

## MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

### B TECH I YEAR- COURSE STRUCTURE (CSE/CSE-AI&ML/CSE-Data Science/B Tech-AI&ML)

#### I Year B. Tech – I Semester

S.No	Subject Code	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R22A0001	English	2	0	0	2	40	60
2	R22A0023	Mathematics – I	3	1	0	4	40	60
3	R22A0201	Principles of Electrical and Electronics Engineering	3	0	0	3	40	60
4	R22A0301	Computer Aided Engineering Graphics	2	0	3	4	40	60
5	R22A0501	Programming for Problem Solving	3	0	0	3	40	60
6	R22A0081	English Language and Communication Skills Lab	-	0	2	1	40	60
7	R22A0281	Principles of Electrical and Electronics Engineering Lab	-	0	3	1.5	40	60
8	R22A0581	Programming for Problem Solving Lab	-	0	3	1.5	40	60
9	R22A0004	Environmental Science	2	0	0	0	40	60
<b>Total</b>			<b>15</b>	<b>1</b>	<b>11</b>	<b>20</b>	<b>360</b>	<b>540</b>

#### I Year B. Tech – II Semester

S.No	Subject Code	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R22A0002	Professional English	2	0	0	2	40	60
2	R22A0024	Mathematics – II	3	1	0	4	40	60
3	R22A0021	Applied Physics	3	1	0	4	40	60
4	R22A0022	Engineering Chemistry	3	0	0	3	40	60
5	R22A0502	Problem Solving using Python Programming	3	0	0	3	40	60
6	R22A0082	Applied Physics/Engineering Chemistry Lab	-	0	3	1.5	40	60
7	R22A0582	Problem Solving using Python Programming Lab	-	0	3	1.5	40	60
8	R22A0083	Engineering and Computing Hardware Workshop	-	0	2	1	40	60
9	R22A0003	Human Values and Professional Ethics	2	0	0	0	40	60
<b>Total</b>			<b>16</b>	<b>2</b>	<b>8</b>	<b>20</b>	<b>360</b>	<b>540</b>

## MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

### B TECH I YEAR- COURSE STRUCTURE

#### (CSE-CS/CSE-IOT/CS&IT/ IT/ECE/EEE/MEC/ANE)

#### I Year B. Tech – I Semester

S.No	Subject Code	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R22A0001	English	2	0	0	2	40	60
2	R22A0023	Mathematics –I	3	1	0	4	40	60
3	R22A0021	Applied Physics	3	1	0	4	40	60
4	R22A0022	Engineering Chemistry	3	0	0	3	40	60
5	R22A0501	Programming for Problem Solving	3	0	0	3	40	60
6	R22A0082	Applied Physics/Engineering Chemistry Lab	-	0	3	1.5	40	60
7	R22A0083	Engineering and Computing Hardware Workshop	-	0	2	1	40	60
8	R22A0581	Programming for Problem Solving Lab	-	0	3	1.5	40	60
9	R22A0003	Human Values and Professional Ethics	2	0	0	0	40	60
<b>Total</b>			<b>16</b>	<b>2</b>	<b>8</b>	<b>20</b>	<b>360</b>	<b>540</b>

#### I Year B. Tech – II Semester

S.No	Subject Code	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R22A0002	Professional English	2	0	0	2	40	60
2	R22A0024	Mathematics – II	3	1	0	4	40	60
3	R22A0201	Principles of Electrical and Electronics Engineering	3	0	0	3	40	60
4	R22A0301	Computer Aided Engineering Graphics	2	0	3	4	40	60
5	R22A0502	Problem Solving using Python Programming	3	0	0	3	40	60
6	R22A0081	English Language and Communication Skills Lab	-	0	2	1	40	60
7	R22A0281	Principles of Electrical and Electronics Engineering Lab	-	0	3	1.5	40	60
8	R22A0582	Problem Solving using Python Programming Lab	-	0	3	1.5	40	60
9	R22A0004	Environmental Science	2	0	0	0	40	60
<b>Total</b>			<b>15</b>	<b>1</b>	<b>11</b>	<b>20</b>	<b>360</b>	<b>540</b>

**MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY****I Year B. TECH - I- SEM****L/T/P/C****2 /- /-/2****(R22A0001) ENGLISH****INTRODUCTION**

English is a global language which is a means to correspond globally. Keeping in account of its vital role in the global market, emphasis is given to train the students to acquire language and communication skills. The syllabus is designed to develop and attain the competency in communicative skills.

The lectures focus on the communication skills and the selected excerpts support as resources for the teachers to develop the relevant skills in the students. The lessons stimulate discussions and help in comprehending the content effectively. The focus is on skill development, nurturing ideas and practicing the skills.

**COURSE OBJECTIVES:**

1. To enable students to enhance their lexical, grammatical and communicative competence.
2. To equip the students to study the academic subjects with better perspective through theoretical and practical components of the designed syllabus.
3. To familiarize students with the principles of writing and to ensure error-free writing
4. To sharpen the speaking skills of learners by involving them in diverse activities such as group discussions, debates, conversations and role plays.
5. To train students in soft skills with the help of case studies.

**SYLLABUS****Reading Skills:****Objectives**

1. To develop an awareness in the students about the significance of silent reading and comprehension.
2. To augment the ability of students to guess the meanings of words from context and grasp the overall message of the text, draw inferences etc.,
  - Skimming the text
  - Understanding the gist of an argument
  - Identifying the topic sentence
  - Inferring lexical and contextual meaning
  - Understanding discourse features
  - Recognizing coherence/sequencing of sentences
  - Scanning the text

**NOTE:**

The students will be trained in reading skills using the prescribed text for detailed study. They will be examined in reading and answering questions using 'unseen' passages which may be taken from authentic texts, such as magazines/newspaper articles.

**Writing Skills:****Objectives**

1. To develop an awareness in the students about basic formal writing skills.
2. To equip students with the components of different forms of writing, beginning with the required ones:
  - Writing sentences
  - Use of appropriate vocabulary
  - Coherence and cohesiveness
  - Formal and informal letter writing

**Unit – I****J K Rowling's Convocation Speech at Harvard**

Grammar	– Tenses and Question Tags
Vocabulary	– word Formation - Affixes Writing
Writing	– Paragraph Writing
Reading	– The art of skimming and
scanning	- Reading Exercise Type 1 (Match the statements to the text they refer to)

**Unit – II****"The Road not taken" by Robert Frost**

Grammar	– Direct and Indirect Speech
Vocabulary	– One-Word Substitutes, Standard Abbreviations, Synonyms and Antonyms
Writing	– Essay Writing (Introduction, body and conclusion)
Reading	– Reading –The art of Intensive and Extensive -Reading Exercise Type 2

**Unit – III****Satya Nadella's Email to His Employees on his First Day as CEO of Microsoft**

Grammar	– Voices
Vocabulary	– Transitive and Intransitive
Writing	– E-mail Writing, Letter Writing (complaints, requisitions, apologies).
Reading	– Reading Comprehension- Reading Exercise Type 3 (Reading between the lines)

**Unit – IV****"Abraham Lincoln's Letter to His Son's Teacher"**

Grammar	– Articles, Punctuation
Vocabulary	– Phrasal Verbs
Writing	– Précis Writing
Reading	– Reading Exercise Type 4 (Cloze test)

**Unit –V****Abdul Kalam's Biography**

Grammar	–	Subject-Verb Agreement, Noun-
Pronoun Agreement Vocabulary	–	Commonly Confused Words
Writing	–	Memo Writing
Reading	-	Reading Exercise Type 5 (Identifying errors)

\* Exercises apart from the textbook shall also be used for classroom tasks.

**REFERENCE BOOKS:**

1. Practical English Usage. Michael Swan. OUP. 1995.
2. Remedial English Grammar. F.T. Wood. Macmillan.2007
3. <https://www.britannica.com/biography/A-P-J-Abdul-Kalam>
4. Study Writing. Liz Hamp-Lyons and Ben Heasley. Cambridge University Press. 2006.
5. Communication Skills. Sanjay Kumar and Pushpa Lata. Oxford University Press. 2011.

**COURSE OUTCOMES:****After completion of the course students will be able to:**

1. Gain competence and proficiency in 'productive' skills, i.e., writing and speaking with the recognition of the need for life-long learning of the same
2. Hone their language abilities in terms of comprehending complex technical texts with a potential to review literature
3. Present ideas clearly and logically to analyze data and provide valid conclusions in written communication
4. Enrich their grammatical accuracy and fluency to be adept at both the active and passive skills
5. Represent old conventions with a set of the new by professional verbal communicative ability.

**MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY****I Year B. TECH - I- SEM****L/T/P/ C****3/1/-/ 4****(R22A0023)MATHEMATICS -I****COURSE OBJECTIVES: To learn**

- The concept of a Rank of the matrix and applying the concept to know the consistency and solving the system of linear equations.
- The concept of Eigen values, Eigen vectors and Diagonalisation.
- The maxima and minima of functions of several variables.
- The Applications of first order ordinary differential equations.
- The methods to solve higher order differential equations.

**UNIT I: Matrices**

Introduction ,Types of matrices ,Rank of a matrix - Echelon form and Normal form, Consistency of system of linear equations (Homogeneous and Non-Homogeneous)-Gauss elimination method and Gauss-Siedel iteration method.

**UNIT II: Eigen values and Eigen vectors**

Linear dependence and independence of vectors, Eigen values and Eigen vectors and their properties, Diagonalisation of a matrix. Cayley-Hamilton theorem(without proof), finding inverse and power of a matrix by Cayley-Hamilton Theorem; Quadratic forms and Nature of the Quadratic Forms; Reduction of Quadratic form to canonical forms by Orthogonal Transformation.

**UNIT III: Multi Variable Calculus ( Differentiation)**

Functions of two variables, Limit, Continuity,Partial derivatives, Total differential and differentiability, Derivatives of composite and implicit functions, Jacobian-functional dependence and independence,Maxima and minima and saddle points, Method of Lagrange multipliers,Taylor's theorem for two variables.

**UNIT IV: First Order Ordinary Differential Equations**

Exact, Equations reducible to exact form, Applications of first order differential equations - Newton's law of cooling, Law of natural growth and decay, Equations not of first degree- Equations solvable for p, equations solvable for y, equations solvable for x and Clairaut's type

**UNIT V : Differential Equations of Higher Order**

Linear differential equations of second and higher order with constant coefficients: Non-homogeneous term of the type  $f(x) = e^{ax}$ ,  $\sin ax$ ,  $\cos ax$ ,  $x^n$ ,  $e^{ax} V$  and  $x^n V$  - Method of variation of parameters, Equations reducible linear ODE with constant coefficients-Cauchy's Euler equation and Legendre's equation.

**Text Books**

- i) Higher Engineering Mathematics by B V Ramana ., Tata McGraw Hill.
- ii) Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers.
- iii) Advanced Engineering Mathematics by Kreyszig ,John Wiley & Sons .

**Reference Books**

- i) Advanced Engineering Mathematics by R.K Jain & S R K Iyenger, Narosa Publishers.
- ii) Ordinary and Partial Differential Equations by M.D. Raisinghania, S.Chand Publishers
- iii) Engineering Mathematics by N.P Bali and Manish Goyal.

**Course Outcomes:** After learning the concepts of this paper the student will be able to

1. Analyze the solution of the system of linear equations and to find the Eigen values and Eigen vectors of a matrix.
2. Reduce the quadratic form to canonical form using orthogonal transformations.
3. Find the extreme values of functions of two variables with / without constraints.
4. Solve first order, first degree differential equations and their applications.
5. Solve higher order differential equations.
6. Analyze the nature of sequence and series.

**MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY****I Year B. TECH - I- SEM****L/T/P/C****3/-/-/ 3****(R22A0201) PRINCIPLES OF ELECTRICAL AND ELECTRONICS ENGINEERING****COURSE OBJECTIVES:**

1. To understand the basic concepts of electrical circuits and analyze Circuits using Network Theorems.
2. To get overview of single phase A.C. circuits and three phase A.C. circuits.
3. To introduce the concept of DC Machines and Single-Phase Transformers.
4. To study the concepts of p-n diodes, rectifiers and Zener diodes.
5. To study the concepts of BJTs, JFET and MOSFETs.

**UNIT –I: INTRODUCTION TO ELECTRICAL CIRCUITS:** Concept of Circuit and Network, R-L-C Parameters, Ohms law and its limitations, Kirchhoff's Laws-KVL, KCL.

**NETWORK ANALYSIS (D.C EXCITATION):** Series and parallel connections of Resistive Networks, voltage division and current division, Meshanalysis, Nodal analysis

**NETWORK THEOREMS:** Thevenin's Theorem, Norton's Theorem and Superposition Theorem (for independent sources).

**UNIT–II: SINGLE PHASE A.C. CIRCUITS:** Average value, R.M.S. value, form factor and peak factor for sinusoidal wave form. Concept of phase, phasor representation of sinusoidal quantities phasedifference, Sinusoidal response of pure R, L, C.

**THREE PHASE A.C. CIRCUITS:** Advantages of Three phase over single phase, Voltage and Current relationship in star and delta connections.

**UNIT-III:MACHINES:**

**DC Generator:** principle of operation and working, Action of commutator, constructional features, basic concept of Lap and wave windings, emf equation.

