MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
B TECH MECHANICAL ENGINEERING
COURSE STRUCTURE

Applicable from AY 2022-23 Batch

I YEAR 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 Software & Hardware Tools Lab	-	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
		Total	**16**	**2**	**8**	**20**	**360**	**540**

I YEAR 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	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	Python Programming Lab	-	0	3	1.5	40	60
9	R22A0004	Environmental Science	1	0	0	0	40	60
		Total	**15**	**1**	**11**	**20**	**360**	**540**

II YEAR I SEMESTER

S.No	Subject Code	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R22A0302	Engineering Mechanics	3	0	0	4	40	60
2	R22A0303	Engineering Thermodynamics	3	0	0	3	40	60
3	R22A0304	Fluid Mechanics & Hydraulic Machines	3	0	0	3	40	60
4	R22A0305	Materials Engineering	2	1	0	3	40	60
5	R22A0306	Kinematics of Machinery	3	0	0	3	40	60
6	R22A0307	Computer Aided Machine Drawing	2	0	2	2	40	60
7	R22A0381	Fluid Mechanics & Hydraulic Machines Lab	-	0	2	1	40	60
8	R22A0382	Materials Engineering lab	-	0	2	1	40	60
9	*R22A0006	Foreign Language: German	2	0	0	0	100	-
		Total	**18**	**1**	**6**	**20**	**420**	**480**

*Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree

II YEAR II SEMESTER

S.No	Subject Code	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R22A0308	Thermal Engineering - I	3	0	0	3	40	60
2	R22A0309	Strength of Materials	3	0	0	3	40	60
3	R22A0310	Dynamics of Machinery	3	0	0	3	40	60
4	R22A0311	Manufacturing Processes	3	0	2	3	40	60
5	R22A0026	Probability and Statistics	3	1	0	4	40	60
6	R22A0383	Manufacturing Processes Lab	0	0	2	1	40	60
7	R22A0384	Strength of Materials Lab	-	0	2	1	40	60
8	R22A0391	Industry Oriented Project	-	0	4	2	40	60
9	*R22A0061	Public Policy & Governance	2	0	0	0	100	-
		Total	**17**	**1**	**10**	**20**	**420**	**480**

*Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree

III Year B. Tech – I Semester

S.No	Subject Code	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R22A0312	Metrology & Machine Tools	3	0	0	3	40	60
2	R22A0313	Thermal Engineering - II	3	0	0	4	40	60
3	R22A0314	Design of Machine Elements	3	1	0	3	40	60
4	R22AXXXX	**Open Elective-I**	3	0	0	3	40	60
5	R22A0315 R22A0xxx R22A0316 R22A0xxx	**Professional Elective-I** Design of Hydraulic and Pneumatic Systems Microprocessors in Automation Composite Materials Fundamentals of Cyber Security	3	0	0	3	40	60
6	R22A0385	Metrology & Machine Tools Lab	-	0	2	1	40	60
7	R22A0386	Thermal Engineering Lab.	-	0	2	1	40	60
8	R22A0392	Application Development-I	0	0	4	2	40	60
		Total	**15**	**1**	**8**	**20**	**320**	**480**

*Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree

Open Elective-I

S.No	Subject Code	SUBJECT
1	R22A0551	Java Programming
2	R22A1251	Web Development
3	R22A3151	Intellectual Property Right
4	R22A0351	Robotics & Automation
5	R22A0451	Electronics for Health Care
6	R22A6751	Principles of Data Science
7	R22A0251	Renewable Energy Sources
8	R22A0063	Business Analytics

III Year B. Tech – II Semester

S.No	Subject Code	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R22A0317	Heat Transfer	3	1	0	4	40	60
2	R22AXXXX	Artificial Intelligence & Machine Learning	3	0	0	3	40	60
3	R22A0318	Machine Design	3	0	0	3	40	60
4	R22AXXXX	Open Elective -II	3	0	0	3	40	60
5	R22A0319 R22A0320 R22A0321 R22A0322	**Professional Elective-II** Automobile Engineering Industrial Robotics Mechanical Vibrations Unconventional Machining Processes	3	0	0	3	40	60
6	R22A0387	Heat Transfer Lab	-	0	2	1	40	60
7	R22A0388	Artificial Intelligence & Machine Learning Lab	-	0	2	1	40	60
8	R22A0393	Application Development-II	0	0	4	2	40	60
		Total	**15**	**1**	**8**	**20**	**320**	**480**

*Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree

Open Elective-II

S.No	Subject Code	SUBJECT
1	R22A66XX	Database Systems
2	R22A6753	Big data Architecture
3	R22A0352	Design Thinking
4	R22A0552	Principles of Cloud Computing
5	R22A6951	IOT & its Application
6	R22A2152	Nano Technology
7	R22A0252	Electrical & Hybrid Vehicles
8	R22A6251	Cyber Governance

IV Year B. Tech – I Semester

S.No	Subject Code	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R22A0323	CAD/CAM	3	0	2	3	40	60
2	R22A0324	Mechanical Measurements & Instrumentation	3	0	0	3	40	60
3	R22A0325	Finite Element Analysis	3	1	0	4	40	60
4	R22A0326 R22A0327 R22A0328 R22A0329	**Professional Elective-III** Refrigeration & Air Conditioning Operations Research Tribology Industrial Engineering	3	0	0	3	40	60
5	R22A0330 R22A0331 R22A0332 R22A0333	**Professional Elective-IV** Production and Operations Management Maintenance and Safety Engineering Automation and Control Engineering Computational Fluid Dynamics	3	0	0	3	40	60
6	R22A0389	Mechanical Measurements & Instrumentation Lab	-	0	2	1	40	60
7	R22A0394	Project Phase-I	-	0	6	3	40	60
		Total	**15**	**1**	**10**	**20**	**280**	**420**

IV Year B. Tech – II Semester

S.No	Subject Code	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R22A03XX	Innovation, Start-Up & Entrepreneurship	4	0	0	4	40	60
2	R22A0334 R22A0335 R22A0336 R22A0337	**Professional Elective-V** Production Planning & control Bio-Mass Engineering Mechatronics Energy conservation and Management	3	0	0	3	40	60
3	R22A0338 R22A0339 R22A0340 R22A0341	**Professional Elective-VI** Turbo Machinery Additive Manufacturing Power Plant Engineering Total Quality Management	3	0	0	3	40	60
4	R22A0395	Project Phase-II	0	0	20	10	80	120
		Total	**10**	**0**	**20**	**20**	**200**	**300**

MALLA REDDY COLLEGE OF ENGINEERING & 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 communicativecompetence.
2. To equip the students to study the academic subjects with better perspective throughtheoretical 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 asgroup 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 andgrasp 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 therequired 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 -ReadingExercise 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 Heasly. 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 apotential 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 passiveskills
5. Represent old conventions with a set of the new by professional verbal communicativeability.

MALLA REDDY COLLEGE OF ENGINEERING & 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 andsolving the system of linear equations.
- The concept of Eigen values, Eigen vectors and Diagonolisation.
- 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,Taylors 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}, sinax, cosax, 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 andEigen 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 & 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 curvebased 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 materialtechnology.

