GODAVARI INSTITUTE OF ENGINEERING & TECHNOLOGY

Department of Mechanical Engineering

COURSE STRUCTURE

B. Tech. Mechanical Engineering

II Year **I Semester**

S. No.	Subject Title	Periods per week			C	Scheme of Examination Maximum Marks		
		T	P	D		Int.	Ext.	Total
1.	Metallurgy & Materials Science	4	-	-	3	30	70	100
2.	Mechanics of Solids	4	-	-	3	30	70	100
3.	Thermodynamics	4	-	-	3	30	70	100
4.	Managerial Economics & Financial Analysis	4	-	-	3	30	70	100
5.	Basic Electrical & Electronics Engineering	4	-	-	3	30	70	100
6.	Computer Aided Engineering Drawing Practice	1	-	3	3	30	70	100
7.	Basic Electrical & Electronics Engineering Lab	-	3	-	2	50	50	100
8.	Mechanics of Solids & Metallurgy lab	-	3	-	2	50	50	100
Total		**21**	**6**	**3**	**22**	-	-	**800**

T- THEORY P – PRACTICAL D- DRAWING C – CREDITS Int. – INTERNAL Ext. - EXTERNAL

II Year **II Semester**

S. No.	Subject Title	Periods per week			C	Scheme of Examination Maximum Marks		
		T	P	D		Int.	Ext.	Total
1.	Kinematics of Machinery	4	-	-	3	30	70	100
2.	Thermal Engineering -I	4	-	-	3	30	70	100
3.	Production Technology	4	-	-	3	30	70	100
4.	Fluid Mechanics & Hydraulic Machinery	4	-	-	3	30	70	100
5.	Industrial Engineering & Management	4	-	-	3	30	70	100
6.	Machine Drawing	1	-	3	3	30	70	100
7.	Fluid Mechanics & Hydraulic Machinery Lab.	-	3	-	2	50	50	100
8.	Production Technology Lab.	-	3	-	2	50	50	100
9.	**Soft Skills -1**	4	-	-	-	-	-	-
Total		**25**	**6**	**3**	**22**	-	-	**800**

T- THEORY P – PRACTICAL D- DRAWING C – CREDITS Int. – INTERNAL Ext. - EXTERNAL

II Year B.Tech. (ME) – I Sem.

METALLURGY & MATERIALS SCIENCE [14130301]

Course Objective: To understand the basic fundamentals of Material science and Physical metallurgy. The basic concepts to be taught will help for the improvement, proper selection and effective utilization of materials which is essential to satisfy the ever increasing demands of the society.

UNIT – I

Learning Objective: To know the basic concepts of bonds in metals and alloys. To understand the basic requirements for the formation of solid solutions and other compounds.

Structure of Metals and Constitution of alloys: Bonds in Solids – Metallic bond - crystallization of metals, grain and grain boundaries, effect of grain boundaries on the properties of metal / alloys – determination of grain size. Necessity of alloying, types of solid solutions, Hume Rotherys rules, intermediate alloy phases, and electron compounds.

UNIT –II

Learning objectives: To understand the regions of stability of the phases that can occur in an alloy system in order to solve the problems in practical metallurgy.

Equilibrium Diagrams : Experimental methods of construction of equilibrium diagrams, Isomorphous alloy systems, equilibrium cooling and heating of alloys, Lever rule, coring miscibility gaps, 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 important binary phase diagrams of Cu-Ni-, Al-Cu, Bi-Cd, Cu-An, Cus-Sn and Fe-Fe3C.

UNIT –III

Learning objectives: To study the basic differences between cast irons and steels, their properties and practical applications.

Cast Irons and Steels: Structure and properties of White Cast iron, Malleable Cast iron, grey cast iron, Spheriodal graphite cast iron, Alloy cast irons. Classification of steels, structure and properties of plain carbon steels, Low alloy steels, Hadfield manganese steels, tool and die steels.

UNIT – IV

Learning objectives: To study the affect of various alloying elements on iron-iron carbide system. To understand the various heat treatment and strengthening processes used in practical applications.

Heat treatment of Alloys: Effect of alloying elements on Fe-Fe3C system, Annealing, normalizing, Hardening, TTT diagrams, tempering, Hardenability, surface - hardening methods, Age hardening treatment, Cryogenic treatment of alloys.

UNIT – V

Learning objectives: To study the properties and applications of widely used non-ferrous metals and alloys so as to use the suitable material for practical applications.

Non-ferrous Metals and Alloys: Structure and properties of copper and its alloys, Aluminium and its alloys, Titanium and its alloys.

Introduction to powder metallurgy – Basic Principles.

UNIT – VI

Learning objectives: To study the properties and applications of ceramic, composite and other advanced materials so as to use the suitable material for practical applications.

Ceramic and composite materials: Crystalline ceramics, glasses, cermets, abrasive materials, nano-materials – definition, properties and applications of the above.

Classification of composites, various methods of component manufacture of composites, particle – reinforced materials, fiber reinforced materials, metal ceramic mixtures, metal – matrix composites and C – C composites.

TEXT BOOKS:

1. Introduction to Physical Metallurgy - Sidney H. Avener - McGrawHill
2. Essential of Materials science and engineering - Donald R.Askeland -Thomson.

REFERENCES:

1. Material Science and Metallurgy – Dr. V.D.kodgire.
2. Materials Science and engineering - Callister & Baalasubrahmanyam
3. Material Science for Engineering students – Fischer – Elsevier Publishers
4. Material science and Engineering - V. Rahghavan
5. Introduction to Material Science and Engineering – Yip-Wah Chung CRC Press
6. Material Science and Metallurgy – A V K Suryanarayana – B S Publications
7. Material Science and Metallurgy – U. C. Jindal – Pearson Publications

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Useful Web-links : http://nptel.ac.in/courses.php
http://mit.espe.edu.ec/courses/mechanical-engineering/

II Year B.Tech. (ME) – I Sem.

MECHANICS OF SOLIDS [14130302]

Objective: The students completing this course are expected to understand the basic terms like stress, strain, poisons ratio… etc. and different stress induced in beams, thin cylinders, thick cylinders and columns. Further the student shall be able to understand the shear stresses in circular shafts.

UNIT – I

Objective: After studying this unit the student will know the basic terms like stress, strain, poisons ratio and stress in bars of varying section, composite bars, Temperature stresses and Mohr's circle.

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 – Bars of varying section – composite bars – Temperature stresses.

Stresses on an inclined plane under different uniaxial and biaxial stress conditions. Principal planes and principal stresses – Concept o f Mohr's circle limited to simple problems only.

UNIT – II

Objective: After studying this unit the student will know the basics of beams, S.F and B.M diagrams of different beams under various loading conditions and also how to solve problems.