**DC Motor:** principle of operation, Back emf and its significance, torque equation-Gross torque and Shaft torque.

**Single Phase Transformer:** principle of operation, emf equation, problems on emf equation.

**UNIT–IV:**

**P-N JUNCTION DIODE:** P-N junction diode, symbol and forward biased and reverse biased conditions, V-I characteristics of P-N junction diode, Half wave, Full wave and Bridge rectifiers.

**ZENER DIODE:** Symbol, construction, principle of operation and its applications.

**UNIT–V:**

**BIPOLAR JUNCTION TRANSISTOR:** Symbols, types, Construction and Principle of Operation of N-P-N and P-N-P transistors, Amplifying Action, Common Emitter, Common Base and Common Collector configurations.

JFET, Symbol, Construction, Principle of operation, and its Characteristics, MOSFET (Enhancement and Depletion mode) Symbol, Construction, Principle of Operation and its Characteristics.

**TEXT BOOKS:**

1. Engineering Circuit Analysis - William Hayt, Jack E. Kemmerly, S M Durbin, Mc GrawHill Companies.
2. Electric Circuits - A. Chakrabarhty, Dhanipat Rai & Sons.
3. Electrical Machines – P.S.Bimbra, Khanna Publishers.
4. “ElectronicDevices&Circuits”, SpecialEdition–MRCET,McGrawHillPublications,2017.
5. IntegratedElectronicsAnalogDigitalCircuits,JacobMillmanandD.Halkias,McGrawHill.
6. ElectronicDevicesandCircuits, S.Salivahanan, N.Sureshkumar, McGrawHill.

**REFERENCE BOOKS**

1. Network analysis by M.E Van Valkenburg, PHI learning publications.
2. Network analysis - N.C Jagan and C. Lakhminarayana, BS publications.
3. Electrical Circuits by A. Sudhakar, Shyammohan and S Palli, Mc Graw Hill Companies.
4. Electrical Machines by I.J. Nagrath & D. P. Kothari, Tata Mc Graw-Hill Publishers.
5. Electronic Devices and Circuits, K.LalKishore, B.S Publications
6. Electronic Devices and Circuits, G.S.N.Raju, I.K.International Publications, NewDelhi,2006.

**COURSE OUTCOMES:**

After the course completion the students will be able to

1. Apply the basic RLC circuit elements and its concepts to networks and circuits.
2. Analyze the circuits by applying network theorems to solve them to find various electrical parameters.
3. Illustrate the single-phase AC circuits along with the concept of impedance parameters and power.
4. Understand the Constructional Details and Principle of Operation of DC Machines and Transformers
5. To understand the concepts of p-n diode, rectifiers and Zener diode
6. To understand the concepts of BJTs, JFET and MOSFETs

**MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY****I Year B. TECH - I- SEM****L/T/P/C****2/-/2/3****(R22A0301) COMPUTER AIDED ENGINEERING GRAPHICS****COURSE OBJECTIVES:**

- 1 To learn basic engineering graphics and Auto CAD concepts.
- 2 To learn the 2D principles of orthographic projections and Multiple views of the same
- 3 To know the planes and solid Projection
- 4 To gain the capability of designing 3D objects with isometric principles by using computer aided sketches
- 5 To know the conversion of Orthographic Views to isometric Views and isometric to Orthographic views

**UNIT 1**

**Introduction to Auto CAD:** Introduction to software interface Standard toolbar/menu, Understanding the co-ordinate systems-2D and 3D Visualisation, Setting the Paper sizes and title block importance, printing and plotting. **Draw commands:** line, arc, circle, rectangle, polygons, ellipse, polyline, splines, text. **Modify commands:** copy, mirror, offset, arrays, move, extend, break, trim, lengthen, chamfer, fillet.etc., **Constraints:** horizontal, vertical, parallel, concentric, perpendicular, symmetric, equal, collinear. **Dimensioning Commands:** Dimensioning and Dimension Style. **Division:** Line division, and circle division. **Polygons:** Constructing regular polygons - inscribed and circumscribed methods and general method.

**UNIT 2**

**Projection of Points:** Introduction to reference planes, four quadrants, importance of reference lines. Projection of points in all the four quadrants

**Projection of Lines:** Parallel to both the reference planes, Parallel to one plane and perpendicular to other plane, Inclined to one plane and parallel to other plane, Inclined to both planes

**UNIT 3**

**Projections of Planes:** Introduction to Regular planes. Parallel/Perpendicular to one reference plane, Inclined to one plane and Inclined to both the reference planes.

**Projections of Solids:** Introduction - Prisms, Pyramids, Cone and Cylinder, Axis parallel and perpendicular to one reference plane, Axis inclined to one reference plane.

**UNIT 4**

**Isometric Projection:** Introduction, Isometric projection of simple plane figures, Solids - right regular prisms, pyramids, cylinder, cone – H.P, V.P

**UNIT 5**

**Conversions:** Conversion of Isometric Views to Orthographic Views and Orthographic Views to Isometric Views

**TEXT BOOKS:**

1. Engineering Drawing – N.D. Bhatt & V.M. Panchal, 48th edition, 2005 Charotar Publishing House, Gujarat.
2. "Computer Aided Engineering Drawing" by Dr. M H Annaiah, Dr C N Chandrappa and Dr B Sudheer Prem Kumar Fifth edition, New Age International Publishers

**REFERENCE BOOKS:**

1. Computer Aided Engineering Drawing – S. Trymbaka Murthy, - I.K. International Publishing House Pvt. Ltd., New Delhi, 3rd revised edition-2006.
2. Engineering Graphics - K.R. Gopalakrishna, 32nd edition, 2005- Subash Publishers, Bangalore.

**COURSE OUTCOMES:**

After the completion of course the student will be capable to

1. To produce geometric construction, dimensioning & Curves and detail drawings.
2. To compile Projections of points, lines, then create virtual drawing by using computer
3. To sketch the Planes and Solid Projections
4. To develop isometric drawings of simple objects reading the orthographic projections of those objects.
5. To understand and visualize the 3-D view of engineering objects. Elaborate the conversions of 2D -3D and Vice-Versa

**MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY****I Year B. TECH - I- SEM****L/T/P/C****3/-/-/3****(R22A0501) PROGRAMMING FOR PROBLEM SOLVING****COURSE OBJECTIVES:**

1. To Understand the use of computer system in problem solving and to build program logic with algorithms and flowcharts.
2. To learn the syntax and semantics of C programming language.
3. To learn the usage of structured programming approach in solving problems.
4. To learn the usage of strings and pointers.
5. Understand the usage of structures and files.

**UNIT - I: Introduction to Programming:**

Computer Languages, Compilers, Compiling and executing a program, Representation of Algorithms and Flowcharts with examples.

**Introduction to C Programming Language:**

Structure of a C Program, I/O: Simple input and output with scanf() and printf(), C Tokens- Keywords, Identifiers, Constants, Variables, Data types, Operators, Expressions and precedence, Expression evaluation, Type conversion.

**UNIT - II: Conditional Branching and Arrays:**

**Control Structures** – Selection Statements (Decision Making)- if and switch statements, nested if-else, Iteration and loops: use of while, do-while and for loops, nested loops, use of goto, break and continue statements.

**Arrays:** Definition, one and two dimensional arrays, creating, accessing and manipulating elements of arrays.

**UNIT - III: Designing Structured Programs using Functions:**

**Functions:** Declaring a function, Categories of functions, passing parameters to functions: call by value, call by reference, passing arrays to functions, Scope- Local Vs Global, Storage classes, Recursion with example programs.

**UNIT - IV: Strings and Pointers:**

**Strings:** Introduction to strings, Declaration and Initialization, String input/output functions, String manipulation functions with example programs, Array of Strings.

**Pointers:** Defining pointers, Declaration and Initialization, accessing variables through pointers, Pointers to arrays, Pointers to functions, Pointers to structures, Command line arguments, Enumeration data type, Dynamic Memory Management Functions: malloc(), calloc(), realloc() and free().

**UNIT - V: Structures and File handling in C:**

**Structures:** Defining structures, Declaration and Initialization, Array of structures, unions.

**Files:** Text and Binary files, Opening and Closing files, File input /output functions, Creating and Reading and writing text files, Appending data to existing files.

**TEXT BOOKS:**

1. Jeri R. Hanly and Elliot B.Koffman, Problem solving and Program Design in C 7th Edition, Pearson.
2. Mastering C, K.R.Venugopal, S R Prasad, Tata McGraw-Hill Education.
3. Computer Programming, E.Balagurusamy, First Edition, TMH.
4. Computer Science: A Structured Programming Approach Using C, B.A.Forouzan and R.F. Gilberg, Third Edition, Cengage Learning.

**REFERENCE BOOKS:**

1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India.
2. Yashavant Kanetkar, Let Us C, 18th Edition, BPB.
3. Programming in C, Stephen G. Kochan, Fourth Edition, Pearson Education.
4. Herbert Schildt, C: The Complete Reference, Mc Graw Hill, 4th Edition.

**COURSE OUTCOMES:** The student will be able

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, structures and files to write C programs.

**MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY****I Year B. TECH – I - SEM****L/T/P/C  
3/1/-/4****(R22A0021) APPLIED PHYSICS****COURSE OBJECTIVES:**

- 1 To understand the basic principles of lasers and optical fibers.
- 2 To interpret dual nature of the matter and behavior of a particle quantum mechanically.
- 3 To classify the solids depending upon electrical conductivity.
- 4 To understand the concepts of semiconductors and devices.
- 5 To analyze dielectric and magnetic properties of the materials.

**UNIT – I****LASERS & FIBER OPTICS****(15 Hours)**

**Lasers:** Characteristics of lasers, Absorption, Spontaneous and stimulated emissions, Einstein's Coefficients, Population inversion, meta stable state, types of pumping, lasing action, construction and working of Ruby Laser, Helium-Neon Laser, Semiconductor diode Laser, Applications of lasers.

**Fiber Optics:** Introduction to optical fiber, Construction and working principle of an Optical Fiber, Acceptance angle and Numerical aperture, Types of Optical fibers - Mode and index profile, Losses in optical fiber, Optical Fiber in Communication System, Applications of optical fibers.

**UNIT – II****QUANTUM MECHANICS****(10 Hours)**

Wave nature of particles, de Broglie's hypothesis, matter waves, Heisenberg's uncertainty principle, Davisson and Germer's experiment, G.P Thomson experiment, Schrodinger time-independent wave equation-significance of wave function, Particle in one dimensional square well potential.

**UNIT – III****FREE ELECTRON THEORY OF METALS****(12 Hours)**

Free electron theory (Classical & Quantum)- Assumptions, Merits and drawbacks, Fermi level, Density of states, Periodic potential, Bloch's theorem, Kronig – Penny model (qualitative) , E –k diagram, Effective mass, Origin of energy bands in solids, Classification of materials : Metals, semiconductors and insulators.

**UNIT-IV****SEMICONDUCTOR PHYSICS****(15 Hours)**

Intrinsic and Extrinsic semiconductors, Direct and Indirect band gap semiconductors, Carrier concentration in intrinsic and extrinsic semiconductors. Dependence of Fermi level on carrier concentration and temperature, Formation of PN Junction, V-I characteristics of PN Junction diode, Energy Diagram of PN diode, Hall effect, semiconductor materials for optoelectronic devices - LED, Photo diode, Solar cell.

**UNIT – V****DIELECTRICS AND MAGNETIC PROPERTIES OF MATERIALS****(12 Hours)**

**Dielectrics:** Introduction, Types of polarizations – Electronic, Ionic and Orientation polarization (qualitative) and calculation of polarizabilities, Internal fields in Solid, Clausius-Mossotti relation, Piezo-electricity and Ferro-electricity.

**Magnetism:** Introduction, Classification of Dia, Para, Ferro magnetic materials based on magnetic moment, Properties of Anti-Ferro and Ferri magnetic materials, Hysteresis curve based on domain theory, Soft and Hard magnetic materials.

**COURSE OUTCOMES:**

- 1 Can apply the principles of laser to understand various lasers and fiber optic systems.
- 2 Basic principles of quantum mechanics can be used to analyze the microscopic behavior of a particle.
- 3 Classification of solids can be made by understanding the band structure of solids.
- 4 Concepts of semiconductors can be applied to predict the importance of electronic devices relevant to engineering domains.
- 5 Examine dielectric, magnetic properties of the materials and apply them in material technology.

**TEXT BOOKS:**

1. Engineering Physics by Kshirsagar&Avadhanulu, S. Chand publications.
2. Modern Engineering Physics-Dr K Vijaya Kumar & Dr S Chandralingam, S. Chand Publications.
3. Engineering Physics- B.K.Pandey, S.Chaturvedi, Cengage Learning.

**REFERENCES:**

1. Engineering Physics – R.K. Gaur and S.L. Gupta, DhanpatRai Publishers.
2. Engineering Physics, S Mani Naidu- Pearson Publishers.
3. Engineering physics 2<sup>nd</sup> edition –H.K. Malik and A.K. Singh.
4. Engineering Physics – P.K. Palaniswamy, Scitech publications.
5. Physics by Resnick and Haliday.

**MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY****I Year B. TECH - I- SEM****L/T/P/C****2/0/0/2****(R22A0022) ENGINEERING CHEMISTRY****COURSE OBJECTIVES:** The students will be able to

1. Acquire the knowledge of electrochemistry and batteries which are essential for the engineers and in industry.
2. Analyze engineering problems related to corrosion and develop different corrosion control techniques.
3. Identify different types of polymers, composites and their applications in various engineering fields.
4. Gain knowledge on wide variety of advanced materials like nano and smart materials which have excellent engineering properties.
5. Analyze water for its various parameters and its significance in industrial and domestic applications.