TEXT BOOKS:

1. Engineering Physics by Kshirsagar&Avadhanulu, S. Chand publications.
2. Modern Engineering Physics-Dr K Vijaya Kumar & Dr S Chandralingam, S. ChandPublications.
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 2nd 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 & TECHNOLOGY

I Year B. TECH - I- SEM **L/T/P/C**
3/0/0/3

(R22A0022) ENGINEERING CHEMISTRY

COURSE OBJECTIVES: The students will be able to

1. Acquire the knowledge of electrochemistry and batteries which are essential for theengineers 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 variousengineering fields.
4. Gain knowledge on wide variety of advanced materials like nano and smart materials whichhave 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_2-O_2 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; Disinfectation 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, NewDelhi. 16thEdition.
2. Engineering Chemistry by Prasanta Rath, B. Rama Devi, C. H. Venkata RamanaReddy, 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, NewDelhi.
2. Engineering Chemistry, by S. S. Dara, S. Chand & Company Ltd, NewDelhi.
3. P.W. Atkins, J.D. Paula, “Physical Chemistry”, Oxford, 8thedition (2006).
4. B.R. Puri, L.R. Sharma and M.S. Pathania, “Principles of Physical Chemistry”, S. Nagin Chand & Company Ltd., 46thedition (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 materialsfor futuristic engineering applications.
4. Apply the knowledge of nanotechnology and smart materials to find solutions for various engineering problems.

   Familiarize with the fundamentals of water treatment technologies and the considerationsfor its design and implementation in water treatment plants.

MALLA REDDY COLLEGE OF ENGINEERING & 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 ofIndia.
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 & TECHNOLOGY

I Year B. TECH - I- SEM **L/T/P/C**

-/-/3/1.5

(R22A0082) Applied Physics/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 Fe^{2+} by Potentiometric titration using $KMnO_4$.

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 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 & TECHNOLOGY

I Year B. TECH - I- SEM **L/T/P/C**

-/-/2/1

(R22A0083) Engineering and Software & Hardware Tools Lab

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, ITL 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 & 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 inC likeoperators, control statements etc.
4. To develop modular, reusable and readable C Programs using the concepts likefunctions,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 operandvalues from standard input.
b. Write a simple program that converts one given data type to another using autoconversion andcasting. 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, wheremark <40%= Failed, 40% to <60% = Second class, 60% to <70%=First class, >= 70% = Distinction.Read percentage from standard input.
d. Write a program that prints a multiplication table for a given number and the numberof rows inthe 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 fromthe top of the building. Find the time taken by the ball to reach each floor. (Use the formula s = ut+(1/2)at^2 where u and a are the initial velocity in m/sec (= 0) and acceleration in m/sec^2 (= 9.8 m/s^2)).
b. Write a C program, which takes two integer operands and one operator from the user,performs the operation and then prints the result. (Consider the operators +,-,*, /, %

and use Switch Statement).

c. Write a 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 givennumberis palindrome.

e. A Fibonacci sequence is defined as follows: the first and second terms in the sequenceare 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Writea 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 thevalues usingthe 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 (Spelledsame in bothdirections 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‘tcontain 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 abook.

