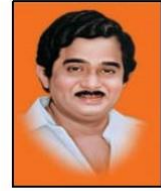


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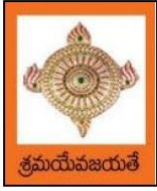
II Year – I SEMESTER

MECHANICAL ENGINEERING

S.NO		SUBJECT NAME	L	T	P	CREDITS
1	BSC	Transformation Techniques	3	0	0	3
2	PCC-1	Mechanics of Solids	3	0	0	3
3	PCC-2	Thermodynamics	3	0	0	3
4	PCC-3	Kinematics of Machinery	3	0	0	3
5	PCC-4	Fluid Mechanics and Hydraulic Machines	3	0	3	3
6	PCC-L1	Computer Aided Engineering Drawing Practice	0	0	3	1.5
7	PCC-L2	Mechanics of solids & Metallurgy Lab	0	0	3	1.5
8	PCC-L3	Fluid Mechanics & Hydraulic Machines lab	0	0	3	1.5
9	SOC	Python programming Lab	2	0	0	2
10	MC	Essence of Indian Traditional Knowledge	2	0	0	0
		Total Credits				21.5

II Year – II SEMESTER

S.NO		SUBJECT NAME	L	T	P	CREDITS
1	ESC	Production Technology	3	0	0	3
2	BSC	Complex variables and statistical Methods	3	0	0	3
3	PCC-1	Dynamics of Machinery	3	0	0	3
4	PCC-2	Thermal Engineering -I	3	0	0	3
5	HSC	Industrial Engineering and Management	3	0	0	3
6.	PCC-L1	Machine Drawing Practice	0	0	3	1.5
7	ESC-1	Production Technology Lab	0	0	3	1.5
8	PCC-L2	Theory Of Machines Lab	0	0	3	1.5
9	SOC	Mat Lab Programming	2	0	3	2
		Total Credits				21.5



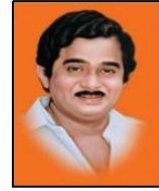
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DEPARTMENT OF MECHANICAL ENGINEERING

II Year- I Semester	L	T	P	C
	3	0	0	3
TRANSFORMATION TECHNIQUES (M-III)				

Course Objectives:

- To familiarize the techniques in partial differential equations
- To furnish the learners with basic concepts and techniques at plus two level to lead them into advanced level by handling various real world applications.

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

- interpret the physical meaning of different operators such as gradient, curl and divergence (L5)
- estimate the work done against a field, circulation and flux using vector calculus (L5)
- apply the Laplace transform for solving differential equations (L3)
- find or compute the Fourier series of periodic signals (L3)
- know and be able to apply integral expressions for the forwards and inverse Fourier transform to a range of non-periodic waveforms (L3)
- identify solution methods for partial differential equations that model physical processes (L3)

UNIT –I: Vector calculus: (10hrs)

Vector Differentiation: Gradient– Directional derivative – Divergence– Curl– Scalar Potential.

Vector Integration: Line integral – Work done – Area– Surface and volume integrals – Vector integral theorems: Greens, Stokes and Gauss Divergence theorems (without proof) and problems on above theorems.

UNIT –II: Laplace Transforms:

Laplace transforms – Definition and Laplace transforms of some certain functions– Shifting theorems – Transforms of derivatives and integrals – Unit step function –Dirac’s delta functionPeriodic function – Inverse Laplace transforms– Convolution theorem (with out proof).

Applications: Solving ordinary differential equations (initial value problems) using Laplace transforms.

UNIT –III: Fourier series and Fourier Transforms: Fourier Series: Introduction– Periodic functions – Fourier series of periodic function –Dirichlet’s conditions – Even and odd functions –Change of interval– Half-range sine and cosine series.

Fourier Transforms: Fourier integral theorem (without proof) – Fourier sine and cosine integrals – Sine and cosine transforms – Properties (article-22.5 in text book-1)– inverse transforms – Convolution theorem (without proof) – Finite Fourier transforms.

UNIT –IV: PDE of first order:

Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions – Solutions of first order linear (Lagrange) equation and nonlinear (standard types) equations.

UNIT – V: Second order PDE and Applications:

Second order PDE: Solutions of linear partial differential equations with constant coefficients – Non- homogeneous term of the type $eaxby$, $\sin(ax by)$, $\cos(ax by)$, $xm yn$.