**Unit I Electrochemistry (8 hours)**

Introduction - Types of cells - Electrolytic and Electrochemical cells (construction and working of Galvanic Cell) - Electrode potential- Cell potential (EMF); Nernst equation and its applications; Electrochemical series and its applications. Batteries - Classification of batteries - primary, secondary and fuel cells with examples. Primary cells - Lithium cells; Secondary cells - Lead acid battery and Lithium ion battery; Fuel cells - Differences between battery and a fuel cell; Construction, working and applications of H<sub>2</sub>-O<sub>2</sub> fuel cell.

**Unit II Corrosion: (8 hours)**

Causes and effects of corrosion – Theories of corrosion - Chemical (oxidation) and Electrochemical corrosion – mechanism of electrochemical corrosion (Evolution of Hydrogen and Absorption of Oxygen); Corrosion control methods - Cathodic protection - Sacrificial anode and Impressed current cathodic methods; Surface coatings – methods of application - Electroplating (Cu-plating) and Electroless plating (Ni-plating) - advantages and applications of electroplating/electroless plating.

**Unit III Water and its treatment: (8 hours)**

Introduction – hardness of water – causes of hardness; Types of hardness - temporary and permanent – expression and units of hardness-numerical problems; Potable water and its specifications; Disinfection of water by chlorination and ozonization. Boiler troubles - caustic embrittlement, scales and sludges; External treatment of water – Ion exchange process; Desalination of water – Reverse osmosis.

**Unit IV Polymers: (10 hours)**

Introduction - Classification of polymers; Types of polymerization - addition and condensation polymerisation with examples. **Plastics** - thermoplastic and thermosetting resins; preparation, properties and engineering applications of Polyvinylchloride (PVC), Teflon (PTFE), and Bakelite. **Rubbers** - Natural rubber and its vulcanization. **Conducting polymers** - classification of conducting polymers – mechanism of conduction in trans-Polyacetylene and applications of conducting polymers. **Bio-degradable polymers** – preparation, properties and applications of Poly-Lactic acid. **Composite materials:** Introduction - Fibre reinforced plastics (FRPs) - Glass fibre reinforced, Carbon fibre reinforced plastics and their applications.

**Unit V Advanced Materials: (8 hours)**

**Nanomaterials:** Introduction and classification of nanomaterials; preparation of nanomaterials - Sol-gel method; applications of nanomaterials (industrial and medicinal); Carbon nanotubes (CNTs)-applications.

**Smart materials:** Introduction - Types of smart materials - examples and applications of piezoelectric materials and shape memory alloys.

**Suggested Text Books:**

1. Engineering Chemistry by P.C. Jain & M. Jain: Dhanpat Rai Publishing Company (P) Ltd, New Delhi. 16<sup>th</sup>Edition.
2. Engineering Chemistry by Prasanta Rath, B. Rama Devi, C. H. Venkata Ramana Reddy, Subhendu Chakroborty, Cengage Learning Publication, India Private Limited, 2018.
3. Engineering Analysis of Smart Material Systems by Donald J. Leo, Wiley, 2007.

**Reference Books:**

1. Engineering Chemistry by Shashi Chawla, Dhanpat Rai Publishing Company (P) Ltd, New Delhi.
2. Engineering Chemistry, by S. S. Dara, S. Chand & Company Ltd, NewDelhi.
3. P.W. Atkins, J.D. Paula, "Physical Chemistry", Oxford, 8<sup>th</sup>edition (2006).
4. B.R. Puri, L.R. Sharma and M.S. Pathania, "Principles of Physical Chemistry", S. Nagin Chand & Company Ltd., 46<sup>th</sup>edition (2013).

**COURSE OUTCOMES:** The student will be able to

1. Relate the knowledge of operating principles of various types of electrochemical cells, including batteries, to optimize the need for sustainable development.
2. Analyze and develop technically sound, economic and sustainable solutions for complex engineering problems related to corrosion and its effects.
3. Identify, formulate and develop polymeric compounds used in various engineering materials for futuristic engineering applications.
4. Apply the knowledge of nanotechnology and smart materials to find solutions for various engineering problems.
5. Familiarize with the fundamentals of water treatment technologies and the considerations for its design and implementation in water treatment plants.

**MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY****I Year B. TECH - I- SEM****L/T/P/C****-/-/2/1****(R22A0081) ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB**

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

**OBJECTIVES:**

1. To facilitate computer-aided multi-media instruction enabling individualized and independent language learning
2. To sensitize the students to the nuances of English speech sounds, word accent, intonation and rhythm
3. To bring about a consistent accent and intelligibility in their pronunciation, ample speaking opportunities are provided.
4. To improve the fluency in spoken English and neutralize mother tongue influence
5. To train students to use language appropriately for interviews, group discussions and public speaking

English Language and Communication Skills Labs two parts:

A.Computer Assisted Language Learning (CALL) Lab

B.Interactive Communication Skills (ICS) Lab

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

**UNIT –I**

CALL Lab: Introduction to Phonetics –Speech Sounds –Vowels and Consonants- Transcriptions

ICS Lab: Ice-Breaking activity - JAM session

**UNIT –II**

CALL Lab: Pronunciation: Past Tense Markers and Plural Markers

ICS Lab: Situational Dialogues/Role Plays--Greetings - Taking Leave – Introducing Oneself and Others - Requests and Seeking Permissions

**UNIT–III**

CALL Lab: Syllable and Syllabification

ICS Lab: Communication at Workplace- Situational Dialogues/Role Plays – Seeking Clarifications – Asking for and Giving Directions – Thanking and Responding – Agreeing and Disagreeing – Seeking and Giving Advice

**UNIT –IV**

CALL Lab: Word Stress and Intonation

ICS Lab:Information transfer – from visual to verbal - maps, charts, tables and graphs

**UNIT –V**

CALL Lab: Errors in Pronunciation- Accent - the Influence of Mother Tongue (MTI)

ICS Lab: Making a Short Speech - Extempore

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

The Computer aided Language Lab for 60 students with 60 systems, one master console, LAN facility and English language software for self-study by learners.

**System Requirement (Hardware component):**

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

- i) P –IV Processor
  - a) Speed –2.8 GHZ
  - b) RAM –512 MB Minimum
  - c) HardDisk –80 GB
- ii) Headphones of High quality

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

A Spacious room with movable chairs and audio-visual aids with a Public Address System, a T. V., a digital stereo –audio & video system and camcorder etc.

**DISTRIBUTION AND WEIGHTAGE OF MARKS****English Language Laboratory Practical Examination:**

1. The practical examinations for the English Language Laboratory shall be conducted as per the University norms prescribed for the core engineering practical sessions.
2. For the Language lab sessions, there shall be a continuous evaluation during the year for 30 marks and 70 year-end Examination marks. Of the 30 marks, 20 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The year-end Examination shall be conducted by the teacher concerned with the help of another member of the staff of the same department of the other institution.

**OUTCOMES:**

1. Learning with precision through computer-assisted individualized and independent language learning to work independently in engineering set up.
2. Improved conversational reception and articulation techniques in the course of repetitive instruction thereby gaining confidence both in institutional and professional environment.
3. Accuracy in pronunciation and restoring Standard English thereby crafting better command in English language so that the students have a cutting edge over others in society.
4. Imbibing appropriate use of language in situations to work as an individual and as a leader in diverse teams
5. Equip themselves with the pre-requisites, and relevant techniques to effectively attend corporate interviews

**MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY****I Year B. TECH - I- SEM****L/T/P/C  
-/-/3/1.5****(R22A0281) PRINCIPLES OF ELECTRICAL AND ELECTRONICS ENGINEERING LAB****COURSE OBJECTIVES:**

1. To design an electrical system.
2. To analyze a given network by applying various circuit laws and network theorems.
3. To expose the students to the operation of DC machine and transformer.
4. To exhibit the students to the operation of PN junction diode and Zener diode.
5. To expose the students to the operation of Rectifier.

**Among the following experiments any 10 are to be conducted**

1. Verification of KVL and KCL.
2. Verification of Thevenin's theorem.
3. Verification of Norton's theorem.
4. Verification of Super position theorem.
5. Magnetization characteristics of DC shunt generator.
6. Speed control of DC shunt motor using armature control method.
7. Speed control of DC shunt motor using flux control method
8. Load test on single phase transformer.
9. PN Junction diode characteristics.
10. Zener diode characteristics.
11. Half wave rectifier.
12. Full wave rectifier.

**COURSE OUTCOMES:****At the end of the course, students would be able to**

1. Explain the concept of circuit laws and network theorems and apply them to laboratory measurements.
2. Be able to systematically obtain the equations that characterize the performance of an electric circuit as well as solving them.
3. Perform the required tests on transformers and DC motors.
4. Plot the characteristics of Zener diodes.
5. Determine the working of rectifiers in detail.

**MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY****I Year B. TECH - I- SEM****L/T/P/C  
-/-/3/1.5****(R22A0581) PROGRAMMING FOR PROBLEM SOLVING LAB****COURSE OBJECTIVES:**

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 create, read from and write to text and binary files.

**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,  $\geq 70\%$  = 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:  
5 x 1 = 5  
5 x 2 = 10  
5 x 3 = 15

**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  $m/sec^2$  ( $= 9.8 m/s^2$ )).
- b. Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators  $+$ ,  $-$ ,  $*$ ,  $/$ ,  $\%$

and use Switch Statement).

- c. Write a C program to find the factorial of a given 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.

#### **Arrays, Functions and Pointers:**

- a. Write a C program to find the minimum, maximum and average in an array of integers.
- b. Write a C program that uses functions to perform the following:
  1. Addition of Two Matrices
  2. Multiplication of Two Matrices
- c. Write a C program to find the Transpose of a matrix.
- d. Write a function to swap the values of two variables using call by value.
- e. Write a function to swap the values of two variables using call by reference.
- f. Write C programs that use both recursive and non-recursive functions
  1. To find the factorial of a given integer.
  2. To find the GCD (greatest common divisor) of two given integers.
- g. Write a program for reading elements using a pointer into an array and display the values using the array.
- h. Write a program for display values reverse order from an array using a pointer.
- i. Write a program through a pointer variable to sum of n elements from an array.

#### **Strings:**

- a. Write a C program that uses functions to perform the following operations:
  1. To insert a sub-string into a given main string from a given position.
  2. To delete n Characters from a given position in a given string.
- b. 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.)
- c. Write a C program that displays the position of a character ch in the string S or - 1 if S doesn't contain ch.
- d. Write a C program to count the lines, words and characters in a given text.

#### **Structures:**

- a. Write a C program to create a structure named book and display the contents of a book.

- b. Write a C program to create a structure named student and display the details of 5 students using array of structures.
- c. Write a C program to calculate total and percentage marks of a student using structure.

**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 file.
- 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 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).

**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 2	* *	2 2
1 2 3	* * *	3 3 3
		4 4 4 4

**TEXT BOOKS:**

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

**REFERENCE BOOKS:**

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

**COURSE OUTCOMES:**

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

- formulate the algorithms for simple problems.
- identify and correct logical errors encountered during execution.
- represent and manipulate data with arrays, strings, structures and pointers.
- create, read and write to and from simple text and binary files.
- modularize the code with functions so that they can be reused.

**MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY****I Year B. TECH - I- SEM****L/T/P/C****-/-/3/1.5****(R22A0082) APPLIED PHYSICS LAB/ENGINEERING CHEMISTRY LAB****COURSE OBJECTIVES:**

1. To experience the mechanical oscillations and resonance phenomena.
2. To verify the concepts of light.
3. To analyze voltage/current phase behavior of RC and LCR circuits.
4. To study the characteristics of semiconductor devices.
5. To understand the concepts of laser.

**LIST OF EXPERIMENTS:**

1. Melde's experiment –Frequency of electrical vibrator.
2. Newton's Rings –Radius of curvature of Plano convex lens.
3. Laser -Wave length of light by using Diffraction grating.
4. CR circuit – Time constant of RC circuit.
5. LCR Circuit- Quality factor and resonance frequency of LCR circuit.
6. LED -Characteristics of LED.
7. Solar cell -Characteristics of Solar cell.
8. Optical fiber- Numerical aperture of an optical fiber.
9. Torsional pendulum- Rigidity modulus of given wire (demonstrative).
10. Hall Effect – Hall coefficient of semiconducting samples (demonstrative).

**REFERENCE BOOKS:**

1. Practical physics by Dr. Aparna, Dr K.V Rao, V.G.S. Publications.
2. Engineering physics practical lab manual – MRCET

**COURSE OUTCOMES:**

1. Students can compare the elastic constants of different metallic wires, and also determine the ac frequency of vibrating bar.
2. Students can illustrate the interference of light phenomena.
3. Wavelength of the given laser can be determined by using diffraction phenomenon
4. By understanding electrical principles, Time constant of RC and resonance phenomenon of LCR circuits can be analyzed.
5. V-I characteristics of various semiconductor devices can be illustrated.