b. Write a C program to create a structure named student and display the details of 5students 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. Thefile nameand 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 filefollowedby 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 betweenfinding the smallest, largest, sum, or average. The menu and all the choices areto be functions. Use a switch statement to determine what action to take. Display an error message if an invalidchoice is entered.
b. Write a C program to construct a pyramid of numbers as follows:

```
1          *          1
1          * *        2 2

2
1          * * *      3 3 3

2

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,(3rd 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 & TECHNOLOGY

I Year B. TECH - I- SEM **L/T/P/C**
2/-/ - / -

(R22A0003) HUMAN VALUES AND PROFESSIONAL ETHICS

COURSE OBJECTIVES:

This introductory course input is intended:

1. To help the students appreciate the essential complementarily 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-Explorjation - 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. Schumancher, 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 & 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 Heasly. 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 & 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 $1/3^{rd}$ and Simpson's $3/8^{th}$ 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 & 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 Characterstics, 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 parametersand 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 & TECHNOLOGY

I Year B. TECH - II- SEM **L/T/P/C**

2/-/33

(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 thesame
3 To know the planes and solid Projection
4 To gain the capability of designing 3D objects with isometric principles by usingComputer aided sketches
5 To know the conversion of Orthographic Views to isometric Views and isometric toOrthographic 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 ofthose objects.
5. To understand and visualize the 3-D view of engineering objects. Elaborate the conversionsof 2D -3D and Vice-Versa.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

I Year B. TECH - II- SEM **L/T/P/C**
-/-/2/1

(R22A0502) 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" 2nd 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 & 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: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 o leader in diverse teams
5. Equip themselves with the pre-requisites, and relevant techniques to effectively attend corporate interviews

MALLA REDDY COLLEGE OF ENGINEERING & 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

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

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

I Year B. TECH - II- SEM **L/T/P/C**

-/-/3/1.5

(R22A0582) 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 iems

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 & 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: **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 & TECHNOLOGY

II Year B. TECH - I- SEM **L/T/P/C**

3/-/-/4

(R22A0302) ENGINEERING MECHANICS

COURSE OBJECTIVES:

1. To understand the resolution of a system of forces, compute their resultant and solve problems using equations of equilibrium.
2. Perform analysis of bodies lying on rough surfaces. To understand the concept of analysis of trusses using method of joints and method of sections.
3. Locate the centroid of a simple figure and composite figures.
4. Locate the centroid of a body and compute the area moment of inertia and massmoment of inertia of standard and composite sections.
5. To understand kinetics and kinematics of particles motion of rigid bodies.

UNIT I

Resultants of Force System: Introduction, Parallelogram law –Forces and components- Resultant of coplanar Concurrent Forces Moment of Force-problems.

Equilibrium of Force Systems: Free Body Diagrams, Equations of Equilibrium - Equilibrium of planar Systems

UNIT II

Friction: Introduction – Theory of Friction – Angle of friction - Laws of Friction – Static and Dynamic Frictions

Analysis of Pin-Jointed Plane Frames: Determination of Forces in members of plane, pin jointed, perfect trusses by (i) method of joints and (ii) method of sections. Analysis of various types of cantilever & simply–supported trusses-by method of joints, method of sections

UNIT III

Centroids and Centers of Gravity: Introduction – Centroids and Centre of gravity of simple figures (from basic principles) – Centroids of Composite Figures - Theorem of Pappus – Center of gravity of bodies and centroids of volumes.

UNIT IV

Moments of Inertia: Definition – Polar Moment of Inertia –Radius of gyration - Transfer formula for moment of inertia - Moments of Inertia for Composite areas.

Mass Moment of Inertia: Moment of Inertia of Masses - Transfer Formula for Mass Moments of Inertia – Mass moment of inertia of composite bodies.

UNIT V

Kinematics of a Particle: Motion of a particle- Rectangular motion-motion curves-Rectangular components of curvilinear motion.

Kinetics of Particles: D'Alemberts Principle for plane motion and connected bodies.

TEXT BOOKS:

1. Engineering Mechanics/ S. Timoshenko and D.H. Young, Mc Graw Hill Book Company.
2. Engineering Mechanics - Statics and Dynamics by Vijaya Kumar Reddy K, Suresh Kumar J.BS Publications
3. Engineering Mechanics / S.S. Bhavikati & K.G. Rajasekharappa

REFERENCES:

1. A text of Engineering Mechanics / YVD Rao / K. Govinda Rajulu/ M. Manzoor Hussain, Academic Publishing Company
2. Engg. Mechanics / M.V. Seshagiri Rao & D Rama Durgaiah/ Universities Press
3. Engineering Mechanics, Umesh Regl / Tayal.
4. Engineering Mechanics / KL Kumar / Tata McGraw Hill.
5. Engineering Mechanics / Irving Shames / Prentice Hall

COURSE OUTCOMES:

1. Gain the knowledge on the concepts of force and moment also apply the knowledge on drawing free body diagrams in problem solving.
2. Students able to do analysis of trusses using method of joints and method of sections.
3. Students are capable of finding centroid and Centre of gravity of simple and composite Figures.
4. Students are capable of finding centroid and moment of inertia, mass moment of Inertia of simple and composite figures.
5. Students able to understand the motion of a particle in a straight line and apply concepts of D'Alemberts principle in particle motion.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B. TECH - I- SEM **L/T/P/C**

3/-/-/3

(R22A0303) ENGINEERING THERMODYNAMICS

COURSE OBJECTIVES:

1. To understand the concepts of energy transformation, conversion of heat into work.
2. To acquire knowledge about the fundamentals of thermodynamic laws, the concept of entropy, and principles.
3. To understand how the change of state results in a process.
4. To understand the various gas laws, psychrometric properties and chart.
5. To learn the importance of thermodynamic cycles, and the derivation of efficiency.

UNIT-I

Basics of thermodynamics: System - Types of Systems - Control Volume - Macroscopic and Microscopic viewpoints - Thermodynamic Equilibrium- State, Property, Process, Cycle – Reversibility – Quasi static Process, Irreversible Process, Causes of Irreversibility – Work and Heat, Point and Path functions. Zeroth Law of Thermodynamics– PMM I - Joule's Experiment – First law of Thermodynamics and its Corollaries – First law applied to a Process– Steady Flow Energy Equation.

UNIT-II

Entropy: Limitations of the First Law - Thermal Reservoir - Heat Engine - Heat pump - Parameters of performance - Second Law of Thermodynamics - Kelvin-Planck and Clausius Statements and their Equivalence / Corollaries - PMM of Second kind - Carnot's principle - Carnot cycle and its specialties - Clausius Inequality - Entropy, Principle of Entropy Increase – Energy Equation - Availability and Irreversibility – Thermodynamic Potentials, Gibbs and Helmholtz Functions - Maxwell Relations – Elementary Treatment of the Third Law of Thermodynamics.

UNIT-III

Properties of pure substances: p-V-T- surfaces, T-S and h-s diagrams, Phase Transformations – Triple point at critical state properties during change of phase - Dryness Fraction – Mollier charts – Various Thermodynamic processes and energy Transfer – Steam Calorimetry - Perfect Gas Laws – Equation of State, specific and Universal Gas constants – Various Non-flow processes, properties, end states, Heat and Work Transfer, changes in Internal Energy – Throttling and Free Expansion Processes – Flow processes – Deviations from perfect Gas Model – Vander Waals Equation of State.

UNIT-IV

Mixtures of perfect Gases: Mole Fraction, Mass fraction Gravimetric and volumetric Analysis – Dalton's Law of partial pressure Avogadro's 's law of additive volumes – Mole fraction , Volume fraction and partial pressure - Equivalent Gas constant, Enthalpy, Specific Heats and Entropy of Mixture of perfect Gases- Vapour, and Atmospheric air - Psychrometric Properties – Dry Bulb Temperature, Wet Bulb Temperature, Dew Point Temperature, Thermodynamic Wet Bulb