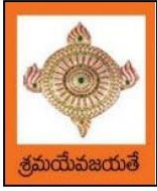
Applications of PDE: Method of separation of Variables– Solution of One dimensional Wave, Heat and two-dimensional Laplace equation.

TEXT BOOKS:

1. B.S.Grewal, Higher Engineering Mathematics, 43rd Edition, Khanna Publishers.
2. B.V.Ramana, Higher Engineering Mathematics, 2007 Edition, Tata Mc.Graw Hill Education

REFERENCE BOOKS:

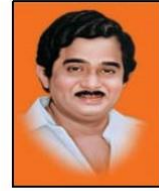
1. Erwin Kreyszig, Advanced Engineering Mathematics, 10thEdition, Wiley-India.
2. Peter O’Neil Advanced Engineering Mathematics, Cengage.



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DEPARTMENT OF MECHANICAL ENGINEERING

II Year - I Semester	L	T	P	C
	3	0	0	3
MECHANICS OF SOLIDS				

Course Objectives: The students completing this course are expected to understand the basic terms like stress, strain, Poisson's ratio...etc and different stresses and deflections induced in beams, thin cylinders, thick cylinders, and columns. Further, the student shall be able to understand the shear stresses due to torsion in circular shafts.

Course outcomes:

On the completion of the course the student will be able to

CO1: Model & Analyze the behavior of basic structural members subjected to various loading and support conditions based on principles of equilibrium.

CO2: Understand the application of the concept of stress and strain to analyze and design structural members and machine parts under axial, shear and bending loads, moment and torsional moment. CO3: Students will learn all the methods to analyze beams, columns, frames for normal, shear, and torsion stresses and to solve deflection problems in preparation for the design of such structural components. Students are able to analyze beams and draw correct and complete shear and bending moment diagrams for beams.

CO4: Students attain a deeper understanding of the loads, stresses, and strains acting on a structure and their relations in the elastic behavior

CO5: Design and analysis of Industrial components like pressure vessels.

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 – Bars of varying section – composite bars – Temperature stresses- Complex Stresses Stresses on an inclined plane under different uniaxial and biaxial stress conditions - Principal planes and principal stresses - Mohr's circle - Relation between elastic constants, Strain energy – Resilience – Gradual, sudden, impact and shock loadings.

UNIT – II

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

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, Angle and Channel sections – Design of simple beam sections.

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

UNIT – IV

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 uniformly varying load. Mohr’s theorems – Moment area method – application to simple cases including overhanging beams, Statically indeterminate Beams and solution methods.

TORSION: Introduction-Derivation- Torsion of Circular shafts- Pure Shear-Transmission of power by circular shafts, Shafts in series, Shafts in parallel.

UNIT – V

THIN AND THICK CYLINDERS: Thin seamless cylindrical shells – Derivation of formula for longitudinal and circumferential stresses – hoop, longitudinal and Volumetric strains – changes in dia, and volume of thin cylinders – Riveted boiler shells – Thin spherical shells. Wire wound thin cylinders. Lamé’s equation – cylinders subjected to inside & outside pressures –compound cylinders.

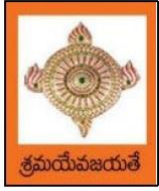
COLUMNS: Buckling and Stability, Columns with Pinned ends, Columns with other support Conditions, Limitations of Euler’s Formula, Rankine’s Formula.

TEXT BOOKS:

1. Strength of materials /GH Ryder/ Mc Millan publishers IndiaLtd.
2. Strength of materials by B.C. Punmia-lakshmi publications pvt.Ltd, New Delhi.

REFERENCES:

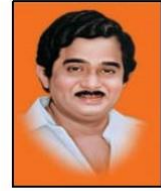
1. Mechanics of Materials by Gere &Timoshenko
2. Strength of Materials -By Jindal, UmeshPublications.
3. Strength of Materials by S.Timoshenko- D. VAN NOSTRAND Company- PHIPublishers
4. Strength of Materials by Andrew Pytel and Ferdinand L. Singer Longman-HarpercollinsCollege Division
5. Solid Mechanics, byPopov-
6. Mechanics of Materials/Gere and Timoshenko, CBS Publishers



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DEPARTMENT OF MECHANICAL ENGINEERING

II Year- I Semester		L	T	P	C
		3	0	0	3
Thermodynamics					

Course Objectives:

To impart the knowledge of the thermodynamic laws and principles so as to enable the student to prepare an energy audit of any mechanical system that exchange heat and work with the surroundings.