**(R22A0082) ENGINEERING CHEMISTRY LAB****COURSE OBJECTIVES:**

The students will be able:

1. To understand and explain scientifically the various chemistry related problems in the industry/engineering and develop experimental skills for building technical competence.
2. To familiarize with the practical implementation of fundamental concepts.
3. To gain hands on experience in handling the instruments.
4. To demonstrate the digital and instrumental methods of analysis.
5. To correlate the practical aspects with theoretical concepts.

**List of Experiments****Titrimetry:**

1. Estimation of Hardness of water by EDTA method.
2. Estimation of Ferrous ion by Dichrometry

**Instrumental Methods****Conductometry:**

3. Estimation of concentration of HCl by Conductometric titrations.
4. Estimation of concentration of Acetic acid by Conductometric titrations.

**Potentiometry:**

5. Estimation of concentration of HCl by Potentiometric titrations.
6. Estimation of amount of  $\text{Fe}^{2+}$  by Potentiometric titration using  $\text{KMnO}_4$ .

**Colorimetry:**

7. Estimation of Copper by Colorimetric method.

**Preparation**

8. Preparation of a Polymer-**Bakelite**

**Physical Property**

9. Determination of Surface Tension of a given liquid by Stalagmometer.

**Corrosion control method**

10. Electroplating of Copper on an Iron object.

**Text Book:**

1. Inorganic quantitative analysis, Vogel
2. A text book on experiments and calculation in Engineering Chemistry by S.S. Dara

**Suggested Readings:**

1. Practical Engineering Chemistry by K. Mukkanti, etal, B.S. Publications, Hyderabad.
2. Text Book of engineering chemistry by R. N. Goyal and HarrmendraGoel, Ane Books Private Ltd.

**COURSE OUTCOMES:**

The students will be able:

1. To estimate the total hardness present in a sample of water.
2. To know the strength of an acid by conductometric and potentiometric methods.
3. To find the amount of  $\text{Cu}^{2+}$  present in unknown sample using colorimetric method.
4. To prepare a thermosetting polymer.
5. To determine the surface tension of a given liquid.
6. To understand the electroplating method for corrosion protection of metals.

**MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY****I Year B. TECH - I- SEM****L/T/P/C****-/-/2/1****(R22A0083) ENGINEERING AND COMPUTING HARDWARE WORKSHOP****It is consisting of 2 parts: Part I: Computing Hardware Workshop****Part II: Engineering Workshop****COURSE OBJECTIVES:**

- Understand the internal structure of computer system and learn to diagnose minor problems with the computer functioning.
- Know the proper usage and threats of the World Wide Web & Study in detail about the various features of Ms-Word, Excel, PowerPoint and Google Forms
- To obtain the knowledge about Electrical wiring and Soldering – Desoldering procedures.
- To provide hands on experience in usage of different engineering materials, tools equipments and processes which are common in the engineering field.
- To develop professional attitude, team work, precision and safety practices at work place.

**Part I: COMPUTING HARDWARE WORKSHOP****Task- 1: PC HARDWARE**

Identification of the peripherals of a computer, components in a CPU and its functions. Block diagram of the CPU along with the configuration of each peripheral. Functions of Motherboard. Assembling and Disassembling of PC. Installation of OS. Basic Linux commands.

**Task- 2: TROUBLESHOOTING**

Hardware Troubleshooting: Students are to be given a PC which does not boot due to proper assembly or defective peripherals and the students should be taught to identify and correct the problem.

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.

**Task 3: INTERNET**

Web Browsers, Access of websites, Surfing the Web, Search Engines, Customization of web browsers, proxy settings, bookmarks, search toolbars, pop-up blockers. Antivirus downloads, Protection from various threats.

**MS OFFICE****Task 4: MICROSOFT WORD**

Overview of MS word features. Usage of Hyperlink, Symbols, Spell Check, Track Changes. Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art,

Formatting Images, Textboxes, Paragraphs and Mail Merge in word. Using Word to create Project Certificate, Project Abstract, News Letter, Resume.

**Task 5: MICROSOFT EXCEL**

Overview of Excel Features Excel formulae & Functions, conditional formatting, Charts, Hyper linking, Renaming and Inserting worksheets, Data Analysis functions.

Creating a Scheduler (Features: - Gridlines, Format Cells, Summation, auto fill, Formatting)

Calculating GPA (Features: - Cell Referencing, Formulae and functions in excel)

**Task 6: MICROSOFT POWER POINT**

Overview of PowerPoint features, Insertion of images, slide transition, Custom animation, Hyperlinks.

**Task 7: GOOGLE FORMS**

Google forms introduction, opening Google forms, editing forms, add questions, copy duplicate questions, delete questions, required questions, more button, form color and themes, preview form, advance form settings, send form, view responses, close form

**PART II: ENGINEERING WORKSHOP****A. List of Experiments:**

1. Residential house wiring using switches, fuse, indicator, lamp and energy meter.
2. Fluorescent lampwiring
3. Stair casewiring
4. Soldering and Desoldering practice – components, devices and circuits using general

1. Purpose PCB.

Note: Minimum ONE experiment need to be conducted in each trade

**A. TRADES FOR EXERCISES:**

At least two exercises from each trade:

**1. Carpentry:**

To prepare T-Lap Joint, Dovetail Joint.

To prepare Mortise & Tenon Joint.

**2. Fitting:**

To prepare V-Fit, Dovetail Fit & Semi-circular fit.

**3. Tin-Smithy:**

To make Square Tin, Rectangular Tray & Conical Funnel.

**Note:** Minimum ONE experiment need to be conducted in each trade

**Trades to demonstrate:**

1. Plumbing
2. Foundry
3. Welding
4. Black smithy
5. Metal cutting (Water Plasma)

Note: Minimum a total of 3 trades to be demonstrated.

**TEXT BOOKS – IT WORKSHOP**

1. Introduction to Information Technology, IITL Education Solutions limited, Pearson Education
2. Excel Functions and Formulae, Bernd held, Theodor Richardson, Third Edition

**TEXT BOOKS – ENGINEERING WORKSHOP**

1. Workshop Manual, P. Kannaiah and K. L. Narayana, 3rd Edition, Scitech, 2015
2. Printed Circuit Boards - Design, Fabrication, Assembly and Testing, R. S. Khandpur, Tata McGraw-Hill Education, 2005.

**COURSE OUTCOMES:**

- Ability to identify, assemble and troubleshoot the major components of a computer and perform the installation of Operating System.
- Capacity to make effective usage of the internet for academics and develop professional documents, spreadsheets and presentations.
- Students will be able to understand the domestic, illumination, stair-case wiring procedures and soldering de soldering practice
- The student will have hands-on experience on manufacturing of components using different trades of engineering processes
- The student will be able to perform in a team, adhering to industrial safety practices and follow professional working standards.

**MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY****I Year B. TECH - I- SEM****L/T/P/C  
2/-/-/-****(R22A0004) ENVIRONMENTAL SCIENCE****COURSE OBJECTIVES:** On successful completion of this course, students will be able:

1. CO1: To distinguish the inter relationship between living organism and environment.
2. CO2: To categorize various types of natural resources available on the earth surface.
3. CO3: To detect the causes, and control measures of various types of environmental pollution.
4. CO4: To articulate the issues related to solid waste and its management.
5. CO5: To explain and understand the importance of Sustainable development.

**COURSE OUTCOMES:** The basic concepts included in this course will help the student to:

1. CO1: Differentiate between various biotic and abiotic components of ecosystem.
2. CO2: Describe the various types of natural resources.
3. CO3: Examine the problems associated with waste management.
4. CO4: Evaluate the causes, and apply control measures of various types of environmental pollutions.
5. CO5: Develop technologies on the basis of ecological principles on environment which in turn helps in sustainable development.

**UNIT-I ECOSYSTEMS (6 hours)**

Definition, Scope and Importance of Ecosystem; Structure of an Ecosystem - abiotic and biotic component; Functions of an ecosystem- food chains, food webs and ecological pyramids.

**Activities:** Case studies, poster making, Essays on biotic components.

**UNIT-II NATURAL RESOURCES (6hours)**

Classification of Resources: Definition of natural resource - renewable and non-renewable resources. Forest resources - functions and uses of forests, Deforestation - causes and consequences. Water resources – Dams - benefits and environmental problems over dams. Renewable resources - solar energy (solar cells), hydro power, biogas and bio-fuel.

**Activities:** Case studies, seminars, Group Project works, to prepare rain water harvesting models, to demonstrate the generation of electricity with the utilization of non-conventional energy resources.

**UNIT-III ENVIRONMENTAL POLLUTION AND TECHNIQUES (6 hours)**

Definition, Types of pollution- Air pollution- causes, effects, control measures of air pollution and prevention techniques. Water pollution- causes, effects, control measures and techniques.

**Activities:** Work sheets, Debate, seminars, surrounding case studies.

**UNIT-IV SOLID WASTE MANAGEMENT (5 hours)**

Definition of Solid waste, characteristics of solid waste; Solid waste management- collection, transportation, processing treatment and disposal methods; e-waste management; 3R techniques- reduce, reuse and recycle.

**Activities:** Quiz, Puzzles, Seminars, Case studies.

**UNIT-V SUSTAINABLE DEVELOPMENT (4 hours)**

Definition of sustainable development, sustainable development goals, threats to sustainability, strategies to achieve sustainable development.

**Activities:** Worksheets, seminars, slogans, group projects.

**TEXT BOOKS**

1. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission
2. Environmental Studies by R. Rajagopalan, Oxford University Press.
3. Textbook of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications
4. Dr. P. D Sharma, "Ecology and Environment", Rastogi Publications, New Delhi, 12 Edition, 2015

**REFERENCE BOOKS**

1. Environmental Studies by Anubha Kaushik, 4 Edition, New age international publishers
2. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL Learning Pvt. Ltd, New Delhi
3. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela. 2008 PHL Learning Pvt. Ltd, New Delhi
4. Environmental Science by Daniel B. Botkin & Edward A. Keller, Wiley INDIA edition

**MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY****I Year B. TECH - I- SEM****L/T/P/C****2/-/ - / -****(R20A0003) HUMAN VALUES AND PROFESSIONAL ETHICS****COURSE OBJECTIVES:**

This introductory course input is intended:

1. To help the students appreciate the essential complementarity between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
2. To facilitate the development of a holistic perspective among students towards life, profession and happiness, based on a correct understanding of the Human reality and the rest of Existence. Such a holistic perspective forms the basis of value based living in a natural way.
3. To highlight plausible implications of such a holistic understanding in terms of ethical human conduct, trustful and mutually satisfying human behavior and mutually enriching interaction with Nature.

**UNIT - I:**

**Course Introduction** - Need, Basic Guidelines, Content and Process for Value Education: Understanding the need, basic guidelines, content and process for Value Education. Self-Exploration - what is it? - its content and process; 'Natural Acceptance' and Experiential Validation - as the mechanism for self-exploration. Continuous Happiness and Prosperity A look at basic Human Aspirations- Right understanding, Relationship and Physical Facilities- the basic requirements for fulfillment of aspirations of every human being with their correct priority. Understanding Happiness and Prosperity correctly - A critical appraisal of the current scenario. Method to fulfill the above human aspirations: understanding and living in harmony at various levels.

**UNIT - II:**

Understanding Harmony in the Human Being - Harmony in Myself! : Understanding human being as a co-existence of the sentient 'I' and the material 'Body'.

Understanding the needs of Self ('I') and 'Body' - Sukh and Suvidha. Understanding the Body as an instrument of 'I' ( I being the doer, seer and enjoyer).

Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal of Physical needs, meaning of Prosperity in detail. Programs to ensure Sanyam and Swasthya.

**UNIT - III:**

Understanding Harmony in the Family and Society - Harmony in Human - Human Relationship: Understanding harmony in the Family the basic unit of human interaction. Understanding values in human - human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti; Trust (Vishwas) and Respect ( Samman) as the foundational values of relationship.

Understanding the meaning of Vishwas; Difference between intention and competence. Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values in relationship.

Understanding the harmony in the society (society being an extension of family): Samadhan, Samridhi, Abhay, Sah-astiva as comprehensive Human Goals. Visualizing a universal harmonious order in society - Undivided Society ( Akhand Samaj), Universal Order (Sarvabhaum Vyawastha) - from family to world family!

#### **UNIT - IV:**

Understanding Harmony in the nature and Existence - Whole existence as Coexistence: Understanding the harmony in the Nature. Interconnectedness and mutual fulfillment among the four orders of nature - recyclability and self-regulation in nature.

Understanding Existence as Co-existence (Sah-astitva) of mutually interacting units in all-pervasive space. Holistic perception of harmony at all levels of existence.

#### **UNIT - V:**

**Implications of the above Holistic Understanding of Harmony on Professional Ethics:** Natural acceptance of human values, Definitiveness of Ethical Human Conduct, Basic for Humanistic Education, Humanistic Constitution and Humanistic Universal Order. Competence in professional ethics:

- a. Ability to utilize the professional competence for augmenting universal human order.
- b. Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems.
- c. Ability to identify and develop appropriate technologies and management patterns for above production systems.

#### **TEXT BOOKS:**

1. R. R. Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course in Human Values and Professional Ethics.
2. Prof. K. V. Subba Raju, 2013, Success Secrets for Engineering Students, Smart Student Publications, 3rd Edition.