Temperature, Specific Humidity, Relative Humidity, Saturated Air, Vapour pressure, Degree of saturation – Adiabatic Saturation – Psychrometric chart.

UNI-V

Power Cycles: Otto cycle, Diesel cycle, Dual Combustion cycle and Brayton cycle description and representation on P–V and T-S diagram, Thermal Efficiency, Mean Effective Pressures on Air standard basis – Comparison of Cycles. Basic Rankine cycle – Performance Evaluation.

TEXT BOOKS:

1. Engineering Thermodynamics, Special Edition. MRCET, McGrahill Publishers.
2. Engineering Thermodynamics / PK Nag /TMH, III Edition
3. Thermodynamics – J.P.Holman / McGrawHill

REFERENCE BOOKS:

1. Engineering Thermodynamics – Jones & Dugan
2. Thermodynamics – An Engineering Approach – YunusCengel& Boles /TMH
3. An introduction to Thermodynamics / YVC Rao / New Age
4. Engineering Thermodynamics – K. Ramakrishna / Anuradha Publisher

COURSE OUTCOMES:

1. Analyse the work and heat interactions associated with a prescribed process path and to perform an analysis of a flow system.
2. Quantify the irreversibility associated with each possibility and choose an optimal cycle.
3. Able to analyse Mollier chart, and to find the quality of steam.
4. Able to analyse psychrometric chart, to estimate thermodynamic properties such as WBT, DBT, RH, etc.
5. Analyse the thermodynamic cycles and evaluate performance parameters.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B. TECH - I- SEM **L/T/P/C**

2/1/-/3

(R22A0304) FLUID MECHANICS & HYDRAULIC MACHINES

COURSE OBJECTIVES:

1. To give insight knowledge on fluid statics.
2. To gain knowledge on fluid kinematics and dynamics.
3. To give basic understanding of boundary layer concept and analyze different types of losses and measurement of flow.
4. To become familiar about different types of turbines & able to analyze their performance characteristics of various turbines.
5. To be able to understand the working of power absorbing devices like pumps & able to analyze their performance characteristics.

UNIT-I:

Fluid Statics: Dimensions and units: physical properties of fluids- specific gravity, viscosity, capillarity, surface tension- vapor pressure and their influence on fluid motion- atmospheric gauge and vacuum pressure – measurement of pressure- Piezometer, U-tube and differential manometers.

UNIT-II:

Fluid Kinematics: Stream line, path line and streak lines and stream tube, classification of flows-steady & unsteady, uniform, non-uniform, laminar, turbulent, rotational, and ir-rotational flows-equation of continuity for one dimensional flow.

Fluid Dynamics: Surface and body forces –Euler's and Bernoulli's equations for flow along a stream line, momentum equation and its application on force on pipe bend.

UNIT-III:

Boundary Layer Concept: Definition, thickness, characteristics along thin plate, laminar and turbulent boundary layers (No derivation).

Closed conduit flow: Reynold's experiment- Darcy Weisbach equation- Major and Minor losses - pipes in series and pipes in parallel- total energy line-hydraulic gradient line. Measurement of flow: Pitot tube, Venturi meter and Orifice meter.

UNIT-IV:

Basics of Turbo Machinery: Hydrodynamic force of jets on stationary and moving flat, inclined, and curved vanes.

Hydraulic Turbines: Classification of turbines, impulse and reaction turbines, Pelton wheel turbine, Francis turbine and Kaplan turbine-working proportions, work done, efficiencies. Hydraulic design- draft tube theory- functions and efficiency.

Performance of hydraulic turbines: Geometric similarity, Unit and specific quantities, characteristic curves, cavitation, surge tank, water hammer.

UNIT-V:

Centrifugal Pumps: Classification, working, work done – manometric head and efficiencies specific speed- performance characteristic curves, NPSH.

Reciprocating Pumps: Working, Discharge, slip, indicator diagrams.

TEXT BOOKS:

1. Hydraulics, fluid mechanics and Hydraulic machinery MODI and SETH.
2. Fluid Mechanics and Hydraulic Machines by Rajput.
3. Fluid Mechanics and Machinery by D. Rama Durgaiah, New Age International

REFERENCE BOOKS:

1. Fluid Mechanics and Fluid Power Engineering by D.S. Kumar, Kotaria & Sons.
2. Hydraulic Machines by Banga & Sharma, Khanna Publishers.
3. Instrumentation for Engineering Measurements by James W. Dally, William E. Riley, Wiley & Sons Inc. 2004 (Chapter 12 – Fluid Flow Measurements).

COURSE OUTCOMES:

1. Students will gain the knowledge on fluid mechanics fundamentals like fluid statics.
2. Student will have basic idea on fluid dynamics and kinematics which are used in real working environment.
3. Student will study the fundamental of boundary layer concepts and its applications.
4. Student will understand the principles of turbo machinery and measure the performance of different types of turbines.
5. Student will calculate the performance of different types of pumps.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B. TECH - I- SEM **L/T/P/C**

3/-/-/3

(R22A0305) MATERIALS ENGINEERING

COURSE OBJECTIVES:

1. To understand the basic structure, mechanism of crystallization andimperfections in crystals.
2. To study the importance of binary phase diagrams.
3. To acquire knowledge on properties and structure of ferrous and nonferrous alloys andto select suitable materials for various engineering applications.
4. To learn various methods of heat treatment processes.
5. To gain knowledge on advanced Composite materials.

UNIT I

Structure of Metals: Atoms, atomic models, miller indices -Bonds in Solids – Metallic bond - crystallization of metals, imperfections, grain and grain boundaries, effect of grain boundaries on the properties of metal / alloys – determination of grain size.

Constitution of Alloys: Necessity of alloying, types of solid solutions, Hume Rothers rules, intermediate alloy phases, and electron compounds.

UNIT II

Equilibrium Diagrams

Experimental methods of construction of equilibrium diagrams, Isomorphous alloy systems, equilibrium cooling and heating of alloys, Lever rule, eutectic systems, congruent melting intermediate phases, peritectic reaction.

Transformations in the solid state, allotropy, eutectoid, peritectoid reactions, phase rule, relationship between equilibrium diagrams and properties of alloys. Study of binary phase diagram of Fe-Fe3C.

UNIT III

Cast Iron & Steel: Structure and properties of White Cast iron, Malleable Cast iron, Grey cast iron, Spheroidal graphite cast iron, Alloy cast irons. Classification of steels, structure and properties of plain carbon steels, Low alloy steels, had field manganese steels, tool and die steels.

Nonferrous metals & Alloys: Structure and properties of copper and its alloys, Aluminium and its alloys, Titanium and its alloys.

UNIT IV

Heat treatment of Alloys: Effect of alloying elements on Iron – Iron carbon system, Annealing, normalizing, Hardening, TTT diagrams, tempering, Harden ability, surface - hardening methods, Age hardening

Ceramic Materials: Crystalline ceramics, glasses, cermets.

UNIT V

Composite Materials: Classification of composites, various methods of component manufacture of composites, particle – reinforced materials, fiber reinforced materials, metal ceramic mixtures, metal – matrix composites and Carbon–Carbon composites.

TEXT BOOKS:

1. Kodgire, Material Science and Metallurgy, 42nd edition Everest Publishing House2017.
2. Donald R.Askeland, Essential of Materials Science and Engineering. Thomson Publications2014.
3. V.Raghavan, Material Science and Engineering, Prentice –Hall of India Pvt. Ltd., 2007
4. Sidney H. Avner, Introduction to physical metallurgy, Tata Mc-Graw-Hill, Inc. 1997.

REFERENCES:

1. Sidney H. Avener, Introduction to Physical Metallurgy, TMH
2. William and collister, Materials Science and Engineering, wiley pub. 2014.
3. V. Raghavan, Material scienceand engineering, PH Pub. 2015.
4. R.K.Rajput, Engineering materials and metallurgy. S.Chand & Co. 2006.
5. O.P. Khanna, Material Science and Metallurgy. Dhanpatrai Pub. 2014

COURSE OUTCOMES:

1. Understand the mechanism of crystallization, methods of determining grain size andfactors affecting the solid solubility.
2. Use the phase diagrams of binary systems and iron-carbide diagram to select the material composition.
3. Understand the structure and properties of various cast irons, steels and nonferrousalloys.
4. Apply the various heat treatment processes, TTT diagram, surface hardening methods &coatings depending on material requirements.
5. Understand the importance of ceramics, composites and concepts of metallurgy.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B. TECH - I- SEM **L/T/P/C**

3/-/-/3

(R22A0306) Kinematics of Machinery

Course Objectives:

1. To impart knowledge on various types of links and synthesis and to understand the concept of machines, mechanisms and related terminologies .
2. To understand the Principles and working of various straight line motion mechanisms. To analyze Steering gear mechanisms.