COURSE OUTCOMES:

After undergoing the course the student is expected to learn

CO1: Basic concepts of thermodynamics

CO2: Laws of thermodynamics

CO3: Concept of entropy

CO4: Property evaluation of vapors and their depiction in tables and charts

CO5: Evaluation of properties of perfect gas mixtures.

UNIT – I

Introduction: Basic Concepts : System, boundary, Surrounding, Universe, control volume, Types of Systems, Macroscopic and Microscopic viewpoints, Concept of Continuum, Thermodynamic Equilibrium, State, Property, Process - Reversible, Quasi static & Irreversible Processes, cycle, Causes of Irreversibility. Energy in State and in Transition - Types, Work and Heat, Point and Path function.

Zeroth Law of Thermodynamics – Concept of Temperature – Principles of Thermometry – Reference Points – Const. Volume gas Thermometer – Scales of Temperature.

UNIT – II

Joule's Experiments – First law of Thermodynamics – Corollaries – First law applied to a Process – applied to a flow system – Energy balance for closed systems-Specific heats- Internal energy, Enthalpy and Specific heats of Solids, liquids and Ideal gases, Some steady flow energy equation applied to Nozzle, Turbine, Compressor and heat exchanger devices, PMM-I.

UNIT III

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 cycle and its specialties, Carnot's theorem, Thermodynamic scale of Temperature.

Clausius Inequality, Entropy, Principle of Entropy Increase, Availability and Irreversibility (Basic definitions) – Thermodynamic Potentials, Gibbs and Helmholtz Functions, Maxwell Relations – Elementary Treatment of the Third Law of Thermodynamics.

UNIT IV

Pure Substances, P-V-T- surfaces, T-S and h-s diagrams, Mollier Charts, Phase Transformations – Triple point and critical point, properties during change of phase, Dryness Fraction – Clausius – Clapeyron Equation, Property tables. Various Thermodynamic processes and energy Transfer – Steam Calorimetry.

UNIT – V

Ideal Gas equation of state- Compressibility factor- Van der Waals equation of state- Beattie-Bridgeman equation of state- Benedict-Webb-Rubin equation of state- Virial equation of state- compressibility charts – variable specific heats .

Mixtures of perfect Gases – Dalton's Law of partial pressure, Avogadro's Laws of additive volumes- Equivalent Gas constant and Molecular Internal Energy, Enthalpy, Specific Heat and Entropy of Mixture of Perfect Gases and Vapour.

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.

TEXT BOOKS:

1. Engineering Thermodynamics, PK Nag 6th Edn , McGraw Hill.
2. Fundamentals of Thermodynamics – Sonntag, Borgnakke, Van Wylen, 6th Edn, Wiley

REFERENCES:

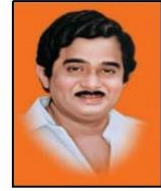
1. Thermodynamics by Prasanna Kumar, Pearson Publishers
2. Engineering Thermodynamics – Jones & Dugan PHI
3. Thermodynamics, an Engineering Approach, Yunus A Cengel, Michael A Boles, 8th Edn inSI Units, McGraw Hill.
4. Thermodynamics – J.P.Holman , McGrawHill
5. An Introduction to Thermodynamics - Y.V.C.Rao – Universities press.
6. Thermodynamics – W.Z.Black & J.G.Hartley, 3rd Edn Pearson Publ.
7. Engineering Thermodynamics – D.P.Misra, Cengage Publ.
8. Engineering Thermodynamics – P.Chattopadhyay – Oxford Higher Edn Publ.



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DEPARTMENT OF MECHANICAL ENGINEERING

II Year- I Semester		L	T	P	C
		3	0	0	3
Kinematics of Machinery					

Course objective: The students completing this course are expected to understand the nature and role of the kinematics of machinery, 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.

Course outcomes:

The student should be able to

CO1: Contrive a mechanism for a given plane motion with single degree of freedom.