SHEAR FORCE AND BENDING MOMENT : 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, u.d.l., uniformly varying loads and combination of these loads – Point of contra flexure – Relation between S.F., B.M and rate of loading at a section of a beam.

UNIT – III

Objective: After studying this unit the student will know the basics of bending and bending equation. Evaluation of bending stress in various cross sections and also how to solve problems.

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 – Design of simple beam sections.

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

UNIT – IV

Objective: After studying this unit the student will know how to find the slope and deflection for different support arrangements by double integration method and Macaulay's methods. Statistically indeterminate Beams and problem solving techniques.

DEFLECTION OF BEAMS : Bending into a circular arc – slope, deflection and radius of curvature – Differential equation for the elastic line of a beam – Double integration and Macaulay's methods – Determination of slope and deflection for cantilever and simply supported beams subjected to point loads & U.D.L. Mohr's theorems – Moment area method – application to simple cases including overhanging beams. Brief explanation of statistically indeterminate Beams and solution methods.

UNIT – V

Objective: After studying this unit the student will know how a cylinder fails, what kind of stress are induced in cylinders subjected to internal and external pressures and problem solving techniques.

THIN CYLINDERS & SPHERES: Thin cylindrical vessels subjected to internal pressure, longitudinal and circumferential stresses & strains, Volumetric strains – changes in dimensions of thin cylinders – Thin spherical shells.

THICK CYLINDERS – Stresses in a thick cylindrical shell, lame's equation – cylinders subjected to inside & outside pressures – streeses in compound thick cylinders.

UNIT – VI

Objective: After studying this unit the student will know shear stresses induced in circular shafts and composite shafts. Difference between Columns & Struts, Failure, different end conditions and problem solving techniques.

TORSION: Introduction- Derivation- Torsion of Circular shafts –Transmission of power by circular shafts, composite shafts.

COLUMNS & STRUTS: Buckling and stability, slenderness ratio, Failure of Columns & Struts, End conditions for long columns, effect of end conditions on column buckling, Expressions for crippling loads. Euler's theory of Columns, Rankine's Formula.

TEXT BOOKS:

1. Strength of materials by R.K.Bansal , Laxmi Publications .
2. Strength of materials by Bhavikatti, Lakshmi publications.
3. Strength of materials by RK Rajput, S Chand publications.
3. Solid Mechanics, Schaum's Outline series

REFERENCES:

1. Analysis of structures by Vazirani and Ratwani.
2. Strength of Materials by S.Timshenko
3. Strength of Materials by Andrew Pytel and Ferdinond L. Singer Longman.

Useful Web-links : http://nptel.ac.in/courses.php
http://mit.espe.edu.ec/courses/mechanical-engineering/

II Year B.Tech. (ME) – I Sem.

THERMODYNAMICS [14130303]

Course Objectives: To Impart the Knowledge of Thermodynamics laws and principles so as to enable the students to prepare an energy audit of any mechanical System that exchange heat and work with the surroundings.

UNIT – I

Objectives: The students Should be able to understand the basic concept like Thermodynamics system, surroundings boundary etc. and distinction between point and path function. To learn First Law of Thermodynamics and its application on preparing temperature scales and thermometers.

Introduction: System, Control volume, Surrounding, Boundaries, Universe - Macroscopic and Microscopic approach of Thermodynamics, Concept of Continuum - Thermodynamic equilibrium - State, Property, Process, Cycle, Reversible process, irreversible process, quasi-static process, causes of irreversibility – Energy, Heat and Work - Point and Path functions - Ideal gas laws and Characteristic gas equation.

Zeroth law of Thermodynamics: Zeroth law of Thermodynamics, concept of temperature, principle of thermometry-Reference points-constant volume and constant pressure thermometer and Ideal gas temperature scale.

UNIT – II

Objectives: To learn the first law of thermodynamics and able to apply this to different thermodynamic processes. Also to learn how to apply the steady flow energy equation to various mechanical components.

First law of thermodynamics: Joule's Experiments - First law of Thermodynamics - corollaries of First law of Thermodynamics, PMM-I, First law applied to different non- flow processes, Specific heats, Enthalpy, Internal energy, Relation between C_p, C_v ,&R - $\int p.dv$ work done for different processes – First law applied to flow processes – Steady Flow Energy Equation (SFEE) - SFEE applied to various mechanical components - Throttling and free expansion processes.

UNIT – III

Objectives: To under the second law of Thermodynamics and its Corollaries and should be able to apply the principles to heat engines. Should be able to understand Carnot theorem and Carnot cycle, Sterling cycle Ericcson cycle etc. Should understand the concept of entropy and able to calculate entropy for different Thermodynamics processes.

Second law of Thermodynamics: Limitation of first law of thermodynamics - Thermal Energy Reservoirs, Second law of Thermodynamics, Kelvin Planck and claussius statements and their equivalence – Corollaries of second law of Thermodynamics - PMM-II - Differences between Direct and Reversed heat engines and their performance parameters, Carnot Theorem, Carnot cycle and its specialties, Sterling cycle, Ericcson cycle, Lenoir cycle, Atkinson cycle and their efficiencies, reversed carnot cycle and its coefficient of performance, Thermodynamic scale of

temperature, Claussius inequality, Entropy, Principles of entropy increase, change in entropy for different thermodynamic process.

UNIT-IV

Objectives: Should be able to understand availability and irreversibility and able to use Maxwell's relations and thermodynamic functions. Student should also know the deviations from perfect gas equation.

Availability and Irreversibility: Energy equation, Availability and Irreversibility - Thermodynamic potentials, Gibbs and Helmoltz functions, Maxwell relations - Elementary treatment of the Third law of thermodynamics.

Deviations from perfect gas equation: Vander Waals equation of state-compressibility charts-variable specific heats-gas tables.

UNIT V

Objectives: Students should understand the process of steam formation and its representation on property diagrams with various phase changes and should be able to calculate the quality of steam after its expansion with the help of standard steam table and Mollier chart.

Pure Substance: Pure substance, P-V-T surface, T-s and H-s diagrams, Phase transformations - Triple point during change of phase, Dryness fraction - Clausius-Clapeyron equation - Property Tables and Mollier chart - Various Thermodynamic processes and energy transfer - Steam Calorimetry - Rankine Cycle - Vapour Compression Refrigeration Cycle.

UNIT VI

Objective: Student should be able to understand laws of perfect gas mixtures and should learn how to use Psychrometric Chart and calculate various Psychrometric properties of air.

Mixture of Perfect gases: Mole fraction, Mass function, Gravimetric and Volumetric Analysis – Dalton's law of partial pressure, Avagadro's law of additive volumes, Equivalent gas constant, Molecular internal energy, Enthalpy, Specific heats and Entropy of mixture of perfect gases and vapour, 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, Carrier's equation - Psychrometric Chart – Sensible Heat Factor.