3. Formulate the concept of synthesis and analysis of different mechanisms and working of hooks joint..
4. Distinguish a mechanism for displacement, velocity and acceleration at any point in a moving link this is prerequisite for dynamics of machines.
5. To understand the theory of gears, gear trains and cams.

UNIT-I

Introduction of Mechanisms and Machines:

Mechanisms : Elements or Links , Classification, Rigid Link, flexible and fluid link, Types of kinematic pairs , sliding, turning, rolling, screw and spherical pairs lower and higher pairs, closed and open pairs, constrained motion, completely, partially or successfully constrained and incompletely Constrained .

Machines: Mechanism and machines, classification of machines, kinematic chain inversion of mechanism, inversions of quadric cycle, chain, single and double slider crank chains.

UNIT-II

Straight Line Motion Mechanisms: Exact and approximate copiers and generated types Peaucellier, Hart and Scott Russell Grasshopper Watt T. Chebicheff and Robert Mechanisms and straight line motion, Pantograph.

Steering Gear Mechanisms: Conditions for correct steering Davis Steering gear Mechanism, Ackerman's steering gear mechanism.

UNIT–III

Kinematics: Velocity and acceleration - Motion of link in machine - Determination of Velocity and acceleration diagrams - Graphical method - Application of relative velocity method four bar chain.

Hooke's Joint: Single and double Hook's joint Universal coupling application problems.

UNIT–IV

Cams: Definitions of cam and followers their uses Types of followers and cams Terminology Types of follower motion - Uniform velocity Simple harmonic motion .Maximum velocity and maximum acceleration during outward and return strokes in the above 2 cases.

UNIT–V

Gears: Higher pairs, friction wheels and toothed gears types law of gearing, condition for constant velocity ratio for transmission of motion, Form of teeth: cycloid and involutes profiles. Velocity of sliding phenomena of interferences.

Gear Trains: Introduction - Train value - Types - Simple and reverted wheel train Epicycle gear Train. Methods of finding train value or velocity ratio - Epicycle gear trains. Selection of gear box-Differential gear for an automobile.

TEXT BOOKS:

1. Rattan S.S, "Theory of Machines" Tata McGraw-Hill Publishing Company Ltd., New Delhi, and 2nd edition -2005.
2. Sadhu Singh, "Theory of Machines," Pearson Education (Singapore) Pvt. Ltd., Indian Branch, New Delhi, 2ND Edi. 2006.
3. Theory of machines, (4th Edition), by R.S. Khurmi, S.chand Publications.

REFERENCE BOOKS:

1. Shigley. J. V. and Uickers, J.J., "Theory of Machines & Mechanisms" OXFORD University press.2004
2. "Theory of Machines -I", by A.S.Ravindra, Sudha Publications, Revised 5th Edi. 2004

Course outcomes:

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

1. Build up critical thinking and problem-solving capacity of various mechanical engineering problems related to kinematics of machines.
2. Asses various concepts of mechanisms like straight line motion mechanisms, Steering gear mechanisms and working principles of power elements (Gears, gear trains, Cams, Belt and Chain drives) and design related problems effectively.
3. Utilize analytical, mathematical and graphical aspects of kinematics of Machines for effective design.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B. TECH - I- SEM **L/T/P/C**

2/-/2/2

(R22A0307) COMPUTER AIDED MACHINE DRAWING

COURSE OBJECTIVES:

1. To familiarize with the standard conventions for different materials and machine parts in working drawings.
2. To gain knowledge of conventional representation of various machining and mechanical details as per IS.
3. To gain knowledge of threads, bolts, nuts, stud bolts, tap bolts, set screws, Keys, cottered joints and knuckle joint.
4. To make part drawings including sectional views for various machine elements.
5. To prepare assembly drawings given the details of part drawings.

Part A: Drawing of Machine Elements and simple parts

1. Selection of Views, additional views for the following machine elements and parts with every drawing proportion.
2. Popular forms of Screw threads, bolts, nuts, studbolts, tapbolts, setscrews.
3. Keys, cottered joints and knuckle joint.
4. Rivetted joints for plates
5. Solid Journal Bearing & Couplings

Part B: Assembly Drawings

1. Drawings of assembled views for the part drawings of the following using conventions and easy drawing proportions.
2. Steam engine parts– Stuffing box, Crosshead, Eccentric.
   Machine parts-Screw jack.
3. Petrol engine connecting rod

NOTE:

1. First angle projection to be adopted. The student should be able to provide working drawings of actual parts.
2. Part A need to be done by using AUTOCAD and Part B need to be done by using Creo.

TEXT BOOKS:

1. Machine Drawing –K.L.Narayana, P.Kannaiah&K.VenkataReddy / New Age/ Publishers
2. Machine Drawing with Auto CAD / Goutham Pohit, Goutam Ghosh / Pearson
3. Machine Drawing / N.D. Bhatt / Charotar

REFERENCE BOOKS:

1. Machine Drawing by / Bhattacharyya / Oxford
2. Machine Drawing / Ajeet Singh / Mc Graw Hill
3. Machine Drawing –P.S.Gill.

COURSE OUTCOMES:

1. Preparation of engineering and working drawings with dimensions and bill of material during design and development. Developing assembly drawings using part drawings of machine components.
2. Conventional representation of materials, common machine elements and parts such as screws, nuts, bolts, keys, gears, webs, ribs.
3. Types of sections – selection of section planes and drawing of sections and auxiliary sectional views. Parts not usually sectioned.
4. Methods of dimensioning, general rules for sizes and placement of dimensions for holes, centers, curved and tapered features.
5. Title boxes, their size, location and details - common abbreviations and their liberal usage. Types of drawings – working drawings for machine parts.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B. TECH - I- SEM **L/T/P/C**

-/-/2/1

(R22A0381) Fluid Mechanics & Hydraulic Machines Lab

COURSE OBJECTIVES:

1. To gain knowledge in performance testing of Hydraulic Turbines and Hydraulic Pumps at constant speed and head.
2. To provide practical knowledge in verification of principles of fluid flow.
3. To calculate cd, cc, cv and Coefficient of impact of various hydraulic systems
4. To understand Major and minor losses.
5. Student able to learn about measuring pressure, discharge and velocity of fluid flow.

LIST OF EXPERIMENTS

1. Determination of coefficient of discharge of Orifice meter.
2. Determination of coefficient of discharge of Venturimeter.
3. Determination of friction factor for a given pipe line.
4. Verification of Bernoulli's theorem.
5. Determination of loss of head in a pipeline.
6. Performance Test on Single Stage Centrifugal Pump.
7. Performance Test on Multi Stage Centrifugal Pump.
8. Performance Test on Reciprocating Pump.
9. Performance Test on Pelton Wheel.
10. Performance Test on Francis Turbine.
11. Performance Test on Kaplan Turbine.
12. Determination of Impact of Jet on Vanes

NOTE: Minimum a total of 8 experiments are to be conducted.

COURSE OUTCOMES:

1. To provide the students' knowledge in calculating performance analysis in turbines.
2. Students exposure to study various operating characteristics of Centrifugal pump and Reciprocating pump.
3. Analyze a variety of fluid flow devices and utilize fluid mechanics principles in design.
4. Get Exposure to verification of Bernoulli's Theorem.
5. To provide the students with a solid foundation in fluid flow principles.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B. TECH - I- SEM **L/T/P/C**

-/-/2/1

(R22A0382) MATERIALS ENGINEERING LAB

COURSE OBJECTIVES:

1. Ability to function on multi-disciplinary teams in the area of materials testing.
2. Ability to use the techniques, skills and modern engineering tools necessary for handling ferrous and non – ferrous metals engineering.
3. Understanding of professional and ethical responsibility in the areas of material testing.
4. Ability to communicate effectively the mechanical properties of materials

LIST OF EXPERIMENTS

To prepare the specimen by mounting powder. The
study of Microstructure of Low Carbon Steels.
The study of Microstructure of Medium Carbon SteelsThe
study of Microstructure of High Carbon Steels
The study of Microstructure Cast Irons. (Grey cast Iron & White cast Iron).
The study of Microstructure Non – Ferrous pure metals. (Copper & Aluminum).The
study of Microstructure Non-Ferrous alloys. (Brass & Bronze).
The study of Microstructure Heat treated steels.
To find out the hardenability of steels by Jominy End Quench Test.To
find out the hardness of various treated and untreated steels.
To Study of Microstructure of Composite Material subjected to tensile testingTo
find Tensile Strength of the Composite Material with the help of UTM.

NOTE: Minimum a total of 8 experiments are to be conducted.

COURSE OUTCOMES:

1. To provide the students' knowledge in finding the microstructure of metals and alloys.
2. To know the characteristics of grain structure.
3. Get Exposure metallurgical microscope.