CO2: Suggest and analyze a mechanism for a given straight line motion and automobile steering motion. CO3: Analyze the motion (velocity and acceleration) of a plane mechanism.

CO4: Suggest and analyze mechanisms for a prescribed intermittent motion like opening and closing of IC engine valves etc.

CO5: Select a power transmission system for a given application and analyze motion of different transmission systems

UNIT – I

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.

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

UNIT – II

LOWER PAIR MECHANISM: Exact and approximate copiers and generated types – Peaucellier, Hart and Scott Russel – 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

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 for a given mechanism, Klein's construction, determination of Coriolis component of acceleration.

PLANE MOTION OF BODY: Instantaneous center of rotation, centroids 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

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 3cases.

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

BELT DRIVES: Introduction, Belt and rope drives, selection of belt drive- types of belt drives, V- belts, materials used for belt and rope drives, velocity ratio of belt drives, slip of belt, creep of belt, tensions for flat belt drive, angle of contact, centrifugal tension, maximum tension of belt, Chains- length, angular speed ratio, classification of chains.

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: 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.

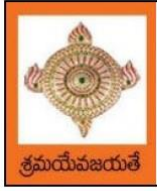
GEAR TRAINS: Introduction to gear Trains, Train value, Types – Simple and reverted wheel train – Epicyclic gear Train. Methods of finding train value or velocity ratio – Epicyclic gear trains. Selection of gear box-Differential gear for an automobile.

TEXT BOOKS:

1. Theory of Mechanisms & Machines by Jagadeesh lal, Metropolitan Pvt. Ltd.
2. Theory of Machines by Thomas Bevan/ CBS Publishers

REFERENCES:

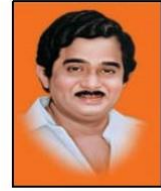
1. Theory of Machines – S. S Rattan- TMH Publishers
2. Theory of machines and Machinery-Vickers - Oxford.
3. Theory of Mechanisms and machines – A.Ghosh&A.K.Malik – East West Press Pvt.Ltd.
4. Kinematics and dynamics of Machinery- R.L Norton- TATAMcGraw-Hill



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DEPARTMENT OF MECHANICAL ENGINEERING

II Year - I Semester		L	T	P	C
		3	0	0	3
FLUID MECHANICS & HYDRAULIC MACHINES					

Course Objectives: The students completing this course are expected to understand the properties of fluids, its kinematic and dynamic behavior through various laws of fluids like continuity, Euler's, Bernoulli's equations, energy and momentum equations. Further, the student shall be able to understand the theory of boundary layer, working and performance characteristics of various hydraulic machines like pumps and turbines.

COURSE OUTCOMES:

From this course the student is expected to learn CO1: The basic concepts of fluid properties.

CO2: The mechanics of fluids in static and dynamic conditions.

CO3: Boundary layer theory, flow separation and dimensional analysis. CO4: Hydrodynamic forces of jet on vanes in different positions.

CO5: Working Principles and performance evaluation of hydraulic pump and turbines.

UNIT I

Objective: After studying this unit student will know the concept of fluid and its properties, manometry, hydrostatic forces acting on different surfaces and also problem solving techniques.

Fluid statics: Dimensions and units: physical properties of fluids - specific gravity, viscosity and its significance, surface tension, capillarity, and vapor pressure. Atmospheric, gauge and vacuum pressure, Measurement of pressure – Manometers - Piezometer, U-tube, inverted and differential manometers. Pascal's & hydrostatic laws.

Buoyancy and floatation: Meta center, stability of floating body. Submerged bodies. Calculation of metacenter height. Stability analysis and applications.

UNIT II

Objective: In this unit student will be exposed to the basic laws of fluids, flow patterns, viscous flow through ducts and their corresponding problems.

Fluid kinematics: Introduction, flow types. Equation of continuity for one dimensional flow, circulation and vorticity, Stream line, path line and streak lines and stream tube. Stream function and velocity potential function, differences and relation between them. Condition for irrotational flow, flow net, source and sink, doublet and vortexflow.

Fluid dynamics: surface and body forces –Euler's and Bernoulli's equations for flow along a stream line, momentum equation and its applications, force on pipebend.

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.