TEXT BOOKS :

1. Engineering Thermodynamics , PK Nag 4th Edn , TMH.
2. Thermodynamics – An Engineering Approach with student resources DVD – Y.A.Cengel & M.A.Boles , 7th Edn - McGrawHill

REFERENCES :

1. Engineering Thermodynamics – Jones & Dugan PHI
2. Thermodynamics – J.P.Holman , McGrawHill
3. An Introduction to Thermodynamics - Y.V.C.Rao – Universities press.
4. Engineering Thermodynamics – P.Chattopadhyay – Oxford Higher Edn Publ.

Useful Web-links : http://nptel.ac.in/courses.php
http://mit.espe.edu.ec/courses/mechanical-engineering/

II Year B.Tech. (ME) – I Sem.

MANAGERIAL ECONOMICS & FINANCIAL ANALYSIS [14139304]

UNIT- I

Objective: To understand the concept ;and nature of Managerial Economics and its relationship with other disciplines, concepts of Demand and Demand forecasting for Proper Production Planning.

Introduction to Managerial Economics and demand Analysis:
Definition of Managerial Economics and Scope – Managerial Economics and its relation with other subjects – Concepts of Demand – Types – Determinants, Law of Demand its Exception – Elasticity of Demand – Types and Measurement - Demand forecasting and its methods.

UNIT-II
Objective: To understand the concept of Production function, Input Output relationship, different Cost Concepts and Concept of Cost – Volume – Profit Analysis.

Production and Cost Analysis:
Production function Isoquants and Isocosts – Law of Variable proportions – Cobb-Douglas Production function- Economies of Scale- Cost Concepts-Opportunity Cost-Fixed Vs Variable Costs – Explicit Cost Vs Implicit Costs – Out of Pocket Costs Vs Imputed Costs – Cost Volume Profit Analysis- Determination of Break-Even Point (Simple Problems)

UNIT-III

Objective: To understand the nature of Competition, Characteristics of Pricing in the different market structure and significance of various pricing methods.

Introduction to Markets, Theories of the Firm and Pricing Policies:
Market Structures: Perfect Competition, Monopoly and Monopolistic and Oligopoly – Features – Price, Output Determination – Managerial Theories of firm: Maris and Williamson's models – Methods of Pricing: Limit Pricing, Market Skimming Pricing, And Internet Pricing: Flat Rate Pricing, Usage sensitive, Transaction based pricing, Priority Pricing.

UNIT- IV

Objective: To know the different forms of Business Organization and their Merits and Demerits both Public and Private Enterprises and the concepts of Business Cycles.

Types of Business Organizations and Business Cycles:
Features and Evaluation of Sole trader – Partnership – Joint Stock Company – State / Public Enterprises and their forms – Business Cycles – Meaning and Features – Phases of Business Cycle.

UNIT- V

Objective: To understand the different Accounting Systems preparation of Financial Statements and uses of Different tools for performance evaluation.

Introduction to Financial Accounts:
Introduction to Double Entry Systems, Preparation of Journal – Subsidiary Books- Ledger-Cash Book-Trial Balance- Preparation of Financial Statements, Analysis of Financial Statements through Ratio Analysis (Simple Problems).

UNIT – VI

Objective: To understand the concept of Capital, Capital Budgeting and to know the techniques used to evaluate Capital Budgeting proposals by using different methods.

Capital, Capital Budgeting:
Capital, Significance of Capital, Sources of Finance (Capital) - Meaning of Capital Budgeting Need for Capital Budgeting - Techniques of Capital Budgeting - Traditional and Modern Methods.

TEXT BOOKS:

1. Prof. J.V. Prabhakara Rao, Prof.P. Venkata Rao. "Managerial Economics and Financial Analysis", Ravindra Publication.
2. Dr.A.R.Aryasri- Managerial Economics and Financial Analysis – TMH Publications.
3. Dr.N.Appa Rao, Dr.P. Vijay Kumar 'Managerial Economics and Financial Analysis", Cengage Publications, New Delhi.

REFERENCE:

1. Dr.B. Kuberudu and Dr.T.V. Ramana: Managerial Economics & Financial Analysis, Himalaya Publishing House.

Useful Web-links : http://nptel.ac.in/courses.php
http://mit.espe.edu.ec/courses/mechanical-engineering/

II Year B.Tech. (ME) – I Sem.
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BASIC ELECTRICAL & ELECTRONICS ENGINEERING [14132305]

UNIT – I
Objective: To learn the basic principles of electrical law's and analysis of networks.
ELECTRICAL CIRCUITS: Basic definitions, Types of network elements, Ohm's Law, Kirchhoff's Laws, inductive networks, capacitive networks, series, parallel circuits and star-delta and delta-star transformations.
UNIT – II
Objective: To understand the principle of operation and construction details of DC machines.
DC MACHINES : Principle of operation of DC generator – emf equation - types – DC motor types –torque equation – applications – three point starter, swinburn's Test, speed control methods.
UNIT – III
Objective: To understand the principle of operation and construction details of transformer.
TRANSFORMERS: Principle of operation of single phase transformers – e.m.f equation – losses –efficiency and regulation.
UNIT – IV
Objective: To understand the principle of operation and construction details of alternator and 3-Phase induction motor.
AC MACHINES: Principle of operation of alternators – regulation by Mechanical Engineering

synchronous impedance method –principle of operation of 3-Phase induction motor – slip-torque characteristics - efficiency – applications.
UNIT V
Objective: To study the operation of PN junction diode, half wave, full wave rectifiers and OP-AMPs.
RECTIFIERS & LINEAR ICs: PN junction diodes, diode applications (Half wave and bridge rectifiers). Characteristics of operation amplifiers (OPAMP) - application of OP-AMPs (inverting, non inverting, integrator and differentiator).
UNIT VI
Objective: To learn the operation of PNP and NPN transistors and various amplifiers.
TRANSISTORS: PNP and NPN junction transistor, transistor as an amplifier, single stage CE Amplifier, frequency response of CE amplifier, concepts of feedback amplifier.

Outcomes:
i. Able to analyse the various electrical networks.
ii. Able to understand the operation of DC generators,3-point starter and conduct the Swinburne's Test.
iii. Able to analyse the performance of transformer.
TEXT BOOKS:
1. Electronic Devices and Circuits, R.L. Boylestad and Louis Nashelsky, 9th edition, PEI/PHI
2. Electrical Technology by Surinder Pal Bali, Pearson Publications.

