:** Construction and Principle of operation of Transformer- EMF Equation. Construction and Principle of Operation of 3 Phase Induction Motors – simple problems

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

**[10 Periods]**

**P-N Junction Diode:** Formation of PN junction Diode, Types of Biasing, Volt-Ampere characteristics, Ideal versus practical, Static and dynamic resistances, Zener diode operation, Zener diode as voltage regulator.

**Rectifiers:** Half Wave Rectifier, Full Wave Rectifier- Centre tap and 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, Transistor as a amplifier, Common Base, Common Emitter and Common Collector Configurations, Input-Output Characteristics of CB , CE & CC , Comparison of CE, CB and CC configurations

**Junction Field Effect Transistor :** Construction & Principle of Operation,Symbol, Drain -Transfer Characteristics, Comparison of BJT and JFET.

## 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.

### Course Outcomes:

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

1. Analyze electrical circuits by applying basic laws.
2. Analyze Single Phase AC circuits.
3. Analyze the performance of DC Motor, Three phase Induction motor and Transformer.
4. Understand Characteristics of various Diodes & Rectifiers.
5. Differentiate the Transistors and their Operations.

Course Outcomes	Programme Outcomes (POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	0	1	0	0	0	2	0	2	2
CO2	3	2	1	0	3	1	0	1	1	2	1	2
CO3	3	2	1	1	3	2	0	0	1	0	2	2
CO4	3	2	1	0	3	1	0	1	1	2	1	2
CO5	3	2	1	1	3	2	0	0	1	0	2	2

<b>2024-25 Onwards (MR-24)</b>	<b>MALLA REDDY ENGINEERING COLLEGE (Autonomous)</b>	<b>B.Tech II Semester</b>		
<b>Code: D0503</b>	<b>Python Programming (Common for CSE, IT, CSE (AIML),and CSE (DS))</b>	<b>L</b>	<b>T</b>	<b>P</b>
<b>Credits: 3</b>		<b>3</b>	<b>-</b>	<b>-</b>

**Prerequisites: Programming for Problem Solving**

**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, and 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().

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

### 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.
5. Raghunadh P. and Rajaram J., “Python Programming”, First Edition, AP, 2024

### E-RESOURCES

1. “Learn Python - Free Interactive Python Tutorial”, <https://www.learnpython.org/>
2. “Free Python Tutorial - Python For Beginner,”  
<https://www.udemy.com/share/101EfoB UcccV1SQHw>
3. “Basics of Python for Data Science”, <https://olympus.greatlearning.in/courses/11265>
4. “Beginners Guide / Programmers - Python Wiki”,  
<https://wiki.python.org/moin/BeginnersGuide/Programmers>

5. “Introduction to Python”, <https://www.datacamp.com/courses/intro-to-python-for-data-science>

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

<b>2024-25 Onwards (MR-24)</b>	<b>MALLA REDDY ENGINEERING COLLEGE (Autonomous)</b>	<b>B. Tech. II Semester</b>		
<b>Code: D0H02</b>	<b>ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB (Common for All branches)</b>	<b>L</b>	<b>T</b>	<b>P</b>
<b>Credits: 1</b>		<b>0</b>	<b>0</b>	<b>2</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

**Syllabus: English Language and Communication Skills Lab (ELCS) shall have two parts:**

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

**Listening Skills:**

Objectives

1. To enable students, develop their listening skills so that they may appreciate the 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 and find the distinction between different sounds, to be able to mark 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 involve students in speaking activities in various contexts
  2. To enable students 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 followingspecifications:*

- 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
6. Cambridge IELTS by Cambridge University Press
7. How to prepare for the TOEFL Ibt 12<sup>th</sup> edition by Pamela. J. Sharp, Galgotia Publications
8. The GRE for Dummies 2<sup>nd</sup> edition by Suzee Vik, Comdex computer publishing.