#### **REFERENCE BOOKS:**

1. Ivan Illich, 1974, Energy & Equity, The Trinity Press, Worcester, and HarperCollins, USA
2. E. F. Schumaner, 1973, Small is Beautiful: a study of economics as if people mattered. Blond & Briggs, Britain.
3. A Nagraj, 1998 Jeevan Vidya ek Parichay, Divya Path Sansthan, Amarkantak.
4. Sussan George, 1976, How the Other Half Dies, Penguin Press, Reprinted 1986, 1991.
5. P. L. Dhar, R. R. Gaur, 1990, Science and Humanism, Commonwealth Publishers.  
A. N. Tripathy, 2003, Human Values, New Age International Publishers.
6. Subhas Palekar, 2000, How to practice Natural Farming, Pracheen(Vaidik) Krishi Tantra Shodh, Amravati.

7. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, Limits to Growth - Club of Rome's report, Universe Books.
8. E G Seebauer & Robert L. Berry, 2000, Fundamentals of Ethics for Scientists & Engineers, Oxford University Press.
9. M Govindrajan, S Natrajan & V. S Senthil kumar, Engineering Ethics ( including Humna Values), Eastern Economy Edition, Prentice Hall of India Ltd.

**Relevant CDs, Movies, Documentaries & Other Literature:**

1. Value Education website, <http://www.uptu.ac.in>
2. Story of Stuff, <http://www.storyofstuff.com>
3. Al Gore, An Inconvenient Truth, Paramount Classics, USA
4. Charle Chaplin, Modern Times, United Artists, USA
5. IIT Delhi, Modern Technology - the Untold Story

**COURSE OUTCOMES:**

1. The students will be able to obtain happiness and prosperity in their life.
2. They will develop harmony at all levels.
3. They can have satisfying human behavior throughout their life

**MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY****I Year B. TECH - II- SEM****L/T/P/C  
2 /- /-/2****(R22A0002) PROFESSIONAL ENGLISH****INTRODUCTION:**

English is a tool for global communication and is the dominant language, which is sweeping almost all the fields in the world. It has become a necessity for people to speak in English comfortably, if they want to enter the global workforce. Hence, the course is designed to help the students to meet the global standards. Each unit focuses on English skill-set to improve: Interview skills, giving presentations and professional etiquette.

**COURSE OBJECTIVES:**

- 1 To enrich students to express themselves appropriately and fluently in professional contexts.
- 2 To enhance their employability through regular participation in group discussions and interview skills.
- 3 To lay foundation with writing strategies for the future workplace needs.
- 4 To acquaint students with different components of professional presentation skills.
- 5 To equip students with necessary training in listening to comprehend dialects of English language.

**UNIT-I*****“Mokshagundam Visvesvaraya”***

Speaking	- Description of Pictures, Places, Objects and Persons
Grammar	- ‘If’ Clauses
Vocabulary	- Homonyms, homophones and homographs
Writing	- Paragraph Writing

***NOTE: Listening and speaking tasks are solely for lab purpose and not for testing in the examinations.***

**UNIT –II**

Speaking	- Small Talks
Grammar	- Finite and Non-finite verbs
Vocabulary	- Standard Abbreviations (Mini Project)
Writing	- Job Application – Cover letter

***NOTE: Listening and speaking tasks are solely for lab purpose and not for testing in the examinations.***

**Unit –III**

Speaking	- Oral presentations
Grammar	- Transformation of Sentences
Vocabulary	- Idioms
Writing	- Abstract Writing

**NOTE: Listening and speaking tasks are solely for lab purpose and not for testing in the examinations.**

**Unit – IV****'How a Chinese Billionaire Built Her Fortune'**

Speaking	- Telephonic Expressions and Conversations
Grammar	- Auxiliary verbs & model
Verbs, Degrees of Comparison	
Vocabulary	- Word Analogy
Writing	- Job Application - Resume

**NOTE: Listening and speaking tasks are solely for lab purpose and not for testing in the examinations.**

**Unit – V**

Speaking	- Group discussion
Grammar	- Common Errors, Prepositions
Vocabulary	- Technical Vocabulary
Writing	- Report Writing

**NOTE: Listening and speaking tasks are solely for lab purpose and not for testing in the examinations.**

**REFERENCE BOOKS:**

1. Practical English Usage. Michael Swan. OUP. 1995.
2. Remedial English Grammar. F.T. Wood. Macmillan.2007
3. Skills Annexe & Epitome of Wisdom - B.Tech 1st Year English Study Material, JNTUH.
4. Study Writing. Liz Hamp-Lyons and Ben Heasley. Cambridge University Press. 2006.
5. Communication Skills. Sanjay Kumar and Pushpa Lata. Oxford University Press. 2011.
6. Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press
7. 'English for Engineers'. Cambridge University Press

**MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY****I Year B. TECH - II- SEM****L/T/P /C  
3 /1/-/4****(R22A0024) MATHEMATICS-II****OBJECTIVES:**

- The aim of numerical methods is to provide systematic methods for solving problems in a numerical form using the given initial data, also used to find the roots of an equation and to solve differential equations.
- The objective of interpolation is to find an unknown function which approximates the given data points and the objective of curve fitting is to find the relation between the variables  $x$  and  $y$  from given data and such relationships which exactly pass through the data (or) approximately satisfy the data under the condition of sum of least squares of errors.
- PDE aims at forming a function with many variables and also their solution methods, Method of separation of variables technique is learnt to solve typical second order PDE.
- Evaluation of multiple integrals.
- In many engineering fields the physical quantities involved are vector valued functions. Hence the vector calculus aims at basic properties of vector-valued functions and their applications to line, surface and volume integrals.

**UNIT – I: Interpolation**

**Interpolation:** Introduction, errors in polynomial interpolation, Finite differences - Forward differences, Backward differences, central differences. Newton's formulae for interpolation, Gauss's central difference formulae, Interpolation with unevenly spaced points - Lagrange's Interpolation.

**Curve fitting :** Fitting a straight line, second degree curve, exponential curve, power curve by method of least squares.

**UNIT – II: Numerical Methods**

**Solution of algebraic and transcendental equations:** Introduction, Bisection Method, Method of false position, Newton Raphson method and their graphical interpretations.

**Numerical integration :** Generalized quadrature - Trapezoidal rule, Simpson's  $1/3^{\text{rd}}$  and Simpson's  $3/8^{\text{th}}$  rules.

**Numerical solution of ordinary differential equations:** Solution by Taylor's series method, Euler's method, Euler's modified method, Runge-Kutta fourth order method.

**UNIT III: Partial Differential Equations**

Introduction, formation of partial differential equation by elimination of arbitrary constants and arbitrary functions, solutions of first order Lagrange's linear equation and non-linear equations, Charpit's method, Method of separation of variables for second order equations and applications of PDE to one dimensional equation (Heat equation).

**Unit IV: Double and Triple Integrals**

Double and triple integrals (Cartesian and polar), Change of order of integration in double integrals, Change of variables (Cartesian to polar). Applications: Areas (by double integrals) and volumes (by double integrals and triple).

**Unit V: Vector Calculus**

Introduction, Scalar point function and vector point function, Directional derivative, Gradient, Divergence, Curl and their related properties, Laplacian operator, Line integral - work done, Surface integrals, Volume integral. Green's Theorem, Stoke's theorem and Gauss's Divergence Theorems (Statement & their Verification).

**Text Books:**

- a. Higher Engineering Mathematics by B V Ramana ., Tata McGraw Hill.
- b. Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers.
- c. Mathematical Methods by S.R.K Iyenger, R.K.Jain, Narosa Publishers.

**Reference Books:**

- i) Elementary Numerical Analysis by Atkinson-Han, Wiley Student Edition.
- ii) Advanced Engineering Mathematics by Michael Greenberg –Pearson publishers.
- iii) Introductory Methods of Numerical Analysis by S.S. Sastry, PHI

**Course Outcomes:** After learning the contents of this paper the student will be able to

1. Find the most appropriate relation of the data variables using curve fitting and this method of data analysis helps engineers to understand the system for better interpretation and decision making.
2. Find the roots of algebraic, non algebraic equations.
3. Solve first order linear and non-linear partial differential equations.
4. Evaluate multiple integrals.
5. Evaluate the line, surface, volume integrals and converting them from one to another using vector integral theorems.

**MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY****I Year B. TECH - II- SEM****L/T/P/C  
3/1/-/4****(R22A0021) APPLIED PHYSICS****COURSE OBJECTIVES:**

- 1 To understand the basic principles of lasers and optical fibers.
- 2 To interpret dual nature of the matter and behavior of a particle quantum mechanically.
- 3 To classify the solids depending upon electrical conductivity.
- 4 To understand the concepts of semiconductors and devices.
- 5 To analyze dielectric and magnetic properties of the materials.

**UNIT – I****LASERS & FIBER OPTICS****(15 Hours)**

**Lasers:** Characteristics of lasers, Absorption, Spontaneous and stimulated emissions, Einstein's Coefficients, Population inversion, meta stable state, types of pumping, lasing action, construction and working of Ruby Laser, Helium-Neon Laser, Semiconductor diode Laser, Applications of lasers.

**Fiber Optics:** Introduction to optical fiber, Construction and working principle of an Optical Fiber, Acceptance angle and Numerical aperture, Types of Optical fibers - Mode and index profile, Losses in optical fiber, Optical Fiber in Communication System, Applications of optical fibers.

**UNIT – II****QUANTUM MECHANICS****(10 Hours)**

Wave nature of particles, de Broglie's hypothesis, matter waves, Heisenberg's uncertainty principle, Davisson and Germer's experiment, G.P Thomson experiment, Schrodinger time-independent wave equation-significance of wave function, Particle in one dimensional square well potential.

**UNIT – III****FREE ELECTRON THEORY OF METALS****(12 Hours)**

Free electron theory (Classical & Quantum)- Assumptions, Merits and drawbacks, Fermi level, Density of states, Periodic potential, Bloch's theorem, Kronig – Penny model (qualitative) , E –k diagram, Effective mass, Origin of energy bands in solids, Classification of materials : Metals, semiconductors and insulators.

**UNIT-IV****SEMICONDUCTOR PHYSICS****(15 Hours)**

Intrinsic and Extrinsic semiconductors, Direct and Indirect band gap semiconductors, Carrier concentration in intrinsic and extrinsic semiconductors. Dependence of Fermi level on carrier concentration and temperature, Formation of PN Junction, V-I characteristics of PN Junction diode, Energy Diagram of PN diode, Hall effect, semiconductor materials for optoelectronic devices - LED, Photo diode, Solar cell.

**UNIT – V:****DIELECTRICS AND MAGNETIC PROPERTIES OF MATERIALS****(12 Hours)**

**Dielectrics:** Introduction, Types of polarizations – Electronic, Ionic and Orientation polarization (qualitative) and calculation of polarizabilities, Internal fields in Solid, Clausius-Mossotti relation, Piezo-electricity and Ferro-electricity.

**Magnetism:** Introduction, Classification of Dia, Para, Ferro magnetic materials based on magnetic moment, Properties of Anti-Ferro and Ferri magnetic materials, Hysteresis curve based on domain theory, Soft and Hard magnetic materials.

**COURSE OUTCOMES:**

- 1 Can apply the principles of laser to understand various lasers and fiber optic systems.
- 2 Basic principles of quantum mechanics can be used to analyze the microscopic behavior of a particle.
- 3 Classification of solids can be made by understanding the band structure of solids.
- 4 Concepts of semiconductors can be applied to predict the importance of electronic devices relevant to engineering domains.
- 5 Examine dielectric, magnetic properties of the materials and apply them in material technology.

**TEXT BOOKS:**

- a. Engineering Physics by Kshirsagar&Avadhanulu, S. Chand publications.
- b. Modern Engineering Physics-Dr K Vijaya Kumar & Dr S Chandralingam, S. Chand Publications.
- c. Engineering Physics- B.K.Pandey, S.Chaturvedi, Cengage Learning.

**REFERENCES:**

1. Engineering Physics – R.K. Gaur and S.L. Gupta, DhanpatRai Publishers.
2. Engineering Physics, S Mani Naidu- Pearson Publishers.
3. Engineering physics 2<sup>nd</sup> edition –H.K. Malik and A.K. Singh.
4. Engineering Physics – P.K. Palaniswamy, Scitech publications.
5. Physics by Resnick and Haliday.

**MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY****I Year B. TECH - II- SEM****L/T/P/C****2/-/-/2****(R22A0022) ENGINEERING CHEMISTRY****COURSE OBJECTIVES:** The students will be able to

1. Acquire the knowledge of electrochemistry and batteries which are essential for the engineers and in industry.
2. Analyze engineering problems related to corrosion and develop different corrosion control techniques.
3. Identify different types of polymers, composites and their applications in various engineering fields.
4. Gain knowledge on wide variety of advanced materials like nano and smart materials which have excellent engineering properties.
5. Analyze water for its various parameters and its significance in industrial and domestic applications.

**Unit I Electrochemistry (8 hours)**

Introduction - Types of cells - Electrolytic and Electrochemical cells (construction and working of Galvanic Cell) - Electrode potential- Cell potential (EMF); Nernst equation and its applications; Electrochemical series and its applications. Batteries - Classification of batteries - primary, secondary and fuel cells with examples. Primary cells - Lithium cells; Secondary cells - Lead acid battery and Lithium ion battery; Fuel cells - Differences between battery and a fuel cell; Construction, working and applications of H<sub>2</sub>-O<sub>2</sub> fuel cell.