3. Electrical Circuit Theory and Technology by John Bird, Routledge Taylor & Francis,

REFERENCE BOOKS:

1. Basic Electrical Engineering by M.S.Naidu and S.Kamakshiah,TMH Publications.
2. Fundamentals of Electrical Engineering by Rajendra Prasad, PHI Publications, 2nd edition.
3. Basic Electrical Engineering by Nagsarkar, Sukhija, Oxford Publications, 2nd edition.

Useful Web-links : http://nptel.ac.in/courses.php
http://mit.espe.edu.ec/courses/mechanical-engineering/

II Year B.Tech. (ME) – I Sem.

COMPUTER AIDED ENGINEERING DRAWING PRACTICE [14130316]

Course Objective: To enhance the student's knowledge and skills in engineering drawing and to introduce drafting packages and commands for computer aided drawing and modeling.

UNIT-I:

Objective: The knowledge of projections of solids is essential in 3D modeling and animation. The student will be able to draw projections of solids. The objective is to enhance the skills they already acquired in their earlier course in drawing of projection and sections of solids.

Projections Of Planes & Solids : Projections of Regular Solids inclined to both planes – Auxiliary Views. Sections and Sectional views of Right Regular Solids – Prism, Cylinder, Pyramid, Cone – Auxiliary views.

UNIT-II:

Objective: The knowledge of development of surfaces of solids is required in designing and manufacturing of the objects. Whenever two or more solids combine, a definite curve is seen at their intersection. The intersection of solids also plays an important role in designing and manufacturing. The objective is to impart this knowledge through this topic.

Development And Interpenetration Of Solids: Development of Surfaces of Regular Solids – Prisms, Cylinder, Pyramid Cone and their parts.
Interpenetration of Right Regular Solids – Intersection of Cylinder Vs Cylinder, Cylinder Vs Prism, Cylinder Vs Cone.

UNIT-III:

Objective: Isometric projections provide a pictorial view with a real appearance. Perspective views provides a realistic 3D View of an object. The objective is to make the students learn the methods of Iso and Perspective views.

Isometric Projections : Principles of Isometric Projection – Isometric Scale – Isometric Views – Conventions – Isometric Views of Lines, Plane Figures, Simple and Compound Solids – Isometric Projection of objects having non- isometric lines. Isometric Projection of Spherical Parts.
Transformation of Projections: Conversion of Isometric Views to Orthographic Views – Conventions.

Perspective Projections: Perspective View: Points, Lines, Plane Figures and Simple Solids, Vanishing Point Methods(General Method only).

In part B computer aided drafting is introduced.

UNIT IV:

Objective: The objective is to introduce various commands in AutoCAD to draw the geometric entities and to create 2D and 3D wire frame models.

Introduction to Computer aided Drafting: Generation of points, lines, curves, polygons, dimensioning. Types of modeling : object selection commands – edit, zoom, cross hatching, pattern filling, utility commands, 2D wire frame modeling, 3D wire frame modeling,.

UNIT V:

Objective: By going through this topic the student will be able to understand the paper-space environment thoroughly.

View points and view ports: view point coordinates and view(s) displayed, examples to exercise different options, restore, delete, joint, single option.

UNIT VI:

Objective: The objective is to make the students create geometrical model of simple solids and machine parts and display the same as an Isometric, Orthographic or Perspective projection.

Computer aided Solid Modeling: Isometric projections, orthographic projections of isometric projections, Modeling of simple solids, Modeling of Machines & Machine Parts.

TEXT BOOKS :

1.Engineering Graphics, K.C. john, PHI Publications
2.Engineering drawing by N.D Bhatt , Charotar publications.

REFERENCES:

1. Mastering Auto CAD 2013 and Auto CAD LT 2013 – George Omura, Sybex
2. Auto CAD 2013 fundamentals- Elisemoss, SDC Publ.
3. Engineering Drawing and Graphics using Auto Cad – T Jeyapoovan, vikas
4. Engineering Drawing + AutoCAD – K Venugopal, V. Prabhu Raja, New Age
5. Engineering Drawing – RK Dhawan, S Chand
6. Engineering Drawing – MB Shaw, BC Rana, Pearson
7. Engineering Drawing – KL Narayana, P Kannaiah, Scitech
8. Engineering Drawing – Agarwal and Agarwal, Mc Graw Hill
9. Engineering Graphics – PI Varghese, Mc Graw Hill
10. Text book of Engineering Drawing with auto-CAD , K.venkata reddy/B.S . publications.

Useful Web-links : http://nptel.ac.in/courses.php
http://mit.espe.edu.ec/courses/mechanical-engineering/

II Year B.Tech. (ME) – I Sem.

BASIC ELECTRICAL & ELECTRONICS ENGINEERING LAB [14132317]

Section A: Electrical Engineering:

The following experiments are required to be conducted as compulsory experiments:

1. Swinburne's test on D.C. Shunt machine (Predetermination of efficiency of a given D.C. Shunt machine working as motor and generator).

2. OC and SC tests on single phase transformer (Predetermination of efficiency and regulation at given power factors).

3. Brake test on 3-phase Induction motor (Determination of performance characteristics).

4. Regulation of alternator by Synchronous impedance method.

5. Speed control of D.C. Shunt motor by

a) Armature Voltage control b) Field flux control method

6. Brake test on D.C. Shunt Motor.

Section B: Electronics Engineering:

1. PN junction Diode characteristics A. Forward bias, B. Reverse bias. (Cut in voltage & Resistance calculations)

2. Transistor CE Characteristics (Input and Output).

3. Full wave Rectifier with and without filters.

4. CE Amplifiers.

5. RC Phase Shift Oscillator.

6. Class A Power Amplifier.

II Year B.Tech. (ME) – I Sem.

MECHANICS OF SOLIDS & METALLURGY LAB [14132318]

Objective: The students completing this course are expected to understand the testing methods to find the strength of different materials, microstructure of various materials.

Any 6 experiments from each section A and B.

(A) METALLURGY LAB:

1. To Study effect of carbon % on Micro Structure of different types of steels

2. To study the effects of heat treatment.(annealing, normalising, and hardening) on hardness and Microstructure of steels.

3. To Determine the grain size in given specimen of steels.

4. To Determine hardenability of steel specimen by Jominy End quench Test.

5. To Study the Micro structures of Non Ferrous Alloy like Aluminum and brass.

6. To find out the hardness of various treated and untreated steels.

(B) MECHNICS OF SOLIDS LAB:

1. Tension test to determine the % elongation,% reduction in cross sectional area of the specimen.

2. Bending test

a) Simple supported beam

b) Cantilever beam

3. Torsion test

4. Hardness test

a) Brinells hardness test

b) Rockwell hardness test

5. Test on springs

6. Compression test on cube

7. Impact test

8. Double shear te

Year B.Tech. (ME) – II Sem.