4. To provide students hands on experience to handle the etchants.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B. TECH - I- SEM **L/T/P/C**

2/-/-/-

(*R22A00XX) Foreign Language: German

INTRODUCTION

This is the age of globalization. Faster communication, extensive travel, greater interaction, outsourcing of jobs, demand of skilled person had made the engineering graduates to learn GERMAN language. Nowadays Aircraft and mechanical domain require more and more graduates with minimum knowledge to speak in German language.

German language has been one of the fastest learning language in the world. This course is customized according to the demand of the requirement in job industries.

COURSE OBJECTIVES:

1.To equip with the vocabulary to create new sentences, sentence pattern, correct pronunciation.
2. To make the students an efficient German language speaker.
3. To focus on basic linguistic and communicative structures of the German language.

UNIT 1: Basics of Deutsch

1.1 Introduction – (About German Country, Language & Culture)
1.2 Formal and Informal Greetings
1.3 Alphabet
1.4 Numbers (0-50)
1.5 Days of The Week and Months of The Year
Vocabulary, Exercises and Assignments

UNIT 2: Getting closer with Deutsch

2.1 Family
2.2 Seasons & Weather
2.3 Time & Directions, Days of Weak, Months
2.4 Colours & Shapes, Numbers (51 – 100)
2.5 Subject Pronouns
Vocabulary, Exercises and Assignments

Unit 3: Construction of Simple Sentences

3.1 Formal Introduction
3.2 Asking Questions
3.3 Responding to the Questions
3.4 Simple Sentences

3.5 Articles, Numbers (101 And Above)
Vocabulary, Exercises and Assignments

Unit 4: Dialogue Writing

4.1 Introduce Oneself
4.2 Introduce Others
4.3 At the Restaurant
4.4 At the Railway Station
4.5 At the University
Vocabulary, Exercises and Assignments

REFERENCE BOOKS

1.Collins easy learning GERMAN dictionary
2. Hallo deutsch – Parul sharma
3. Studio D A1 – Hermann
4. So geht das – New Saraswati book house
5. Practice German language for beginners – Dominic
6. German Made easy – Diego Agundez.

COURSE OUTCOMES

After completion of the course, Student will be able to:
1.stand ahead of getting the opportunity in the Job market by learning German language.
2. learn German language with engineering degree that will give them a sense of identity among
the competitive global engineering industry.
3. learn German language on a regular basis that will help them in improving multi-lingual ability

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B. TECH - II- SEM **L/T/P/C**

3/-/-/3

(R22A0308) Thermal Engineering - I

COURSE OBJECTIVES:

1. To have Knowledge in steam power plants and their components, performance and analysis of Steam Turbines, Gas Turbines.
2. To understand Steam nozzles, Steam Condensers and their performances in Industries.
3. The purpose of this course is to enable the student to gain an understanding of how thermodynamic principles govern the behavior of various systems.
4. Evaluate the performance of critical components and accessories steam and gas power plants.
5. To understand the concept of jet propulsion, Rockets and their propellants.

UNIT-I

Basic Concepts: Rankine cycle – Schematic layout, Thermodynamic Analysis, Concept of Mean Temperature of heat addition, Methods to improve cycle performance Regeneration & reheating

Boilers: Classification - Working principles with sketches including H.P. Boilers - Mountings and Accessories - Working principle.

UNIT-II

Steam Nozzles: Function of nozzle - Applications and Types- Flow through nozzles- Thermodynamic analysis.

Steam Condensers: Requirements of steam condensing plant - Classification of condensers - Working principle of different types.

UNIT-III

Steam Turbines: Classification - Impulse turbine; Mechanical details - Velocity diagram - Effect of friction - Power developed, axial thrust, Blade or diagram efficiency - Condition for Maximum efficiency.

Reaction Turbine: Mechanical details - Principle of operation, Thermodynamic analysis of a stage, Degree of reaction - Velocity diagram - Parson's reaction turbine - Condition for Maximum efficiency.

UNIT-IV

Gas Turbines: Simple gas turbine plant - Ideal cycle, essential components - Parameters of Performance - Actual cycle - Regeneration, Inter cooling and Reheating - Closed and Semi - Closed cycles - Merits and Demerits.

Sources of waste heat – Heat recovery for industrial application – Thermal storage principles and applications of hot and cold systems.

UNIT-V

Jet Propulsion: Principle of Operation - Classification of jet propulsive engines – Working Principles with schematic diagrams and representation on T-S diagram- Thrust, Thrust Power and Propulsion Efficiency - Turbo jet engines - Needs and Demands met by Turbo jet -Schematic Diagram, Thermodynamic Cycle, Performance Evaluation Thrust Augmentation - Methods.

Rockets: Application - Working Principle - Classification - Propellant Type - Thrust, Propulsive Efficiency - Specific Impulse - Solid and Liquid propellant Rocket Engines

TEXT BOOKS:

1. Thermal Engineering / Rajput / Lakshmi Publications.
2. Gas Turbines / V. Ganesan / TMH.
3. Thermal Engineering /P.L. Ballaney / Khanna Publishers, NewDelhi.

REFERENCE BOOKS:

1. Gas Turbines and Propulsive Systems / P. Khajuria & S.P. Dubey / Dhanapatrai Pub.
2. Thermal Engineering / R.S. Khurmi & J.K. Gupta / S. Chand Pub.
3. Thermodynamics and Heat Engines / R. Yadav / Central Book Depot

COURSE OUTCOMES:

1. Describe knowledge of Rankine cycle and heat equation in different processes, and improving efficiency techniques.
2. Demonstrate knowledge of ability to identify & apply fundamentals to solve problems involving nozzles and turbines, jet propulsion systems and rockets.
3. Design nozzles, turbines and condensers with desired needs within realistic constraints related thermal fields like different types of power plants etc.
4. Explore their knowledge & ability to design the constructional features of various types of boilers in various fields of energy transfer equipments and to understand the velocity triangles in Steam Turbines & Reaction Turbines
5. Knowledge of impact of engineering solutions on the society and also on contemporary issues related to different types of steam cycles and propulsion systems.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B. TECH - II- SEM **L/T/P/C**

3/-/-/3

(R22A0309) Strength of Materials

Course Objectives:

1. To understand the nature of stresses induced in material under different loads.
2. To plot the variation of shear force and bending moments over the beams under different types of loads.
3. To understand the behaviour of beams subjected to Bending stress and shear stress.
4. To understand the behaviour of deflection of beams under different loads.
5. To analyse the torsional stresses for solid and hollow cylindrical shaft

UNIT-I

Simple Stresses & Strains :

Elasticity and plasticity – Types of stresses & strains–Hooke's law – stress – strain diagram for mild steel – Working stress – Factor of safety – Lateral strain, Poisson's ratio & volumetric strain – Elastic moduli & the relationship between them – Deformation in Bars of varying cross section – composite bars – Thermal stresses. Strain energy – Resilience – Gradual, sudden, impact and shock loadings.

UNIT-II

Shear Force and Bending Moment Diagrams:

Definition of beam – Types of beams – Concept of shear force and bending moment – S.F and B.M diagrams for cantilever, simply supported and overhanging beams subjected to point loads, uniformly distributed loads, uniformly varying loads and combination of these loads – Point of contra flexure.

UNIT-III

Flexural Stresses:

Theory of simple bending – Assumptions – Derivation of bending equation: M/I = f/y = E/R Neutral axis – Determination bending stresses – section modulus of rectangular and circular sections (Solid and Hollow), I, T -sections.

Shear Stresses:

Derivation of formula – Shear stress distribution across various beams sections like rectangular, circular, triangular, I, T- sections.

UNIT-IV

Principal Stresses and Strains:

Introduction – Stresses on an inclined section of a bar under axial loading – Normal and tangential stresses on an inclined plane for biaxial stresses – Two perpendicular normal stresses accompanied by a state of simple shear –principal stress and strains -Analytical and graphical solutions- Mohr's circle method.

Deflection of Beams:

Bending into a circular arc – slope, deflection and radius of curvature – Moment area method for determination of slope and deflection for cantilever and simply supported beams subjected to Point Loads- Uniformly Distributed Load, -Uniformly Varying Load.

UNIT-V

Torsion of Circular Shafts:

Theory of pure torsion, Derivation of torsion equations: $T/J=q/r=N\theta/L$. Assumptions made in theory of pure torsion-Torsional moment of resistance – Polar section modulus – Power transmitted by shafts.

Thin Cylinders:

Thin seamless cylindrical shells – Derivation of formula for longitudinal and circumferential stresses – hoop, longitudinal and volumetric strains – changes in diameter and volume of thin cylinders.