**Unit II Corrosion: (8 hours)**

Causes and effects of corrosion – Theories of corrosion - Chemical (oxidation) and Electrochemical corrosion – mechanism of electrochemical corrosion (Evolution of Hydrogen and Absorption of Oxygen); Corrosion control methods - Cathodic protection - Sacrificial anode and Impressed current cathodic methods; Surface coatings – methods of application - Electroplating (Cu-plating) and Electroless plating (Ni-plating) - advantages and applications of electroplating/electroless plating.

**Unit III Water and its treatment: (8 hours)**

Introduction – hardness of water – causes of hardness; Types of hardness - temporary and permanent – expression and units of hardness-numerical problems; Potable water and its specifications; Disinfection of water by chlorination and ozonation. Boiler troubles - caustic embrittlement, scales and sludges; External treatment of water – Ion exchange process; Desalination of water – Reverse osmosis.

**Unit IV Polymers: (10 hours)**

Introduction - Classification of polymers; Types of polymerization - addition and condensation polymerisation with examples. **Plastics** - thermoplastic and thermosetting resins; preparation, properties and engineering applications of Polyvinylchloride (PVC), Teflon (PTFE), and Bakelite. **Rubbers** - Natural rubber and its vulcanization. **Conducting polymers** - classification of conducting polymers – mechanism of conduction in trans-Polyacetylene and applications of conducting polymers. **Bio-degradable polymers** – preparation, properties and applications of Poly-Lactic acid. **Composite materials:** Introduction - Fibre reinforced plastics (FRPs) - Glass fibre reinforced, Carbon fibre reinforced plastics and their applications.

**Unit V Advanced Materials: (8 hours)**

**Nanomaterials:** Introduction and classification of nanomaterials; preparation of nanomaterials - Sol-gel method; applications of nanomaterials (industrial and medicinal); Carbon nanotubes (CNTs)-applications.

**Smart materials:** Introduction - Types of smart materials - examples and applications of piezoelectric materials and shape memory alloys.

**Suggested Text Books:**

1. Engineering Chemistry by P.C. Jain & M. Jain: Dhanpat Rai Publishing Company (P) Ltd, New Delhi. 16<sup>th</sup> Edition.
2. Engineering Chemistry by Prasanta Rath, B. Rama Devi, C. H. Venkata Ramana Reddy, Subhendu Chakroborty, Cengage Learning Publication, India Private Limited, 2018.
3. Engineering Analysis of Smart Material Systems by Donald J. Leo, Wiley, 2007.

**Reference Books:**

1. Engineering Chemistry by Shashi Chawla, Dhanpat Rai Publishing Company (P) Ltd, New Delhi.
2. Engineering Chemistry, by S. S. Dara, S. Chand & Company Ltd, New Delhi.
3. P.W. Atkins, J.D. Paula, "Physical Chemistry", Oxford, 8<sup>th</sup> edition (2006).
4. B.R. Puri, L.R. Sharma and M.S. Pathania, "Principles of Physical Chemistry", S. Nagin Chand & Company Ltd., 46<sup>th</sup> edition (2013).

**COURSE OUTCOMES:** The student will be able to

1. Relate the knowledge of operating principles of various types of electrochemical cells, including batteries, to optimize the need for sustainable development.
2. Analyze and develop technically sound, economic and sustainable solutions for complex engineering problems related to corrosion and its effects.
3. Identify, formulate and develop polymeric compounds used in various engineering materials for futuristic engineering applications.
4. Apply the knowledge of nanotechnology and smart materials to find solutions for various engineering problems.
5. Familiarize with the fundamentals of water treatment technologies and the considerations for its design and implementation in water treatment plants.

**MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY****I Year B. TECH - II- SEM****L/T/P/C****3/-/-/3****(R22A0502) PROBLEM SOLVING USING PYTHON PROGRAMMING****COURSE OBJECTIVES:**

This course will enable students

1. To read and write simple Python programs.
2. To develop Python programs with conditionals and loops.
3. To develop Python programs with using arrays and functions.
4. To use Python data structures—lists, tuples, dictionaries.
5. To do input/output with files in Python.

**UNIT-I**

**Introduction to Python Programming Language:** Introduction to Python Language, Features of Python, Python Installation, Python Input and Output Statements, Numeric Data Types: int, float, boolean, complex and string and its operations, Standard Data Types: List, Tuples, Sets and Dictionaries, Data Type conversions, Comments in Python.

**UNIT-II**

**Variables and Operators:** Understanding Python variables, multiple variable declarations, Operators in Python: Arithmetic operators, Assignment operators, Comparison operators, Logical operators, Identity operators, Membership operators, Bitwise operators, Precedence of operators, Expressions.

**Control Flow and Loops:** Indentation, if statement, if-else statement, chained conditional if-elif -else statement, Loops: While loop, for loop using ranges, Loop manipulation using break, continue and pass.

**UNIT- III**

**Arrays:** Advantages of Arrays, Creating an Array, Importing the Array Module, Indexing and Slicing on Arrays, Types of arrays, working with arrays using numpy.

**UNIT-IV**

**Functions:** Defining a function, Calling Functions, Passing parameters and arguments, Python Function arguments: Positional Arguments, Keyword Arguments, Default Arguments, Variable-length arguments, Scope of the Variables in a Function—Local and Global Variables, Fruitful Functions, Anonymous functions or Lambda functions, Powerful Lambda functions in Python.

**UNIT-V**

**File Handling in Python:** Introduction to files, Text files and Binary files, Access Modes, Writing Data to a File, Reading Data from a File, File input / output functions.

**Error Handling in Python:** Introduction to Errors and Exceptions: Compile-Time Errors, Logical Errors, Runtime Errors, Types of Exceptions, Python Exception Handling Using try, except and finally statements.

**COURSE OUTCOMES:**

Upon completion of the course, students will be able to

1. Read, write, execute by hand simple Python programs.
2. Structure simple Python programs for solving problems.
3. Decompose a Python program into arrays and functions.
4. Represent compound data using Python lists, tuples, dictionaries.
5. Read and write data from/to files in Python programs.

**TEXT BOOKS**

1. R.NageswaraRao, "Core Python Programming", dream tech.
2. Allen B. Downey, "Think Python: How to Think Like a Computer Scientist" 2<sup>nd</sup> edition, Updated for Python3, Shroff/O'Reilly Publishers, 2016.
3. Python Programming: A Modern Approach, Vamsi Kurama, Pearson.

**REFERENCEBOOKS:**

1. Core Python Programming, W.Chun, Pearson.
2. Introduction to Python, Kenneth A. Lambert, Cengage.
3. Learning Python, Mark Lutz, Orielly.

**MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY****I Year B. TECH - II- SEM****L/T/P/C****3/-/-/3****(R22A0201) PRINCIPLES OF ELECTRICAL AND ELECTRONICS ENGINEERING****COURSE OBJECTIVES:**

1. To understand the basic concepts of electrical circuits and analyze Circuits using Network Theorems.
2. To get overview of single phase A.C. circuits and three phase A.C. circuits.
3. To introduce the concept of DC Machines and Single-Phase Transformers.
4. To study the concepts of p-n diodes, rectifiers and Zener diodes.
5. To study the concepts of BJTs, JFET and MOSFETs.

**UNIT –I: INTRODUCTION TO ELECTRICAL CIRCUITS:** Concept of Circuit and Network, R-L-C Parameters, Ohms law and its limitations, Kirchhoff's Laws-KVL, KCL.

**NETWORK ANALYSIS (D.C EXCITATION):** Series and parallel connections of Resistive Networks, voltage division and current division, Meshanalysis, Nodal analysis

**NETWORK THEOREMS:** Thevenin's Theorem, Norton's Theorem and Superposition Theorem (for independent sources).

**UNIT–II: SINGLE PHASE A.C. CIRCUITS:** Average value, R.M.S. value, form factor and peak factor for sinusoidal wave form. Concept of phase, phasor representation of sinusoidal quantities phasedifference, Sinusoidal response of pure R, L, C.

**THREE PHASE A.C. CIRCUITS:** Advantages of Three phase over single phase, Voltage and Current relationship in star and delta connections.

**UNIT-III: MACHINES:**

**DC Generator:** principle of operation and working, Action of commutator, constructional features, basic concept of Lap and wave windings, emf equation.

**DC Motor:** principle of operation, Back emf and its significance, torque equation-Gross torque and Shaft torque.

**Single Phase Transformer:** principle of operation, emf equation, problems on emf equation.

**UNIT–IV:**

**P-N JUNCTION DIODE:** P-N junction diode, symbol and forward biased and reverse biased conditions, V-I characteristics of P-N junction diode, Half wave, Full wave and Bridge rectifiers.

**ZENER DIODE:** Symbol, construction, principle of operation and its applications.

**UNIT-V:**

**BIPOLAR JUNCTION TRANSISTOR:** Symbols, types, Construction and Principle of Operation of N-P-N and P-N-P transistors, Amplifying Action, Common Emitter, Common Base and Common Collector configurations.

JFET, Symbol, Construction, Principle of operation, and its Characteristics, MOSFET (Enhancement and Depletion mode) Symbol, Construction, Principle of Operation and its Characteristics.

**TEXT BOOKS:**

1. Engineering Circuit Analysis - William Hayt, Jack E. Kemmerly, S M Durbin, Mc GrawHill Companies.
2. Electric Circuits - A. Chakrabarhty, Dhanipat Rai & Sons.
3. Electrical Machines – P.S.Bimbra, Khanna Publishers.
4. “Electronic Devices & Circuits”, Special Edition – MRCET, McGrawHill Publications, 2017.
5. Integrated Electronics Analog Digital Circuits, Jacob Millman and D. Halkias, McGrawHill.
6. Electronic Devices and Circuits, S. Salivahanan, N. Sureshkumar, McGrawHill.

**REFERENCE BOOKS**

1. Network analysis by M.E Van Valkenburg, PHI learning publications.
2. Network analysis - N.C Jagan and C. Lakhminarayana, BS publications.
3. Electrical Circuits by A. Sudhakar, Shyammohan and S Palli, Mc Graw Hill Companies.
4. Electrical Machines by I.J. Nagrath & D. P. Kothari, Tata Mc Graw-Hill Publishers.
5. Electronic Devices and Circuits, K. Lal Kishore, B.S Publications
6. Electronic Devices and Circuits, G.S.N. Raju, I.K. International Publications, New Delhi, 2006.

**COURSE OUTCOMES:**

After the course completion the students will be able to

1. Apply the basic RLC circuit elements and its concepts to networks and circuits.
2. Analyze the circuits by applying network theorems to solve them to find various electrical parameters.
3. Illustrate the single-phase AC circuits along with the concept of impedance parameters and power.
4. Understand the Constructional Details and Principle of Operation of DC Machines and Transformers
5. To understand the concepts of p-n diode, rectifiers and Zener diode
6. To understand the concepts of BJTs, JFET and MOSFETs

**MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY****I Year B. TECH - II- SEM****L/T/P/C****2/-/2/3****(R22A0301) COMPUTER AIDED ENGINEERING GRAPHICS****COURSE OBJECTIVES:**

- 1 To learn basic engineering graphics and Auto CAD concepts.
- 2 To learn the 2D principles of orthographic projections and Multiple views of the same
- 3 To know the planes and solid Projection
- 4 To gain the capability of designing 3D objects with isometric principles by using Computer aided sketches
- 5 To know the conversion of Orthographic Views to isometric Views and isometric to Orthographic views

**UNIT 1**

**Introduction to Auto CAD:** Introduction to software interface Standard toolbar/menu, Understanding the co-ordinate systems-2D and 3D Visualisation, Setting the Paper sizes and title block importance, printing and plotting. **Draw commands:** line, arc, circle, rectangle, polygons, ellipse, polyline, splines, text. **Modify commands:** copy, mirror, offset, arrays, move, extend, break, trim, lengthen, chamfer, fillet.etc., **Constraints:** horizontal, vertical, parallel, concentric, perpendicular, symmetric, equal, collinear. **Dimensioning Commands:** Dimensioning and Dimension Style. **Division:** Line division, and circle division. **Polygons:** Constructing regular polygons - inscribed and circumscribed methods and general method.

**UNIT 2**

**Projection of Points:** Introduction to reference planes, four quadrants, importance of reference lines. Projection of points in all the four quadrants

**Projection of Lines:** Parallel to both the reference planes, Parallel to one plane and perpendicular to other plane, Inclined to one plane and parallel to other plane, Inclined to both planes

**UNIT 3**

**Projections of Planes:** Introduction to Regular planes. Parallel/Perpendicular to one reference plane, Inclined to one plane and Inclined to both the reference planes.

**Projections of Solids:** Introduction - Prisms, Pyramids, Cone and Cylinder, Axis parallel and perpendicular to one reference plane, Axis inclined to one reference plane.

**UNIT 4**

**Isometric Projection:** Introduction, Isometric projection of simple plane figures, Solids - right regular prisms, pyramids, cylinder, cone – H.P, V.P

**UNIT 5**

**Conversions:** Conversion of Isometric Views to Orthographic Views and Orthographic Views to Isometric Views

**TEXT BOOKS:**

1. Engineering Drawing – N.D. Bhatt & V.M. Panchal, 48th edition, 2005 Charotar Publishing House, Gujarat.
2. "Computer Aided Engineering Drawing" by Dr. M H Annaiah, Dr C N Chandrappa and Dr B Sudheer Prem Kumar Fifth edition, New Age International Publishers

**REFERENCE BOOKS:**

1. Computer Aided Engineering Drawing – S. Trymbaka Murthy, - I.K. International Publishing House Pvt. Ltd., New Delhi, 3rd revised edition-2006.
2. Engineering Graphics - K.R. Gopalakrishna, 32nd edition, 2005- Subash Publishers, Bangalore.