UNIT III

Objective: At the end of this unit student will be aware of the concepts related to boundary layer theory, flow separation, basic concepts of velocity profiles, dimensionless numbers and dimensional analysis.

Boundary Layer Theory: Introduction, momentum integral equation, displacement, momentum and energy thickness, separation of boundary layer, control of flow separation, Stream lined body, Bluff body and its applications, basic concepts of velocity profiles.

Dimensional Analysis: Dimensions and Units, Dimensional Homogeneity, Non dimensionalization of equations, Method of repeating variables and Buckingham Pi Theorem.

UNIT IV

Objective: In this unit student will know the hydrodynamic forces acting on vanes and their performance evaluation.

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 done and efficiency, flow over radial vanes.

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.

UNIT V

Objective: After studying this unit student will be in a position to understand the characteristic curves of hydraulic turbines and also evaluate the performance characteristics of hydraulic pumps.

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. Hydraulic systems- hydraulic ram, hydraulic lift, hydraulic coupling. Fluidics – amplifiers, sensors and oscillators. Advantages, limitations and applications.

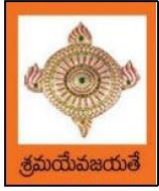
Centrifugal pumps: classification, working, work done – manometric head- losses and efficiencies- specific speed- pumps in series and parallel-performance characteristic curves, cavitation & NPSH. **Reciprocating pumps:** Working, Discharge, slip, indicator diagrams

TEXT BOOKS:

1. Fluid Mechanics- Fundamentals and Applications by Y.A. Cengel, J.M.Cimbala, 6thEdn,McGrawHill
2. Fluid Mechanics - Dixon, 7thEdn,Elesvier

REFERENCE BOOKS:

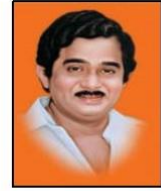
1. Hydraulics, fluid mechanics and Hydraulic machinery- Modi andSeth
2. Fluid Mechanics and Hydraulic Machines - RK Bansal- Laxmi Publications (P)Ltd.
3. Fluid Mechanics and Hydraulic Machines –Rajput
4. Fluid Mechanics and Fluid Power Engineering - D.S. Kumar, Kotaria&Sons.
5. Fluid Mechanics and Machinery - D. Rama Durgaiah, New AgeInternational



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DEPARTMENT OF MECHANICAL ENGINEERING

II Year-I Semester		L	T	P	C
		0	0	3	1.5

Computer Aided Engineering Drawing Practice

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.

Course outcomes:

1. Student get exposed on working of sheet metal with help of development of surfaces.
2. Student understands how to know the hidden details of machine components with the help of sections and interpenetrations of solids.
3. Student shall exposed to modeling commands for generating 2D and 3D objects using computer aided drafting tools which are useful to create machine elements for computer aided analysis.

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.

PROJECTIONS OF SOLIDS: Projections of Regular Solids inclined to both planes – Auxiliary Views.

UNIT-II:

The knowledge of sections of solids and development of surfaces is required in designing and manufacturing of the objects. Whenever two or more solids combine, a definite curve is seen at their intersection.

SECTIONS OF SOLIDS: Sections and Sectional views of Right Regular Solids – Prism, Cylinder, Pyramid, Cone – Auxiliary views.

DEVELOPMENT AND INTERPENETRATION OF SOLIDS: Development of Surfaces of Right Regular Solids – Prism, Cylinder, Pyramid, Cone and their parts.

UNIT-III:

The intersection of solids also plays an important role in designing and manufacturing. The objective is to impart this knowledge through this topic. A perspective view provides a realistic 3D View of an object. The objective is to make the students learn the methods of Iso and Perspective views.

INTERPENETRATION OF RIGHT REGULAR SOLIDS: Intersection of Cylinder Vs Cylinder, Cylinder Vs Prism, Cylinder Vs Cone, Prism Vs Cone.

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:

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:

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 like save, restore, delete , joint , single option.