KINEMATICS OF MACHINERY [14130401]

Objective: The students completing this course are expected to understand the nature and role of the kinematics of machinery, the mechanisms and machines. The course includes velocity and acceleration diagrams, analysis of mechanisms joints, Cams and their applications. It exposes the students to various kinds of power transmission devices like belt, rope, chain and gear drives and their working principles and their merits and demerits.

UNIT – I

Objective: The objective of this unit is to make student understand the purpose of kinematics, Kinematic joint and mechanism and to study the relative motion of parts in a machine without taking into consideration the forces involved.

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 .
Gruebler's criteria , Grashoff's law , Degrees of freedom, Kutzbach criterian for planar mechanisms, Mechanism and machines – classification of machines – kinematic chain – inversion of mechanism – inversions of quadric cycle chain – single and double slider crank chains.

UNIT – II

Objective: The objective of this unit is to make student understand various mechanisms for straight line motion and their applications including steering mechanism.

LOWER PAIR MECHANISM: Exact and approximate copiers and generated types – Peaucellier, Hart and Scott Russul – Grasshopper – Watt T. Chebicheff and Robert Mechanisms and straight line motion, Pantograph.
Conditions for correct steering – Davis Steering gear, Ackermans steering gear – velocity ratio; Hooke's Joint: Single and double – Universal coupling–application–problems.

UNIT – III

Objective : The objective of this unit is to make student understand the velocity and acceleration concepts and the methodology using graphical methods and principles and application of four bar chain. To understand the application of slider crank mechanism etc. and study of plane motion of the body.

KINEMATICS: Velocity and acceleration – Motion of a link in machine – Determination of Velocity and acceleration diagrams – Graphical method – Application of relative velocity method - Four bar chain. Velocity and acceleration analysis of a given mechanism, Kleins construction - Determination of Corioli's component of acceleration.

Plane motion of body: Instantaneous center of rotation, centrodes and axodes – relative motion between two bodies – Three centres in line theorem – Graphical determination of instantaneous centre, diagrams for simple mechanisms and determination of angular velocity of points and links.

UNIT – IV

Objective The objective of this unit is to make student understand the theories involved in cams. Further the students are exposed to the applications of cams and their working principles.

CAMS: Definitions of cam and followers – their uses – Types of followers and cams – Terminology –Types of follower motion: Uniform velocity, Simple harmonic motion and uniform acceleration and retardation. Maximum velocity and maximum acceleration during outward and return strokes in the above 3 cases.

Analysis of motion of followers: Roller follower – circular cam with straight, concave and convex flanks.

UNIT – V

Objective: The objective of this unit is to make student understand gears, power transmission through different types of gears including gear profiles and its efficiency.

Gears: Higher pairs, friction wheels and toothed gears–types – law of gearing, condition for constant velocity ratio for transmission of motion, Form of teeth: cycloidal and involute profiles. Velocity of sliding – phenomena of interferences – Methods of interference. Condition for minimum number of teeth to avoid interference, expressions for arc of contact and path of contact – Introduction to Helical, Bevel and worm gearing.

UNIT – VI

Objective: The objective of this unit is to make student understand different types of gear trains and their principles of operation. Students are exposed to merits and demerits of each gear train

Gear Trains :

Introduction to gear Trains, Train value, Types – Simple and reverted wheel train – Epicyclic gear Train. Methods of finding train value or velocity ratio – Epicyclic gear trains. Selection of gear box-Differential gear for an automobile.

TEXT BOOKS:

1. Theory of Machines by Thomas Bevan/ CBS
2. Theory of Machines – S. S Rattan- TMH
3. Theory of machines and Mechanisms – J.J Uicker, G.R.Pennock & J.E.Shigley – Oxford publishers.

REFERENCES:

1. Theory of Machines Sadhu Singh Pearsons Edn
2. Theory of machines and Machinery /Vickers /Oxford .
3. Theory of Mechanisms and machines – A.Ghosh & A.K.Malik – East West Press Pvt. Ltd.

Useful Web-links : http://nptel.ac.in/courses.php
http://mit.espe.edu.ec/courses/mechanical-engineering/

II Year B.Tech. (ME) – II Sem.
3+1-0-3

THERMAL ENGINEERING – I [14130402]

UNIT – I

Objectives: To familiarize the student with the various engine systems along with their function and necessity.

I. C. ENGINES : Classification - Working principles, Valve and Port Timing Diagrams, - Engine systems – Fuel, Carburetor, Fuel Injection System, Ignition, Cooling and Lubrication, principle of wankle engine, principles of supercharging and turbo charging.

UNIT – II

Objectives: To make the student learn and understand the reasons and affects of various losses that occur in the actual engine operation.

Actual Cycles and their Analysis: Introduction, Comparison of Air Standard and Actual Cycles, Time Loss Factor, Heat Loss Factor, Exhaust Blowdown-Loss due to Gas exchange process, Volumetric Efficiency. Loss due to Rubbing Friction, Actual and Fuel-Air Cycles of CI Engines.

UNIT – III

Objectives: To learn about normal combustion phenomenon and knocking in S.I. and C.I. Engines and to find the several engine operating parameters that affect the smooth engine operation.

Combustion in S.I. Engines : Normal Combustion and abnormal combustion – Importance of flame speed and effect of engine variables – Type of Abnormal combustion, pre-ignition and knocking (explanation of) – Fuel requirements and fuel rating, anti knock additives – combustion chamber – requirements, types.

Combustion in C.I. Engines : Four stages of combustion – Delay period and its importance – Effect of engine variables – Diesel Knock– Need for air movement, suction, compression and combustion induced turbulence – open and divided combustion chambers and nozzles used – fuel requirements and fuel rating.

UNIT – IV

Objectives: To make the student learn to perform testing on S.I and C.I Engines for the calculations of performance and emission parameters.

Measurement, Testing and Performance: Parameters of performance - measurement of cylinder pressure, fuel consumption, air intake, exhaust gas composition, Brake power – Determination of frictional losses and indicated power – Performance test – Heat balance sheet and chart.

UNIT – V

Objectives: To make students learn about different types of compressors and to calculate power and efficiency of reciprocating compressors.

COMPRESSORS – Classification –positive displacement and roto dynamic machinery – Power producing and power absorbing machines, fan, blower and compressor – positive displacement and dynamic types – reciprocating and rotary types.

Reciprocating Compressors: Principle of operation, work required, Isothermal efficiency volumetric efficiency and effect of clearance, stage compression, undercooling, saving of work, minimum work condition for stage compression.

UNIT VI

Objectives: To make students learn mechanical details, and to calculate power and efficiency of rotary compressors.

Rotary Compressors (Positive displacement type) : Roots Blower, vane sealed compressor, Lysholm compressor – mechanical details and principle of working – efficiency considerations.