#### Course Outcomes with BLOOM's

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

	Course Outcomes	Bloom's Taxonomy
CO1	Understand the nuances of English language through audio-visual experience and group activities	Apply (L3)
CO2	Neutralise their accent for intelligibility	Apply (L3)
CO3	Speak with clarity and confidence which in turn enhances their employability skills	Apply (L2)

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

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

<b>2024-25 Onwards (MR-24)</b>	<b>MALLA REDDY ENGINEERING COLLEGE (Autonomous)</b>	<b>B.Tech. II Semester</b>		
<b>Code: D0204</b>	<b>Basic Electrical and Electronics Engineering Laboratory (Common for CSM, CSD, IT, CE &amp; ME )</b>	<b>L</b>	<b>T</b>	<b>P</b>
<b>Credits: 1</b>		-	-	<b>2</b>

**Prerequisites:** Basic Electrical and Electronics Engineering

**Course Objectives:**

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

**List of Experiments:**

**PART-A(Compulsory)**

1. Verification of Kirchoff'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. V-I Characteristics of PN junction Diode
7. V-I Characteristics of Zener Diode
8. Input and Output characteristics of BJT with CE configuration

**PART-B (any two experiments from the given list)**

1. Verification of Superposition theorem.
2. Brake Test on Three Phase Induction Motors. Determination of Performance curves
3. Half Wave & Full Wave rectifier without filters.
4. Input and Output characteristics of BJT with CB configuration
5. Drain -Transfer 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 Single Phase AC circuits
3. Analyze the performance of DC Motor, three phase Induction motor and transformer
4. Understand Characteristics of various diodes & rectifiers
5. Differentiate the Transistors and their Operations

<b>CO- PO, PSO Mapping</b> (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
CO5	2		2		3							1	1		
CO5	2		2		2							3			2



### WEEK-3

1. a) Write a program to create, concatenate and print a string and accessing substring from a given string  
b) Write a program to count the numbers of characters in the given string and store them in a dictionary data structure
2. a) Write a program to combine two lists into a dictionary.  
b) Write a function dups to find all duplicates in the list.  
c) Write a function unique to find all the unique elements of a list.

### WEEK-4

1. 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.
2. a) Write a function reverse to reverse a list. Without using the reverse function.  
b) Write a function called palindrome that takes a string argument and returns True if it is a palindrome and False otherwise. Remember that you can use the built-in function len(), to check the length of a string.

### WEEK-5

1. a) Write a program to perform addition of two square matrices  
b) Write a program to perform multiplication of two square matrices
2. 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.  
d) Write a program to compute the number of characters, words and lines in a file.

### WEEK-6

1. a) Program to implement Animal Communication using Inheritance  
b) Program demonstrates encapsulation by managing bank account details
2. a) Program to implement Vehicle Engine Startup using Abstraction  
b) Program to draw different shapes by using Polymorphism

### WEEK-7

1. a) Program to implement Bank Account Management System using Exception handling?  
b) Basic calculator that performs arithmetic operations and handles exceptions for invalid inputs and operations.
2. a) program to implement user registration system using Exception Handling?

b) Program to implement multi-threading with threading module?

### WEEK-8

1.a) Write a GUI for an Expression Calculator using tkinter

b) A simple to-do list application where users can add and remove tasks.

2.a) Write a GUI Application for student registration form using tkinter?

b) Write a GUI Application for Employee Login Page form using tkinter?

### Course Outcomes

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

1. Able to learn core Python scripting elements such as variables and flow control structures
2. Able to know how to work with lists and sequence data
3. Able to write Python functions to facilitate code reuse
4. Able to use Python to read and write files
5. Able to manage exceptions, implement multi-threading, and create GUIs with Tkinter in Python.

### 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.
4. Raghunadh P. and Rajaram J., "Python Programming", First Edition, AP, 2024

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

<b>2024-25 Onwards (MR24)</b>	<b>Malla Reddy Engineering College (Autonomous)</b>	<b>B.Tech. II Semester</b>		
<b>Code: D1201</b>	<b>Engineering and IT Workshop</b>	<b>L</b>	<b>T</b>	<b>P</b>
<b>Credits:2</b>		-	-	<b>4</b>

**Pre requisites:** NIL

**Course Objectives:**

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

**Engineering Workshop:**

**Problem 1: Trades for Exercises**

**At least two exercises from each trade**

1. House-wiring
2. Soldering

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

1. Carpentry
2. Wood working lathe

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

**Problem 3:**

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

**Problem 4:**

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

**Problem 5:**

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

**Problem 6:**

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



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

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

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

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

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

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

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

**Reference Books:**

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

**Course Outcomes:**

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

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

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