UNIT VI:

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:

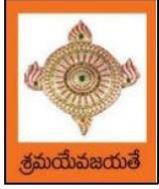
1. Engineering drawing by N.D Bhatt ,Charotarpublications.
2. Engineering Graphics, K.C. john, PHIPublications

REFERENCES:

1. Mastering Auto CAD 2013 and Auto CAD LT 2013 – George Omura,Sybex
2. Auto CAD 2013 fundamentals- Elisemoss, SDCPubl.
3. Engineering Drawing and Graphics using Auto Cad – T Jeyapoovan,vikas
4. Engineering Drawing + AutoCAD – K Venugopal, V. Prabhu Raja, NewAge
5. Engineering Drawing – RK Dhawan, SChand
6. Engineering Drawing – MB Shaw, BC Rana,Pearson
7. Engineering Drawing – KL Narayana, P Kannaiah,Scitech
8. Engineering Drawing – Agarwal and Agarwal, Mc GrawHill
9. Engineering Graphics – PI Varghese, Mc GrawHill
10. Text book of Engineering Drawing with auto-CAD ,K.venkatareddy/B.S .publications.
11. Engineering Drawing with Auto CAD/ James D Bethune/Pearson Publications
12. Engineering Graphics with Auto CAD/Kulkarni D.M, Rastogi A.P, Sarkar A.K/PHI Publications

End Semester examination shall be conducted for **Four** hours with the following pattern:

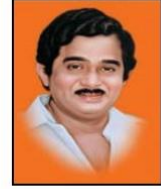
- a) Two hours - Conventional drawing
- b) Two hours – Computer Aided Drawing



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DEPARTMENT OF MECHANICAL ENGINEERING

II Year- I Semester		L	T	P	C
		0	0	3	1.5
MECHANICS OF SOLIDS & METALLURGY LAB					

Course Objective: To impart practical exposure on the microstructures of various materials and their hardness evaluation. Also to impart practical knowledge on the evaluation of material properties through various destructive testing procedures.

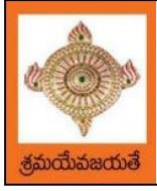
NOTE: Any 6 experiments from each section A and B.

(A) MECHANICS OF SOLIDSLAB:

1. Direct tension test
2. Bending test on
a) Simple supported
b) Cantilever beam
3. Torsion test
4. Hardness test
a) Brinell's hardness test
b) Rockwell hardness test
5. Test on springs
6. Compression test on cube
7. Impact test
8. Punch shear test

(B) METALLURGY LAB:

1. Preparation and study of the Microstructure of pure metals like Iron, Cu and Al.
2. Preparation and study of the Microstructure of Mild steel, Medium carbon steels, High carbon steels.
3. Study of the Micro Structures of Cast Irons.
4. Study of the Micro Structures of Non-Ferrous alloys.
5. Study of the Micro structures of Heat treated steels.
6. Hardenability of steels by Jominy End Quench Test.
7. To find out the hardness of various treated and untreated steels.



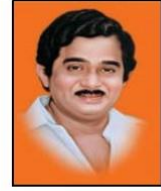
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DEPARTMENT OF MECHANICAL ENGINEERING

II Year - I Semester	L	T	P	C
	0	0	3	1.5

FLUID MECHANICS & HYDRAULIC MACHINERY LAB

Course Objective: To impart practical exposure on the performance evaluation methods of various flow measuring equipment and hydraulic turbines and pumps.

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 pipeline.
11. Determination of loss of head due to sudden contraction in a pipe line.
12. Turbine flowmeter.



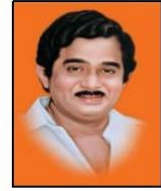
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II Year - II Semester		L	T	P	C
		1	0	2	2
PYTHON PROGRAMMING LAB					

Course Objective: To understand the PYTHON environment and make numerical computations and analysis.

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

- CO1** Solve the different methods for linear, non-linear and differential equations
- CO2** Learn the PYTHON Programming language
- CO3** Familiar with the strings and matrices in PYTHON
- CO4** Write the Program scripts and functions in PYTHON to solve the methods

CONTENTS

Write Programs in PYTHON Programming for the following:

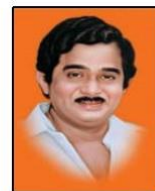
1. To find the roots of non-linear equation using Bisection method
2. To find the roots of non-linear equation using Newton Raphson's method.
3. Curve fitting by least – square approximations
4. To solve the system of linear equations using Gauss - elimination method
5. To solve the system of linear equations using Gauss - Siedal method
6. To solve the system of linear equations using Gauss - Jordan method
7. To integrate numerically using Trapezoidal rule
8. To integrate numerically using Simpsons rule
9. To find the largest eigen value of a matrix by Power – method
10. To find numerical solution of ordinary differential equations by Euler's method
11. To find numerical solution of ordinary differential equations by Runge-Kutta method
12. To find numerical solution of ordinary differential equations by Milne's method
13. To find the numerical solution of Laplace equation
14. To find the numerical solution of Wave equation
15. To find the solution of a tri-diagonal matrix using Thomas algorithm
16. To fit a straight using least square technique



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II YEAR-I semester		L	T	P	C
		2	0	0	0
ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE					

Course Objectives:

To facilitate the students with the concepts of Indian traditional knowledge and to make them understand the Importance of roots of knowledge system

- The course aim of the importing basic principle of third process reasoning and inference sustainability is at the course of Indian traditional knowledge system
- To understand the legal framework and traditional knowledge and biological diversity act 2002 and geographical indication act 2003
- The courses focus on traditional knowledge and intellectual property mechanism of traditional knowledge and protection
- To know the student traditional knowledge in different sector

Course Outcomes:

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

- Understand the concept of Traditional knowledge and its importance
- Know the need and importance of protecting traditional knowledge
- Know the various enactments related to the protection of traditional knowledge
- Understand the concepts of Intellectual property to protect the traditional knowledge

UNIT I

Introduction to traditional knowledge: Define traditional knowledge, nature and characteristics, scope and importance, kinds of traditional knowledge, the physical and social contexts in which traditional knowledge develop, the historical impact of social change on traditional knowledge systems. Indigenous Knowledge (IK), characteristics, traditional knowledge vis-à-vis indigenous knowledge, traditional knowledge Vs western knowledge traditional knowledge vis-à-vis formal knowledge

UNIT II

Protection of traditional knowledge: the need for protecting traditional knowledge Significance of TK Protection, value of TK in global economy, Role of Government to harness TK.

UNIT III

Legal framework and TK: A: The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, Plant Varieties Protection and Farmers Rights Act, 2001 (PPVFR Act);B:The Biological Diversity Act 2002 and Rules 2004, the protection of traditional knowledge bill, 2016.Geographical indications act 2003.

UNIT IV

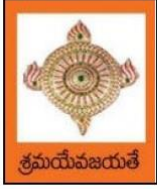
Traditional knowledge and intellectual property: Systems of traditional knowledge protection, Legal concepts for the protection of traditional knowledge, Certain non IPR mechanisms of traditional knowledge protection, Patents and traditional knowledge, Strategies to increase protection of traditional knowledge, global legal FORA for increasing protection of Indian Traditional Knowledge

UNIT V

Traditional knowledge in different sectors: Traditional knowledge and engineering, Traditional medicine system, TK and biotechnology, TK in agriculture, Traditional societies depend on it for their food and healthcare needs, Importance of conservation and sustainable development of environment, Management of biodiversity, Food security of the country and protection of TK.

REFERENCE BOOKS:

1. Traditional Knowledge System in India, by Amit Jha,2009.
2. Traditional Knowledge System and Technology in India by Basanta Kumar Mohanta and Vipin Kumar Singh, PratibhaPrakashan2012.
3. Traditional Knowledge System in India by Amit Jha Atlantic publishers,2002
4. "Knowledge Traditions and Practices of India" Kapil Kapoor, MichelDanino



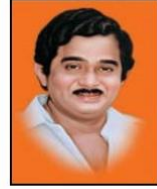
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DEPARTMENT OF MECHANICAL ENGINEERING

II Year-II Semester	L	T	P	C
	3	0	0	3
Production Technology				

Course Objective:

To impart basic knowledge and understanding about the primary manufacturing processes such as casting, joining, bulk forming, sheet metal forming and powder metallurgy and their relevance in current manufacturing industry.

UNIT – I

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, Molding – molding methods - ingredients of molding sand –. Molding materials, Properties of molding sand, Testing of molding sand. Types of molding – Hand molding – Machine molding. Core – different types of cores – materials – properties of core sand – core manufacturing.