Dynamic Compressors: Centrifugal compressors: Mechanical details and principle of operation – velocity and pressure variation. Energy transfer-impeller blade shape-losses, slip factor, power input factor, pressure coefficient and adiabatic coefficient – velocity diagrams – power.

Axial Flow Compressors: Mechanical details and principle of operation – velocity triangles and energy transfer per stage degree of reaction, work done factor - isentropic efficiency- pressure rise calculations – Polytropic efficiency.

TEXT BOOKS:

1. I.C. Engines / V. GANESAN- TMH
2. Heat engines, vasandani & Kumar publications Thermal

REFERENCES:

1. IC Engines – M.L.Mathur &R.P.Sharma – Dhanpath Rai & Sons.
2. I.C.Engines–AppliedThermosciences–C.R.Ferguson&A.T.Kirkpatrick-2nd Edition-Wiley Publ
3. I.C. Engines - J.B.Heywood /McGrawHIll.
4. Thermal Engineering – R.S.Khurmi & J.S.Gupta- S.chand Publ

Useful Web-links : http://nptel.ac.in/courses.php
http://mit.espe.edu.ec/courses/mechanical-engineering/

II Year B.Tech. (ME) – II Sem.

PRODUCTION TECHNOLOGY [14130403]

Course Objective:

To impart basic knowledge and understanding about the primary manufacturing processes such as casting, joining, forming and powder metallurgy and their relevance in current manufacturing industry; To introduce processing methods of plastics.

UNIT – I

Objective: To make the students understand fundamentals of casting.

CASTING: Steps involved in making a casting – Advantage of casting and its applications. – Patterns and Pattern making – Types of patterns – Materials used for patterns, pattern allowances and their construction, Principles of Gating, Gating ratio and design of Gating systems

UNIT – II

Objective: To provide insight into sand casting and introduce other casting processes.

Methods of melting and types of furnaces, Solidification of castings, Solidification of pure metals and alloys, short & long freezing range alloys. Risers – Types, function and design, casting design considerations, Basic principles and applications of Centrifugal casting, Die casting and Investment casting.

UNIT – III

Objective: To impart fundamentals of gas welding and arc welding.

Welding : Classification of welding processes, types of welded joints and their characteristics, Gas welding, Different types of flames and uses, Oxy – Acetylene Gas cutting.

Basic principles of Arc welding, Manual metal arc welding, Sub merged arc welding, Inert Gas welding- TIG & MIG welding.

UNIT – IV

Objective: To teach principles of advanced welding processes and their applications.

Resistance welding, Solid state welding processes- Friction welding, Friction stir welding, Forge welding, Explosive welding; Thermit welding, Plasma welding, Laser welding, electron beam welding, Soldering & Brazing.
Heat affected zones in welding; pre & post heating, Weldability of metals, welding defects – causes and remedies – destructive and nondestructive testing of welds, Design of welded joints.

UNIT – V

Objective: To impart knowledge on bulk forming processes.

Plastic deformation in metals and alloys, Hot working and Cold working, Strain hardening and Annealing.
Bulk forming processes: Forging - Types Forging, Smith forging, Drop Forging, Roll forging, Forging hammers, Rotary forging, forging defects; Rolling – fundamentals, types of rolling mills and products, Forces in rolling and power requirements. Extrusion and its characteristics. Types of extrusion, Impact extrusion, Hydrostatic extrusion; Wire drawing and Tube drawing.
Introduction to powder metallurgy – compaction and sintering, advantages and applications

UNIT – VI

Objective: To provide understanding of various sheet metal forming processes and processing of plastics.

Sheet metal forming - Blanking and piercing, Forces and power requirement in these operations, Deep drawing, Stretch forming, Bending, Springback and its remedies, Coining, Spinning, Types of presses and press tools.

Processing of Plastics: Types of Plastics, Properties, Applications and their processing methods, Blow and Injection molding.

TEXT BOOKS:

1. Manufacturing Processes for Engineering Materials - Kalpakjian S and Steven R Schmid- Pearson
   Publ , 5th Edn.
2. Manufacturing Technology -Vol I- P.N. Rao- TMH
3. Fundamentals of Modern Manufacturing - Mikell P Groover- Wiley publ – 3rd Edition

REFERENCES :

1. Manufacturing Science – A.Ghosh & A.K.Malik – East West Press Pvt. Ltd
2. Process and materials of manufacture- Lindberg- PHI
3. Production Technology- R.K. Jain- Khanna
4. Production Technology-P C Sharma-S. Chand
5. Manufacturing Processes- H.S. Shaun- Pearson

6. Manufacturing Processes- J.P. Kaushish- PHI

Useful Web-links : http://nptel.ac.in/courses.php
http://mit.espe.edu.ec/courses/mechanical-engineering/

II Year B.Tech. (ME) – II Sem.
3+1-0-3

FLUID MECHANICS & HYDRAULIC MACHINERY [14130404]

UNIT I

Objective: The objective of this unit is to make student understand the properties of fluids, specific gravity, viscosity and measurement of pressure.

Fluid statics: Dimensions and units: physical properties of fluids- specific gravity, viscosity 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

Objective: The objective of this unit is to make student understand the Fluid kinematics and Fluid dynamics. Euler's and Bernoulli's equations of fluid flow, momentum equation and its application.

Fluid kinematics: stream line, path line and streak lines and stream tube, classification of flows- steady & Unsteady, uniform, non uniform, laminar, turbulent, rotational, and irrotational 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

Objective: The objective of this unit is to make student understand flow in closed conduits. Losses and hydraulic gradient line. Momentum equation and its application. Measurement of fluid flow.

Closed conduit flow: Reynold's experiment- Darcy Weisbach equation- Minor losses in pipes- pipes in series and pipes in parallel- total energy line-hydraulic gradient line. Measurement of flow: pilot tube, venturimeter, and orifice meter, Flow nozzle, Turbine flow meter.

UNIT IV

Objective: The objective of this unit is to make student understand dimensional analysis and dimensional numbers and their significance. Boundary layer theory and applications. Drag and lift on immersed bodies.

Dimensional analysis and similitude: Dimensional homogeneity, Raleigh's Theorem and Buckingham's theorem, important dimensional numbers and their significance, geometric, Kinematic and dynamic similarity, model studies.

Boundary Layer Theory and Applications: Concepts of boundary layer, boundary layer thickness and equations, momentum integral equation, boundary layer separation and its control, cavitation. Circulation, Drag and lift on immersed bodies, Magnus effect. **UNIT V**

Objective: The objective of this unit is to make student understand basics of turbo machinery: hydrodynamic force of jets. Hydraulic pumps and their Classification, performance characteristic curves of Centrifugal and reciprocating pumps.