TEXT BOOKS:

1. Strength of Materials by R.K. Bansal, Laxmi Publications 2010.
2. Strength of materials by Sadhu Singh. Khanna Publications.
3. Strength of Materials by S. Timshenko

REFERENCE BOOKS:

1. Strength of Materials -By Jindal, Umesh Publications.
2. Strength of materials by Bhavikatti, Lakshmi publications.
3. Mechanics of Structures Vol-III, by S.B. Junnarkar.

Course Outcomes:

1. Determine the simple stresses and strains when members are subjected to axial loads.
2. Draw the shear force and bending moment diagrams for the beam subjected to different loading conditions.
3. Evaluate stresses induced in different cross-sectional members subjected to bending and shear loads.
4. Evaluate the deflections in beams subjected to different loading conditions.
5. Evaluate the torsional stresses for solid and hollow cylindrical shaft

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B. TECH - II- SEM **L/T/P/C**

3/-/-/3

(R22A0310) Dynamics of Machinery

Course objectives:

1. To teach students concepts of generalized forces and the Principle of Virtual Work.
2. To teach students concepts of static and dynamic mass balancing and flywheels
3. Able to learn about Clutches, Brakes and Dynamometers.
4. Develop understanding of vibrations and its significance on engineering design.
5. Develop understanding of dynamic balancing, flywheel analysis, gyroscopic forces and moments.

UNIT-I

Precession: Gyroscopes, effect of precession motion on the stability of moving vehicles such as motor car, motor cycle, aero planes and ships.

UNIT-II

Static and Dynamic Force Analysis of Planar Mechanisms: Introduction -Free Body Diagrams – Conditions for equilibrium – Two, Three and Four Members – Inertia forces and D'Alemberts Principle – planar rotation about a fixed centre.

Friction and Friction Drives: Introduction to friction, Laws of friction, Coefficient of friction, Inclined plane, Pivot and Collars, Friction clutches-centrifugal clutch.

UNIT–III

Brakes and Dynamometers: Simple block brakes, internal expanding brake, band brake of vehicle. Dynamometers – absorption and transmission types.

Turning moment Diagrams: Single cylinder double acting steam engine, Four Stroke Cycle Internal Combustion Engine, Multi-cylinder Engine, and Flywheel.

UNIT–IV

Balancing: Balancing of rotating masses Single and multiple – single and different planes. Balancing of Reciprocating Masses- Primary, Secondary, and higher balancing of reciprocating masses using Analytical methods.

Vibration: Free Vibration of mass attached to vertical spring – Simple problems on forced damped vibration, Vibration Isolation & Transmissibility Whirling of shafts, critical speeds, torsional vibrations, two and three rotor systems.

UNIT–V

Governors: Watt, Porter and Proell governors. Sensitiveness ,isochronisms and hunting.

TEXT BOOKS:

1. Rattan S.S, "Theory of Machines" Tata McGraw-Hill Publishing Company Ltd., New Delhi, and 2nd edition - 2005.

2. Sadhu Singh, "Theory of Machines," Pearson Education (Singapore) Pvt. Ltd., Indian Branch, New Delhi, 2ND Edi. 2006.

3. Theory of machines, (4th Edition), by R.S. Khurmi, S.chand Publications.

REFERENCE BOOKS:

1. Shigley. J. V. and Uickers, J.J., "Theory of Machines & Mechanisms" OXFORD University press.2004
2. "Theory of Machines -I", by A.S.Ravindra, Sudha Publications, Revised 5th Edi. 2004

Course outcomes:

1. Analyze stabilization of sea vehicles, aircrafts and automobile vehicles.
2. Compute frictional losses, torque transmission of mechanical systsms.
3. Student gets the exposure of linkages, cams, and gears, within the general machine design context.
4. Understand balancing of reciprocating and rotary masses. Understand how to determine the natural frequencies of continuous systems starting from the general equation of displacement
5. Student gets the exposure of different governors.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B. TECH - II- SEM **L/T/P/C**

3/-/2/3

(R22A0311) Manufacturing Processes

COURSE OBJECTIVES:

1. The primary objective of this course is to introduce the concept of manufacturing technology with the help of various casting processes widely employed in industries.
2. The course consists of welding and its classifications with the related details of equipment and applications.
3. To understand various metal forming, hot and cold working process. To appreciate the capabilities, advantages and the limitations of the processes.
4. To understand the various concepts of extrusion, forging processes, drawing, its classification and their applications.
5. To understand the various concepts of additive manufacturing and its advance techniques along with their applications.

UNIT-I

Casting: Introduction, Steps involved in Design of Casting – Types of Patterns and allowances, Principles of Gating and its types, Solidification of Casting, Risers- Types, function, Cores: Material, Types, advantages & limitations, Types of molding: Injection and blow molding.

Advanced Casting Processes: Metal mould casting- Low & High Pressure, Continuous casting, Squeeze casting, vacuum mould casting, Evaporative pattern casting, ceramic shell casting,

UNIT-II:

Welding: Introduction, Types of weld joints, Detailed Classification of Gas, Arc, Forge, Resistance, Thermit and Plasma (Air and water) welding, Soldering & Brazing. Heat affected zones in welding, welding defects – causes and remedies.

Advanced Welding Processes: Electron beam Welding, Laser beam welding, Friction Stir Welding, Ultrasonic Welding.

UNIT-III:

Cutting of Metals: Oxy – Acetylene Gas cutting, Water Plasma Cutting

Metal Forming: Introduction, Strain Hardening, Recovery, Recrystallization and Grain growth, forming processes - Bending, Coining, embossing.

Hot and Cold working processes: Rolling and types of Rolling and Roll mills.

UNIT-IV:

Extrusion and Forging: Basic Extrusion process and types, Forging operations and its classification, drawing: wire and tube drawing, Swaging, Blanking, Piercing, Punching and Trimming.

Advanced Metal Forming Process: Details of High energy rate forming process, Electro Magnetic Forming, Explosive Forming, Electro-Hydraulic Forming, Contour Roll forming.

UNIT-V:

Additive manufacturing: Introduction to Rapid Prototyping, material, applications, limitations, Classification of Rapid Manufacturing Process.

Additive Manufacturing Techniques: Photo polymerization, Stereo lithography, Powder Bed Fusion, Selective Laser Sintering, Fused Deposition Modeling, 3D Printing, Laminated Object Manufacturing.

TEXTBOOKS:

1. Manufacturing Technology, P.N.Rao,TMH
2. Manufacturing Technology, Kalpak Jain, Pearson education.
3. Production Technology, R.K.Jain

REFERENCE BOOKS:

1. Principles of Metal Castings, Rosenthal.
2. Welding Process, Parmar
3. Manufacturing Technology, R.K. Rajput, Laxmi Pub
4. Manufacturing Engineering &Technology, Kalpak Jain,S.

COURSE OUTCOMES:

1. Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. Acquire knowledge and hands-on competence in applying the concepts of manufacturing science in the design and development of mechanical systems.
3. Competence to design a system, component or process to meet societal needs within realistic constraints.
4. Demonstrate creativeness in designing new systems components and processes in the field of engineering in general and mechanical engineering in particular.
5. An ability to formulate solve complex engineering problem using modern engineering and information Technology tools.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B. TECH - II- SEM **L/T/P/C**

3/1/-/4

(R22A0026) Probability and Statistics

COURSE OBJECTIVES:

- To understand a random variable that describes randomness or an uncertainty in certain realistic situation. It can be either discrete or continuous type.
- To learn important probability distributions like: in the discrete case, study of the Binomial and the Poisson Distributions and in the continuous case the Normal Distributions.
- To Understand linear relationship between two variables and also to predict how a dependent variable changes based on adjustments to an independent variable.
- To learn the types of sampling, sampling distribution of means and variance, Estimations of statistical parameters.
- Use of probability theory to make inferences about a population from large and small samples.
- To understand different queuing models.

UNIT – I: Basic Probability and Random Variables

Basic Probability: Definition,The axioms of probability, some elementary theorems, conditional probability, Bayes' theorem. Single Random Variables:Discrete and Continuous. Probability distribution function,Probability mass and density functions, mathematical expectation, Moments about origin. Multiple Random variables: Discrete and Continuous, Joint probability distributions-Joint probability mass and density functions, Marginal probability mass and density functions.

UNIT-II: Probability Distributions