**COURSE OUTCOMES:**

After the completion of course the student will be capable to

1. To produce geometric construction, dimensioning & Curves and detail drawings.
2. To compile Projections of points, lines, then create virtual drawing by using computer
3. To sketch the Planes and Solid Projections
4. To develop isometric drawings of simple objects reading the orthographic projections of those objects.
5. To understand and visualize the 3-D view of engineering objects. Elaborate the conversions of 2D -3D and Vice-Versa

**MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY****I Year B. TECH - II- SEM****L/T/P/C****-/-/3/1.5****(R22A0082) APPLIED PHYSICS LAB/ENGINEERING CHEMISTRY LAB****COURSE OBJECTIVES:**

1. To experience the mechanical oscillations and resonance phenomena.
2. To verify the concepts of light.
3. To analyze voltage/current phase behavior of RC and LCR circuits.
4. To study the characteristics of semiconductor devices.
5. To understand the concepts of laser.

**LIST OF EXPERIMENTS:**

1. Melde's experiment –Frequency of electrical vibrator.
2. Newton's Rings –Radius of curvature of Plano convex lens.
3. Laser -Wave length of light by using Diffraction grating.
4. CR circuit – Time constant of RC circuit.
5. LCR Circuit- Quality factor and resonance frequency of LCR circuit.
6. LED -Characteristics of LED.
7. Solar cell -Characteristics of Solar cell.
8. Optical fiber- Numerical aperture of an optical fiber.
9. Torsional pendulum- Rigidity modulus of given wire (demonstrative).
10. Hall Effect – Hall coefficient of semiconducting samples (demonstrative).

**REFERENCE BOOKS:**

1. Practical physics by Dr. Aparna, Dr K.V Rao, V.G.S. Publications.
2. Engineering physics practical lab manual – MRCET

**COURSE OUTCOMES:**

1. Students can compare the elastic constants of different metallic wires, and also determine the ac frequency of vibrating bar.
2. Students can illustrate the interference of light phenomena.
3. Wavelength of the given laser can be determined by using diffraction phenomenon
4. By understanding electrical principles, Time constant of RC and resonance phenomenon of LCR circuits can be analyzed.
5. V-I characteristics of various semiconductor devices can be illustrated.

**(R22A0082) ENGINEERING CHEMISTRY LAB****COURSE OBJECTIVES:**

The students will be able:

1. To understand and explain scientifically the various chemistry related problems in the industry/engineering and develop experimental skills for building technical competence.
2. To familiarize with the practical implementation of fundamental concepts.
3. To gain hands on experience in handling the instruments.
4. To demonstrate the digital and instrumental methods of analysis.
5. To correlate the practical aspects with theoretical concepts.

**List of Experiments****Titrimetry:**

1. Estimation of Hardness of water by EDTA method.
2. Estimation of Ferrous ion by Dichrometry

**Instrumental Methods****Conductometry:**

3. Estimation of concentration of HCl by Conductometric titrations.
4. Estimation of concentration of Acetic acid by Conductometric titrations.

**Potentiometry:**

5. Estimation of concentration of HCl by Potentiometric titrations.
6. Estimation of amount of  $\text{Fe}^{2+}$  by Potentiometric titration using  $\text{KMnO}_4$ .

**Colorimetry:**

7. Estimation of Copper by Colorimetric method.

**Preparation**

8. Preparation of a Polymer-**Bakelite**

**Physical Property**

9. Determination of Surface Tension of a given liquid by Stalagmometer.

**Corrosion control method**

10. Electroplating of Copper on an Iron object.

**Text Book:**

1. Inorganic quantitative analysis, Vogel
2. A text book on experiments and calculation in Engineering Chemistry by S.S. Dara

**Suggested Readings:**

1. Practical Engineering Chemistry by K. Mukkanti, etal, B.S. Publications, Hyderabad.
2. Text Book of engineering chemistry by R. N. Goyal and HarrmendraGoel, Ane Books Private Ltd.

**COURSE OUTCOMES:**

The students will be able:

1. To estimate the total hardness present in a sample of water.
2. To know the strength of an acid by conductometric and potentiometric methods.
3. To find the amount of  $\text{Cu}^{2+}$  present in unknown sample using colorimetric method.
4. To prepare a thermosetting polymer.
5. To determine the surface tension of a given liquid.
6. To understand the electroplating method for corrosion protection of metals.

**MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY****I Year B. TECH - II- SEM****L/T/P/C  
-/-/3/1.5****(R22A0582) PROBLEM SOLVING USING PYTHON PROGRAMMING LAB****COURSE OBJECTIVES**

This course will enable the students:

1. Able to understand Syntax and Semantics and create Arrays and Functions in Python.
2. Able to learn different data types Lists, Dictionaries in Python.
3. Able to know how to execute the programs using loops and control statements.
4. Able to learn decision making and Functions in Python.
5. Able to know how to handle Files and exceptions in Python.

**Week 1:**

- A) Write python program to print HelloWorld.
- B) Write a python program to get string,int,float input from user.
- C) Write a python program to add 2 numbers.

**Week 2:**

- A) Create a list and perform the following methods  
1)insert() 2)remove() 3)append() 4)len() 5)pop() 6) clear()
- B) Write a python program to find the length of list.
- C) Write a python program to find the smallest and largest number in the list.

**Week 3:**

- A) Create a tuple and perform the following methods  
1) Add items 2) len() 3)check for item in tuple 4)Access items
- B) Write a python program using the following methods:1)count2)index
- C) Write a python program using "+" and "\*" operations which resulting a new tuple.

**Week 4:**

- A) Create a dictionary and apply the following methods  
1) Print the dictionary items 2)access items 3)use get() 4)change values 5)use len()
- B) Write a python code to convert list of tuples into dictionaries.
- C) Write python program to store data in list, tuple, set, dictionary and then try to print them.

**Week 5:**

- A) Write a python program to perform arithmetic, assignment, logical and comparison operators.
- B) Write a Python program to add two positive integers without using the '+' operator. (use bitwise operator)
- C) Write a Python program to perform the basic four operators(+,-,\*,/).

**Week 6:**

- A) Write a simple python program to declare a variable in different possible ways.

- B) Write a python program to show precedence of operators using the expression:  
 $z=(v+w)*x/y$
- C) Write a python program to check whether the values of a list exist or not (use membership operator) and also perform identity operation.

**Week 7:**

- A) Write a python program to print a number is positive/negative using if-else.  
B) Write a python program to find largest number among three numbers.  
C) Write a python Program to read a number and display corresponding day using if-elif-else.  
D) Write a python program to print list of numbers using range and for loop.

**Week 8:**

- A) Write a python code to print the sum of natural numbers using while loop.  
B) Write a python program to print the factorial of given number.  
C) Write a python program to find the sum of all numbers stored in a list using for loop.

**Week 9:**

- A) Using a numpy module create an array and check the following:  
1. Type of array    2. Axes of array    3. Shape of array    4. Type of elements in array  
B) Using a numpy module create array and check the following:  
1. List with type float    2. 3\*4 array with all zeros    3. From tuple    4. Random values

**Week10:**

- A) Write python program in which a function is defined and calling that function prints Hello World.  
B) Write python program in which a function (with single string parameter) is defined and calling that function prints the string parameters given to function.  
C) Write a python program using with any one of python function argument.

**Week11:**

- A) Write a program to double a given number and add two numbers using lambda().  
B) Write a program for filter() to filter only even numbers from a given list.  
C) Write a program for map() function to double all the items in the list?  
D) Write a program to find sum of the numbers for the elements of the list by using reduce().

**Week12:**

- A) Write a python program to open and write "hello world" into a file.  
B) Write a python program to write the content "hi python programming" for the existing file.  
C) Write a python program to read the content of a file.

**Week 13:**

- A) Write a python program to append data to an existing file and then displaying the entire file.  
B) Write a python program to open a new file, add some data into it and display the contents of that file.

**Week 14:**

- A) Write a python program to handle the Zero Divison Error exception.
- B) Write a python program to demonstrate multiple except block with a single try block.

**TEXT BOOKS:**

1. R.NageswaraRao,“Core Python Programming”,dream tech.
2. Allen B. Downey,“Think Python: How to Think Like a Computer Scientist”,Second Edition,Updated for Python3,Shroff /O’ Reilly Publishers,2016.

**COURSE OUTCOMES:**

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

1. Evaluate Problem solving and programming capability.
2. Describe the Numbers, Math functions, Strings, List, Tuples and Dictionaries in Python.
3. Implement conditional and loop for python programs.
4. Express different Decision Making statements, Arrays and Functions.
5. Understand and summarize different File handling operations and exceptions.

**MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY****I Year B. TECH - II- SEM****L/T/P/C****-/-/2/1****(R22A0083) ENGINEERING AND COMPUTING HARDWARE WORKSHOP**

**It is consisting of 2 parts:   Part I: Computing Hardware Workshop**  
**Part II: Engineering Workshop**

**COURSE OBJECTIVES:**

- Understand the internal structure of computer system and learn to diagnose minor problems with the computer functioning.
- Know the proper usage and threats of the World Wide Web & Study in detail about the various features of Ms-Word, Excel, PowerPoint and Google Forms
- To obtain the knowledge about Electrical wiring and Soldering – Desoldering procedures.
- To provide hands on experience in usage of different engineering materials, tools equipments and processes which are common in the engineering field.
- To develop professional attitude, team work, precision and safety practices at work place.

**Part I: COMPUTING HARDWARE WORKSHOP****Task- 1: PC HARDWARE**

Identification of the peripherals of a computer, components in a CPU and its functions. Block diagram of the CPU along with the configuration of each peripheral. Functions of Motherboard. Assembling and Disassembling of PC. Installation of OS. Basic Linux commands.

**Task- 2: TROUBLESHOOTING**

Hardware Troubleshooting: Students are to be given a PC which does not boot due to proper assembly or defective peripherals and the students should be taught to identify and correct the problem.

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.

**Task 3: INTERNET**

Web Browsers, Access of websites, Surfing the Web, Search Engines, Customization of web browsers, proxy settings, bookmarks, search toolbars, pop-up blockers. Antivirus downloads, Protection from various threats.

**MS OFFICE****Task 4: MICROSOFT WORD**

Overview of MS word features. Usage of Hyperlink, Symbols, Spell Check, Track Changes. Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art,

Formatting Images, Textboxes, Paragraphs and Mail Merge in word. Using Word to create Project Certificate, Project Abstract, News Letter, Resume.

#### **Task 5: MICROSOFT EXCEL**

Overview of Excel Features Excel formulae & Functions, conditional formatting, Charts, Hyper linking, Renaming and Inserting worksheets, Data Analysis functions.

Creating a Scheduler (Features: - Gridlines, Format Cells, Summation, auto fill, Formatting)

Calculating GPA (Features: - Cell Referencing, Formulae and functions in excel)

#### **Task 6: MICROSOFT POWER POINT**

Overview of PowerPoint features, Insertion of images, slide transition, Custom animation, Hyperlinks.

#### **Task 7: GOOGLE FORMS**

Google forms introduction, opening Google forms, editing forms, add questions, copy duplicate questions, delete questions, required questions, more button, form color and themes, preview form, advance form settings, send form, view responses, close form

### **PART II: ENGINEERING WORKSHOP**

#### **B. List of Experiments:**

1. Residential house wiring using switches, fuse, indicator, lamp and energy meter.
  2. Fluorescent lampwiring
  3. Stair casewiring
  4. Soldering and Desoldering practice – components, devices and circuits using general
2. Purpose PCB.

**Note:** Minimum ONE experiment need to be conducted in each trade

#### **B. TRADES FOR EXERCISES:**

At least two exercises from each trade:

#### **4. Carpentry:**

To prepare T-Lap Joint, Dovetail Joint.

To prepare Mortise & Tenon Joint.

#### **5. Fitting:**

To prepare V-Fit, Dovetail Fit & Semi-circular fit.

#### **6. Tin-Smithy:**

To make Square Tin, Rectangular Tray & Conical Funnel.

**Note:** Minimum ONE experiment need to be conducted in each trade

**Trades to demonstrate:**

1. Plumbing
2. Foundry
3. Welding
4. Black smithy
5. Metal cutting (Water Plasma)

Note: Minimum a total of 3 trades to be demonstrated.

**TEXT BOOKS – IT WORKSHOP**

1. Introduction to Information Technology, IITL Education Solutions limited, Pearson Education
2. Excel Functions and Formulae, Bernd held, Theodor Richardson, Third Edition

**TEXT BOOKS – ENGINEERING WORKSHOP**

1. Workshop Manual, P. Kannaiah and K. L. Narayana, 3rd Edition, Scitech, 2015
2. Printed Circuit Boards - Design, Fabrication, Assembly and Testing, R. S. Khandpur, Tata McGraw-Hill Education, 2005.