Basics of turbo machinery: hydrodynamic force of jets on stationary and moving flat, inclined, and curved vanes, jet striking centrally and at tip, velocity diagrams, work don and efficiency, flow over radial vanes.

Centrifugal pumps: classification, working, work done – manomertic head- losses and efficiencies specific speed- pumps in series and parallel-performance characteristic curves, NPSH. Reciprocating pumps: Working, Discharge, slip, indicator diagrams.

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

UNIT VI

Objective: The objective of this unit is to make student understand basics of Hydraulic Turbines and Performance of hydraulic turbines.

Hydraulic Turbines: classification of turbines, impulse and reaction turbines, Pelton wheel, 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, governing of turbines, selection of type of turbine, cavitation, surge tank, water hammer.

TEXT BOOKS:

1. Fluid Mechanics and Hydraulic Machines by Rajput.
2. Hydraulics, fluid mechanics and Hydraulic machinery by Modi and Seth.

REFERENCE BOOKS:

1. Fluid Mechanics and Fluid Power Engineering by D.S. Kumar, Kotaria & Sons.
2. Fluid Mechanics and Machinery by D. Rama Durgaiah, New Age International.
3. Hydraulic Machines by Banga & Sharma, Khanna Publishers.

Useful Web-links : http://nptel.ac.in/courses.php
http://mit.espe.edu.ec/courses/mechanical-engineering/

II Year B.Tech. (ME) – II Sem.

INDUSTRIAL ENGINEERING AND MANAGEMENT [14130405]

Course Objective: To impart knowledge on Industrial Engineering and Scientific Principles of Management to improve productivity in manufacturing industries and to understand work culture in Industrial Units with emphasis on new methods and techniques.

UNIT – I
Objective: To introduce basic concepts of Industrial Engineering and Management and various theories of eminent in this field.

Introduction:
Industrial Engineering- Role of Industrial Engineer- IE Applications – Productivity – Scope of Industrial Engineering.

Management – Concepts, Origin, Importance, functions, Henry Fayol's Management Principles, F W Taylor's Scientific Management, Mc Gregor's theory- System's approach to Management – Human Resource Management.

UNIT – II
Objective: To edify the basics of plant location & layout with an introduction to Maintenance in Industrial Plants with emphasis on Employee Safety.

Plant - Facility Location & Lay-out
Factors governing plant location, Location Economics, Plant layout types of plant layout - computer aided layout design techniques.

Plant maintenance – Types - Preventive Maintenance – Reliability - Maintainability, and Availability concepts - Employee Health & Safety.

UNIT – III
Objective: To introduce basic idea of Production Methods and Tools of Prodcutivity.

Production & Work Study
Production –Types of Production- Advantages and disadvantages - Aggregate Production Planning.
Work study – Method Study and Motion Study – Work measurement - Procedure – micro-motion study - Concept of normal time; allowances. Work sampling - Technique of work measurement - **PMTS** - Role of work study in improving productivity – Introduction to Ergonomics, Therbligs – Flow process Charts – String Diagrams.

UNIT – IV

Objective: To enlighten importance of Quality & Concepts of New Quality Management Techniques with an idea of various calculations involved.

Quality Management:

Quality – DMAIC Cycle – Life cycle approach - Quality costs- Inspection - Control Charts – Numerical Examples on X Bar – R Charts, C Charts and P Charts - Seven QC tools.

TQM basic Concepts -Zero Defects – Quality Circles – ISO Quality Systems, 5S, Six Sigma, Quality Function Deployment, Kaizen.

UNIT – V

Objective: To train in Innovative Industrial Engineering Techniques and enlightening their importance in Industrial Scenario.

Innovative Industrial Engineering Techniques

Materials Management - Inventory Management – Selective Inventory Control techniques – ABC-VED-FSN- Surplus Disposal.

MRP1 and MRPII, Supply Chain Management, ERP, Value Engineering – Value Analysis

UNIT – VI

Objective: To provide knowledge in principles of networking/ project management and project completion a head-of schedule.

Project Management

Introduction to Network Diagrams - CPM and PERT - Critical Path Analysis, Crashing - Activity times and floats, Project completion times.

PERT and three Time Estimates, critical path analysis of a PERT network, Probability of completion of project - Simple Numerical Examples on CPM & PERT.

Text Books:

1. Industrial Engineering and Management OP Khanna – Khanna Publishers
2. Industrial Engineering – Banga & Sharma.
3. Industrial Engineering and Production management – Martand Telsang – S Chand & Co New Delhi.
4. Production and Operations Management – Paneerselvem – PHI

References:

1. Introduction to Work Study, I.L.O., 3rd Revised Edn., 1986
2. Operations Management by J.G Monks, McGrawHill Publishers.
3. Production and operations management by K.C Arora.
4. Production Management by Buffa,
5. Industrial Engineering and Management: A New Perspective, Philip E. Hicks McGraw-Hill
6. Handbook of Industrial Engineering: Technology and Operations Management By Gavriel Salvendy – Institute of Industrial Engineers

Useful Web-links : http://nptel.ac.in/courses.php
http://mit.espe.edu.ec/courses/mechanical-engineering/

II Year B.Tech. (ME) – II Sem.

MACHINE DRAWING [14130406]

Course Objective: The student will acquire knowledge of fastening arrangements such as welding, riveting the different styles of attachment for shaft. The student also is enabled to prepare the assembly of various machine or engine components and miscellaneous machine components.

Machine Drawing Conventions:

Need for drawing conventions – introduction to IS conventions
a) Conventional representation of materials, common machine elements and parts such as screws, nuts, bolts, keys, gears, webs, ribs.
b) Types of sections – selection of section planes and drawing of sections and auxiliary sectional views. Parts not usually sectioned.
c) Methods of dimensioning, general rules for sizes and placement of dimensions for holes, centers, curved and tapered features.
d) Title boxes, their size, location and details - common abbreviations & their liberal usage
e) Types of Drawings – working drawings for machine parts.

I. Drawing of Machine Elements and simple parts

Objective: To provide basic understanding and drawing practice of various joint, simple mechanical parts

Selection of Views, additional views for the following machine elements and parts with every drawing proportions.
a) Popular forms of Screw threads, bolts, nuts, stud bolts, tap bolts, set screws.
b) Keys, cottered joints and knuckle joint.
c) Rivetted joints for plates
d) Shaft coupling, spigot and socket pipe joint.
e) Journal, pivot and collar and foot step bearings.

II. Assembly Drawings:

Objective: The student will be able to draw the assembly from the individual part drawing.