Binomial distribution – properties, mean, variance and recurrence formula for Binomial distribution, Poisson distribution – Poisson distribution as Limiting case of Binomial distribution, properties, mean variance and recurrence formula for Poisson distribution,Normal distribution – mean, variance, median,mode and characteristics of Normal distribution. Moment generating function of probability distributions

UNIT -III: Correlation and Regression

Correlation -Coefficient of correlation, Rank correlation, Regression- Regression coefficients, Lines of regression.

Multiple correlation and regression- Coefficient of multiple Correlation, multiple regression, Multiple linear regression equations.

UNIT –IV: Testing of Hypothesis

Sampling: Definitions ,Standard error . Estimation - Point estimation and Interval estimation.

Testing of hypothesis: Null and Alternative hypothesis - Type I and Type II errors, Critical region - confidence

interval - Level of significance, One tailed and Two tailed test.

Large sample Tests: Test of significance - Large sample test for single mean, difference of means, single proportion, difference of proportions.

Small samples: Test for single mean, difference of means, paired t-test, test for ratio of variances (F-test) ,Chisquare test for goodness of fit and independence of attributes.

UNIT V: Queuing Theory

Queuing theory –Structure of a queuing system and its characteristics-Arrival pattern and service pattern- Pure birth and Death process.

Terminology of Queuing systems-queuing models and its types - M/M/1 Model of infinite queue(without proofs) and M/M/1 Model of finite queue(without proofs).

Suggested Text Books:

1. Fundamental of Statistics by S.C. Gupta,7thEdition,2016.
2. Fundamentals of Mathematical Statistics by SC Gupta and V.K.Kapoor
3. Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers, 35th Edition,2000.
4. R. A. Johnson, Miller and Freund's "Probability and Statistics for Engineers", Pearson Publishers, 9th Edition, 2017.

References :

1. Introduction to Probability and Statistics for Engineers and Scientists by SheldonM.Ross.
2. Probability and Statistics for Engineers by Dr. J. Ravichandran.

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

1.Describe randomness in certain realistic situation which can be either discrete or continuous type
and compute statistical constants of these random variables.
2. Provide very good insight which is essential for industrial applications by learning probability distributions.
3. Make objective, data-driven decisions by using correlation and regression.
4. Draw statistical inference using samples of a given size which is taken from a population.
5. To design balanced systems that serve customers quickly and efficiently but it is not cost effective.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B. TECH - II- SEM **L/T/P/C**

0/0/2/1

(R22A0383) Manufacturing Processes Lab

COURSE OBJECTIVES:

1. Ability to function on multi-disciplinary teams in the area of materials processing.
2. Ability to use the techniques, skills and modern engineering tools necessary for handling welding techniques.
3. Understanding of professional and ethical responsibility in the areas of materials management.
4. Ability to communicate effectively the joining processes in welding.

LIST OF EXPERIMENTS

1. To design and making of pattern - for one casting drawing.
2. To determine sand properties- Exercise -for strengths, and permeability.
3. To Prepare Mould for Casting.
4. To prepare a butt joint with the specimens by Arc Welding.
5. To join the specimens by gas welding process.
6. To perform Plasma welding operation
7. To perform Spot welding operation.
8. To perform blanking & piercing operation.
9. To perform deep drawing and extrusion operation.
10. To prepare the product by Injection Moulding machine.
11. To prepare the product by Blow Moulding machine.
12. To manufacture components using by 3D printing.

NOTE: Minimum a total of 8 experiments are to be conducted.

COURSE OUTCOMES:

1. To provide the students' knowledge in finding the different techniques in manufacturing processes.
2. To gain knowledge on welding techniques.
3. Get Exposure different types of plastic moulding processes.
4. To provide students hands on experience to handle the joing processes.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B. TECH - II- SEM **L/T/P/C**

-/-/2/1

(R22A0384) Strength of Materials Lab

COURSE OBJECTIVES:

1. Analyze the tensile and compressive strength of a specimen.
2. Determine the hardness, impact strength, fatigue strength
3. to analyze the application of a specific material for a given design requirements
4. Understanding the bending in beams and to analyze the bending stresses
5. Evaluate the capacity of a material to withstand torsional stresses for a safe and sustainable

LIST OF EXPERIMENTS

1. Direct Tension Test.
2. Brinell's Hardness Test.
3. Rockwell Hardness Test.
4. Charpy Impact Test.
5. Izod Impact Test.
6. Torsion Test.
7. Compression test on spring.
8. Tension test on spring.
9. Deflection of Simply supported beam.
10. Deflection of Cantilever beam.
11. Shear Test.
12. Compressive Test on Cube

NOTE: Minimum a total of 8 experiments are to be conducted.

COURSE OUTCOMES:

1. To provide the students' knowledge in finding the materials testing of metals and alloys.
2. To know the hardness of metals.
3. Get Exposure different kinds of materials testing.
4. To provide students hands on experience to handle the machines.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B. TECH - II- SEM **L/T/P/C**

-/-/4/2

(R22A0391) Industry Oriented Project

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B. TECH - II- SEM **L/T/P/C**

2/-/-/-

(*R22A00XX) Public Policy & Governance

Course objectives:

1.To make the students understand in-depth analysis of public policy and to solve its ills prevailing in the society.
2. To provide an opportunity for the students to learn the basic areas of public policy analysis, implementation and evaluation.
3. To make understand the process and various approaches in public policy making.
4. To understand the theories and issues of social coordination and the nature of all patterns of rule.
5. To make the students understand the techniques of governance and emerging trends in public and private governance its policy-making and implementation.

Unit-I

Introduction of Public Policy: Definition, Nature, Scope and Importance of Public Policy, Evolution of Public Policy and Policy Sciences, Public Policy and Public Administration. **Approaches to Public Policy Analysis:** The Process Approach, The Logical Positivist Approach, The Phenomenological Approach, The Participatory Approach and Normative Approach.

Unit-II

Theories and Process of Public Policy Making: Theories and Models of Policy Making, Perspectives of Policy Making Process, Institutions of Policy Making.

Unit-III

Policy Implementation and Evaluation: Concept of Policy Implementation, Techniques of Policy Implementation, Concept of Policy Evaluation, Constraints of Public Policy Evaluation.

Unit-IV

Introduction of Governance: Definitions, Issues and Controversies, Reinventing Government, Reforming Institutions: The State, Market and Public domain. **State and Governance:** Origin and types of State, Democratic State and Democratic Administration, Neo-Liberalism and Rolling Back State and Governance as Government.

Unit-V

Citizen and Techniques of Governance: Rule of Law and Human Rights, Accountability, Participation, Representation. **Techniques of Governance**: Openness and Transparency, Citizen Charter, Social Audit. **Emerging Trends in Public and Private Governance:** An Overview, Market, Civil Society, Information and Communication Technology.

TEXT AND REFERENCE BOOKS:

1.Introduction to Public Policy- Charles Wheelan, Naked Economics 2010.
2. Birkland Thomas A., (2005), An Introduction to The Policy Process: Theories, Concepts, And Models of Public Policy Making, Armonk; M.E. Sharpe.
3.Anderson J.E., (2006) Public Policy-Making: An Introduction, Boston, Houghton

4. Bardach, Eugene (1977), The Implementation Game: What Happens After a Bill Becomes a Law, Cambridge, MA: MIT.
5. Bell, S., and Hind moor, A. (2009) Rethinking Governance: The Centrality of the State in Modern Society, Cambridge: Cambridge University Bell, Stephen and Andrew Hind moor.
6. Joyee M. Mitchell & William C. Mitchell, Political Analysis & Public Policy: An Introduction to Political Science, Thomson Press Limited, New Delhi, 1972.
7. R.K. Sapru, Public Policy, Art and Craft of policy Analysis, PHI learning private limited, New Delhi, 2011.
8. Brian W. Hogwood & Lewis A. Gunn, Policy Analysis for the Real world, Oxford University, Press, 1986.

COURSE OUTCOMES

After completion of the course, student will be able to

1.Understand public policy analysis and they will be able to understand policy evaluation and implementation.
2. Understand the public policy and governance on the largest gamut of its canvas.
3. Students will understand the what are emerging trends in public and private governance and various theories in public policy making