**COURSE OUTCOMES:**

- Ability to identify, assemble and troubleshoot the major components of a computer and perform the installation of Operating System.
- Capacity to make effective usage of the internet for academics and develop professional documents, spreadsheets and presentations.
- Students will be able to understand the domestic, illumination, stair-case wiring procedures and soldering de soldering practice
- The student will have hands-on experience on manufacturing of components using different trades of engineering processes
- The student will be able to perform in a team, adhering to industrial safety practices and follow professional working standards.

**MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY****I Year B. TECH - II- SEM****L/T/P/C****-/-/2/1****(R22A0081) ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB**

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

**OBJECTIVES:**

1. To facilitate computer-aided multi-media instruction enabling individualized and independent language learning
2. To sensitize the students to the nuances of English speech sounds, word accent, intonation and rhythm
3. To bring about a consistent accent and intelligibility in their pronunciation, ample speaking opportunities are provided.
4. To improve the fluency in spoken English and neutralize mother tongue influence
5. To train students to use language appropriately for interviews, group discussions and public speaking

English Language and Communication Skills Labs two parts:

A.Computer Assisted Language Learning (CALL) Lab

B.Interactive Communication Skills (ICS) Lab

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

**UNIT –I**

CALL Lab: Introduction to Phonetics –Speech Sounds –Vowels and Consonants- Transcriptions

ICS Lab: Ice-Breaking activity - JAM session

**UNIT –II**

CALL Lab: Pronunciation: Past Tense Markers and Plural Markers

ICS Lab: Situational Dialogues/Role Plays--Greetings - Taking Leave – Introducing Oneself and Others - Requests and Seeking Permissions

**UNIT–III**

CALL Lab: Syllable and Syllabification

ICS Lab: Communication at Workplace- Situational Dialogues/Role Plays – Seeking Clarifications – Asking for and Giving Directions – Thanking and Responding – Agreeing and Disagreeing – Seeking and Giving Advice

**UNIT –IV**

CALL Lab: Word Stress and Intonation

ICS Lab: Information transfer – from visual to verbal - maps, charts, tables and graphs

**UNIT –V**

CALL Lab: Errors in Pronunciation- Accent - the Influence of Mother Tongue (MTI)

ICS Lab: Making a Short Speech - Extempore

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

The Computer aided Language Lab for 60 students with 60 systems, one master console, LAN facility and English language software for self-study by learners.

**System Requirement (Hardware component):**

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

- i) P–IV Processor
  - a) Speed –2.8 GHZ
  - b) RAM –512 MB Minimum
  - c) HardDisk –80 GB

- ii) Headphones of High quality

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

A Spacious room with movable chairs and audio-visual aids with a Public Address System, a T. V., a digital stereo –audio & video system and camcorder etc.

**DISTRIBUTION AND WEIGHTAGE OF MARKS****English Language Laboratory Practical Examination:**

1. The practical examinations for the English Language Laboratory shall be conducted as per the University norms prescribed for the core engineering practical sessions.
2. For the Language lab sessions, there shall be a continuous evaluation during the year for 30 marks and 70 year-end Examination marks. Of the 30 marks, 20 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The year-end Examination shall be conducted by the teacher concerned with the help of another member of the staff of the same department of the other institution.

**OUTCOMES:**

1. Learning with precision through computer-assisted individualized and independent language learning to work independently in engineering set up.
2. Improved conversational reception and articulation techniques in the course of repetitive instruction thereby gaining confidence both in institutional and professional environment.

3. Accuracy in pronunciation and restoring Standard English thereby crafting better command in English language so that the students have a cutting edge over others in society.
4. Imbibing appropriate use of language in situations to work as an individual and as a leader in diverse teams
5. Equip themselves with the pre-requisites, and relevant techniques to effectively attend corporate interviews

**MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY****I Year B. TECH - II- SEM****L/T/P/C****-/-/3/1.5****(R22A0281)PRINCIPLES OF ELECTRICAL AND ELECTRONICS ENGINEERING LAB****COURSE OBJECTIVES:**

1. To design an electrical systems.
2. To analyze a given network by applying various circuit laws and network theorems.
3. To expose the students to the operation of DC machine and transformer.
4. To exhibit the students to the operation of PN junction diode and Zener diode.
5. To expose the students to the operation of Rectifier.

**Among the following experiments any 10 are to be conducted**

1. Verification of KVL and KCL.
2. Verification of Thevenin's theorem.
3. Verification of Norton's theorem.
4. Verification of Super position theorem.
5. Magnetization characteristics of DC shunt generator.
6. Speed control of DC shunt motor using armature control method.
7. Speed control of DC shunt motor using flux control method
8. Load test on single phase transformer.
9. PN Junction diode characteristics.
10. Zener diode characteristics.
11. Half wave rectifier.
12. Full wave rectifier.

**COURSE OUTCOMES:****At the end of the course, students would be able to**

1. Explain the concept of circuit laws and network theorems and apply them to laboratory measurements.
2. Be able to systematically obtain the equations that characterize the performance of an electric circuit as well as solving them.
3. Perform the required tests on transformers and DC motors.
4. Plot the characteristics of Zener diodes.
5. Determine the working of rectifiers in detail.

**MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY****I Year B. TECH - II- SEM****L/T/P/C****1/-/ - / 1****(R20A0003) HUMAN VALUES AND PROFESSIONAL ETHICS****COURSE OBJECTIVES:**

This introductory course input is intended:

1. To help the students appreciate the essential complementarity between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
2. To facilitate the development of a holistic perspective among students towards life, profession and happiness, based on a correct understanding of the Human reality and the rest of Existence. Such a holistic perspective forms the basis of value based living in a natural way.
3. To highlight plausible implications of such a holistic understanding in terms of ethical human conduct, trustful and mutually satisfying human behavior and mutually enriching interaction with Nature.

**UNIT - I:**

**Course Introduction** - Need, Basic Guidelines, Content and Process for Value Education: Understanding the need, basic guidelines, content and process for Value Education. Self-Exploration - what is it? - its content and process; 'Natural Acceptance' and Experiential Validation - as the mechanism for self-exploration. Continuous Happiness and Prosperity A look at basic Human Aspirations- Right understanding, Relationship and Physical Facilities- the basic requirements for fulfillment of aspirations of every human being with their correct priority. Understanding Happiness and Prosperity correctly - A critical appraisal of the current scenario. Method to fulfill the above human aspirations: understanding and living in harmony at various levels.

**UNIT - II:**

Understanding Harmony in the Human Being - Harmony in Myself! : Understanding human being as a co-existence of the sentient 'I' and the material 'Body'.

Understanding the needs of Self ('I') and 'Body' - Sukh and Suvidha. Understanding the Body as an instrument of 'I' ( I being the doer, seer and enjoyer).

Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal of Physical needs, meaning of Prosperity in detail. Programs to ensure Sanyam and Swasthya.

**UNIT - III:**

Understanding Harmony in the Family and Society - Harmony in Human - Human Relationship: Understanding harmony in the Family the basic unit of human interaction. Understanding values in human - human relationship; meaning of Nyaya and program for its fulfillment to

ensure Ubhay-tripti; Trust (Vishwas) and Respect ( Samman) as the foundational values of relationship.

Understanding the meaning of Vishwas; Difference between intention and competence. Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values in relationship.

Understanding the harmony in the society (society being an extension of family): Samadhan, Samridhi, Abhay, Sah-astiva as comprehensive Human Goals. Visualizing a universal harmonious order in society - Undivided Society ( Akhand Samaj), Universal Order (Sarvabhaum Vyawastha) - from family to world family!

#### **UNIT - IV:**

Understanding Harmony in the nature and Existence - Whole existence as Coexistence: Understanding the harmony in the Nature. Interconnectedness and mutual fulfillment among the four orders of nature - recyclability and self-regulation in nature.

Understanding Existence as Co-existence (Sah-astitva) of mutually interacting units in all-pervasive space. Holistic perception of harmony at all levels of existence.

#### **UNIT - V:**

**Implications of the above Holistic Understanding of Harmony on Professional Ethics:** Natural acceptance of human values, Definitiveness of Ethical Human Conduct, Basic for Humanistic Education, Humanistic Constitution and Humanistic Universal Order. Competence in professional ethics:

- a. Ability to utilize the professional competence for augmenting universal human order.
- b. Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems.
- c. Ability to identify and develop appropriate technologies and management patterns for above production systems.

#### **TEXT BOOKS:**

1. R. R. Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course in Human Values and Professional Ethics.
2. Prof. K. V. Subba Raju, 2013, Success Secrets for Engineering Students, Smart Student Publications, 3rd Edition.

#### **REFERENCE BOOKS:**

1. Ivan Illich, 1974, Energy & Equity, The Trinity Press, Worcester, and HarperCollins, USA
2. E. F. Schumaner, 1973, Small is Beautiful: a study of economics as if people mattered. Blond & Briggs, Britain.
3. A Nagraj, 1998 Jeevan Vidya ek Parichay, Divya Path Sansthan, Amarkantak.
4. Sussan George, 1976, How the Other Half Dies, Penguin Press, Reprinted 1986, 1991.

5. P. L. Dhar, R. R. Gaur, 1990, Science and Humanism, Commonwealth Publishers.  
A. N. Tripathy, 2003, Human Values, New Age International Publishers.
6. Subhas Palekar, 2000, How to practice Natural Farming, Pracheen(Vaidik) Krishi Tantra Shodh, Amravati.
7. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, Limits to Growth - Club of Rome's report, Universe Books.
8. E G Seebauer & Robert L.Berry, 2000, Fundamentals of Ethics for Scientists & Engineers, Oxford University Press.
9. M Govindrajan, S Natrajan & V. S Senthil kumar, Engineering Ethics ( including Humna Values), Eastern Economy Edition, Prentice Hall of India Ltd.

**Relevant CDs, Movies, Documentaries & Other Literature:**

1. Value Education website, <http://www.uptu.ac.in>
2. Story of Stuff, <http://www.storyofstuff.com>
3. Al Gore, An Inconvenient Truth, Paramount Classics, USA
4. Charle Chaplin, Modern Times, United Artists, USA
5. IIT Delhi, Modern Technology - the Untold Story

**COURSE OUTCOMES:**

1. The students will be able to obtain happiness and prosperity in their life.
2. They will develop harmony at all levels.
3. They can have satisfying human behavior throughout their life

**MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY****I Year B. TECH - II- SEM****L/T/P/C****1/-/-/1****(R22A0004) ENVIRONMENTAL SCIENCE****COURSE OBJECTIVES:** On successful completion of this course, students will be able:

1. CO1: To distinguish the inter relationship between living organism and environment.
2. CO2: To categorize various types of natural resources available on the earth surface.
3. CO3: To detect the causes, and control measures of various types of environmental pollution.
4. CO4: To articulate the issues related to solid waste and its management.
5. CO5: To explain and understand the importance of Sustainable development.

**COURSE OUTCOMES:**

The basic concepts included in this course will help the student to:

1. CO1: Differentiate between various biotic and abiotic components of ecosystem.
2. CO2: Describe the various types of natural resources.
3. CO3: Examine the problems associated with waste management.
4. CO4: Evaluate the causes, and apply control measures of various types of environmental pollutions.
5. CO5: Develop technologies on the basis of ecological principles on environment which in turn helps in sustainable development.

**UNIT-I ECOSYSTEMS (6 hours)**

Definition, Scope and Importance of Ecosystem; Structure of an Ecosystem - abiotic and biotic component; Functions of an ecosystem- food chains, food webs and ecological pyramids.

**Activities:** Case studies, poster making, Essays on biotic components.**UNIT-II NATURAL RESOURCES (6hours)**

Classification of Resources: Definition of natural resource - renewable and non-renewable resources. Forest resources - functions and uses of forests, Deforestation - causes and consequences. Water resources – Dams - benefits and environmental problems over dams. Renewable resources - solar energy (solar cells), hydro power, biogas and bio-fuel.

**Activities:** Case studies, seminars, Group Project works, to prepare rain water harvesting models, to demonstrate the generation of electricity with the utilization of non-conventional energy resources.**UNIT-III ENVIRONMENTAL POLLUTION AND TECHNIQUES (6 hours)**

Definition, Types of pollution- Air pollution- causes, effects, control measures of air pollution and prevention techniques. Water pollution- causes, effects, control measures and techniques.

**Activities:** Work sheets, Debate, seminars, surrounding case studies.

**UNIT-IV SOLID WASTE MANAGEMENT (5 hours)**

Definition of Solid waste, characteristics of solid waste; Solid waste management- collection, transportation, processing treatment and disposal methods; e-waste management; 3R techniques- reduce, reuse and recycle.

**Activities:** Quiz, Puzzles, Seminars, Case studies.

**UNIT-V SUSTAINABLE DEVELOPMENT (4 hours)**

Definition of sustainable development, sustainable development goals, threats to sustainability, strategies to achieve sustainable development.

**Activities:** Worksheets, seminars, slogans, group projects.

**TEXT BOOKS**

1. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission
2. Environmental Studies by R. Rajagopalan, Oxford University Press.
3. Textbook of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications
4. Dr. P. D Sharma, "Ecology and Environment", Rastogi Publications, New Delhi, 12 Edition, 2015

**REFERENCE BOOKS**

1. Environmental Studies by Anubha Kaushik, 4 Edition, New age international publishers
2. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL Learning Pvt. Ltd, New Delhi
3. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela. 2008 PHL Learning Pvt. Ltd, New Delhi
4. Environmental Science by Daniel B. Botkin & Edward A. Keller, Wiley INDIA edition