Drawings of assembled views for the part drawings of the following using conventions and easy drawing proportions.

a) Engine parts – stuffing boxes, cross heads, Eccentrics, Petrol Engine connecting rod, piston assembly.

b) Other machine parts - Screws jacks, Machine Vices Plummer block, Tailstock.

c) Valves: Steam stop valve, spring loaded safety valve, feed check valve and air cock.

NOTE: First angle projection to be adopted. The student should be able to provide working drawings of actual parts.

TEXT BOOKS:

1. Machine Drawing – Dhawan, S.Chand Publications

2. Machine Drawing –K.L.Narayana, P.Kannaiah & K. Venkata Reddy / New Age/ Publishers

REFERENCES:

1. Machine Drawing – N.Siddeswar, K.Kannaiah & V.V.S.Sastry - TMH

2. Machine Drawing – P.S.Gill,

3. Machine Drawing – Luzzader

4. Machine Drawing – Rajput

5. Machine Drawing – N.D. Junnarkar, Pearson

6. Machine Drawing – Ajeeth Singh, McGraw Hill

7. Machine Drawing – KC John, PHI

8. Machine Drawing – B Battacharya, Oxford

9. Machine Drawing – Gowtham and Gowtham, Pearson

Useful Web-links : http://nptel.ac.in/courses.php
http://mit.espe.edu.ec/courses/mechanical-engineering/

II Year B.Tech. (ME) – II Sem.

FLUID MECHANICS & HYDRAULIC MACHINERY LAB [14130417]

Course Objective: To impart hands-on practical exposure on study of fluid flow and working of hydraulic machinery.

1. Impact of jets on Vanes.
2. Performance Test on Pelton Wheel.
3. Performance Test on Francis Turbine.
4. Performance Test on Kaplan Turbine.
5. Performance Test on Single Stage Centrifugal Pump.
6. Performance Test on Multi Stage Centrifugal Pump.
7. Performance Test on Reciprocating Pump.
8. Calibration of Venturimeter.
9. Calibration of Orifice meter.
10. Determination of friction factor for a given pipe line.
11. Determination of loss of head due to sudden contraction in a pipeline.
12. Turbine flow meter.

Note: Any 10 of the above 12 experiments are to be conducted.

II Year B.Tech. (ME) – II Sem.

PRODUCTION TECHNOLOGY LAB [14130418]

Course Objective: To impart hands-on practical exposure on manufacturing processes and equipment.

Minimum of 12 Exercises need to be performed

I. METAL CASTING:

1. Pattern Design and making - for one casting drawing.
2. Sand properties testing - for strength and permeability
3. Mould preparation, Melting and Casting

II WELDING:

1. Gas welding
2. Gas cutting
3. Manual metal arc welding - Lap & Butt Joints
4. TIG/MIG Welding
5. Resistance Spot Welding
6. Brazing and soldering

III METAL FORMING AND POWDER METALLURGY:

1. Blanking & Piercing operations and study of simple, compound and progressive dies.
2. Deep drawing and extrusion operations.
3. Bending and other operations

4. Basic powder compaction and sintering

IV PROCESSING OF PLASTICS

1. Injection Moulding
2. Blow Moulding

II Year B.Tech. (ME) – II Sem.

SOFT SKILLS – 1 [14139499]

Course Objective: To strengthen the four language skills of the learners and to prepare them for success in academics and the job market.

Semester II **60 hours + Assessment 1 hrs**

Total: 15 weeks Theory: 45 hours Practical: 15 hours
Per week: 4 hours Theory: 3 hours Practical: 1 hours

UNIT 1: PLACES		Theory/Lab	Time frame
Reading	Introducing the theme; Scanning for information/numbers; understanding key vocab; making predictions	Punctuation Understanding unknown text	
Writing	Punctuation, sentence structure, writing different sentences		
Listening & Pronunciation	listening for main ideas/details; wordstress vowel sounds	Lab	
Speaking	Organizing information for a presentation*;* Making a presentation	Lab	
Grammar	Parts of speech: Nouns, verbs and adjectives; Subject + verb; There is / There are; Past simple		
Vocabulary	Vocabulary to describe places		
UNIT 2: FESTIVALS AND CELEBRATIONS		Theory/Lab	Time frame
Reading	Previewing a text using the title, sub-titles and photographs; recognizing text types, skimming the text	Pre-reading requires viewing of a video	
Writing	Organizing sentences into a paragraph*;* writing a first draft; writing paragraph :descriptive ,narrative etc.		
Listening & Pronunciation	Listening and taking notes; listening for examples; Stressed words and unstressed sounds	Lab	
Speaking	Making suggestions*;* Giving a poster presentation, understanding intonation	Lab	

Grammar	Prepositions of time and place: *on, in, at;* Adverbs of frequency*;* Sentence structure: subject and verb order; Prepositional phrases; Present tense question forms		
Vocabulary	Vocabulary to describe festivals; Collocations		
UNIT 3: SCHOOL AND EDUCATION		Theory/Lab	Time frame
Reading	Skimming for main ideas; reading for details; making inferences	Pre-reading requires viewing of a video	
Writing	Paragraph organization: topic sentence and supporting sentences, selection of type of paragraph, ordering and sequencing		
Listening & Pronunciation	Using visual clues to listen; following native accent and intonation	Lab	
Speaking	Giving opinions in a debate*:* agreeing and disagreeing,convincing	Lab	
Grammar	Tense and aspect, use of *because* and *so;* basic verb patterns		
Vocabulary	Vocabulary in academic context; Collocations about learning; Prepositional phrases		
UNIT 4: THE INTERNET AND TECHNOLOGY		Theory/Lab	Time frame
Reading	Understanding theme; Scanning to predict content; Making inferences	Pre-reading requires viewing of a video	
Writing	Describing an ordering steps,structurizing information		
Listening & Pronunciation	Listening for reasons; Listening and predicting the inner theme and conclusion ,consonant sounds	Lab	
Speaking	Presenting additional or contrasting information;	Lab	
Grammar	Compound nouns; *and, also* and *too*; *but* and *however; can* / *be able to*		
Vocabulary	Vocabulary for Internet and technology		
UNIT 5: LANGUAGE AND COMMUNICATION		Theory/Lab	Time frame
Reading	Reading for main ideas, identifying the meaning, preparing captions	Pre-reading requires viewing of a video	
Writing	Writing supporting sentences; Reviewing a paragraph for content and structure, report writing ,types of report		
Listening & Pronunciation	Listening for genre; Listening for instructions; Consonant sounds	Lab	
Speaking	Sequencing words to organize instructions; Planning and giving a set of instructions	Lab	
Grammar	Countable and uncountable nouns; Articles *a, an*		

	or no article; Quantifiers: *some, many, a lot of, a few, a little;* Imperative clauses; Verb patterns		
Vocabulary	Vocabulary for every day communication		