UNIT – II

Principles of Gating, Gating ratio and design of Gating systems. Risers – Types, function and design, casting design considerations. Methods of melting and types of furnaces - cupola, electric arc, resistance and induction furnace. Solidification of castings-Solidification of pure metals and alloys-Short & long freezing range alloys. Fettling. Casting defects. Basic principles and applications of special casting processes - Centrifugal casting – True, semi and centrifuging, Die casting, Investment casting and shell molding.

UNIT – III

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, power characteristics, Manual metal arc welding, Submerged arc welding, TIG & MIG welding. Electro – slag welding.

Resistance welding, Friction welding, Friction stir welding, Forge welding, Explosive welding; Thermit welding, Plasma Arc 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.

UNIT – IV

Plastic deformation in metals and alloys-recovery, recrystallization and grain growth. Hot working and Cold working-Strain hardening and Annealing.

Bulkforming processes: Forging - Types of 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

UNIT – V

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

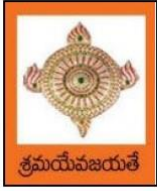
High energy rate forming processes: Principles of explosive forming, electromagnetic forming, Electro hydraulic forming, rubber pad forming, advantages and limitations.

TEXT BOOKS:

1. Manufacturing Processes for Engineering Materials – Kalpakjian S and Steven R Schmid-Pearson Publ , 5thEdn.
2. Manufacturing Technology -Vol I- P.N. Rao-TMH

REFERENCES:

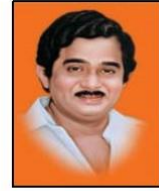
1. Manufacturing Science – A.Ghosh&A.K.Malik – East West Press Pvt.Ltd
2. Process and materials of manufacture- Lindberg-PHI
3. Production Technology- R.K. Jain-Khanna
4. Production Technology-P C Sharma-S.Chand
5. Manufacturing Processes- H.S. Shaun-Pearson
6. Manufacturing Processes- J.P. Kaushish-PHI
7. Workshop Technology -WAJ Chapman/CBS Publishers&DistributorsPvt.Ltd.
8. Production Technology-HMT- TataMcGrawHill



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DEPARTMENT OF MECHANICAL ENGINEERING

II Year-II Semester	L	T	P	C
	3	0	0	3
Complex Variables and Statistical Methods				

Course Objectives:

- To familiarize the complex variables.
- To familiarize the students with the foundations of probability and statistical methods.
- To equip the students to solve application problems in their disciplines.

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

- apply Cauchy-Riemann equations to complex functions in order to determine whether a given continuous function is analytic (L3)
- find the differentiation and integration of complex functions used in engineering problems (L5)
- make use of the Cauchy residue theorem to evaluate certain integrals (L3)
- apply discrete and continuous probability distributions (L3)
- design the components of a classical hypothesis test (L6)
- infer the statistical inferential methods based on small and large sampling tests (L4)

UNIT – I: Functions of a complex variable and Complex integration: (10 hrs) Introduction – Continuity – Differentiability – Analyticity – Cauchy-Riemann equations in Cartesian and polar coordinates – Harmonic and conjugate harmonic functions – Milne – Thompson method. Complex integration: Line integral – Cauchy's integral theorem – Cauchy's integral formula – Generalized integral formula (all without proofs) and problems on above theorems.

UNIT – II: Series expansions and Residue Theorem: (10 hrs)

Radius of convergence – Expansion in Taylor's series, Maclaurin's series and Laurent series. Types of Singularities: Isolated – Essential – Pole of order m – Residues – Residue theorem (without proof) – Evaluation of real integral of the types $\int f(x)dx$ and $\int f(\cos, \sin) d$.

UNIT – III: Probability and Distributions: (10 hrs)

Review of probability and Baye's theorem – Random variables – Discrete and Continuous random variables – Distribution functions – Probability mass function, Probability density function and Cumulative distribution functions – Mathematical Expectation and Variance – Binomial, Poisson, Uniform and Normal distributions.

UNIT – IV: Sampling Theory: (8 hrs)

Introduction – Population and Samples – Sampling distribution of Means and Variance (definition only) – Central limit theorem (without proof) – Representation of the normal theory distributions –

Introduction to t, estimate.

2 and F-distributions – Point and Interval estimations – Maximum error of

UNIT – V: Tests of Hypothesis: (10 hrs)

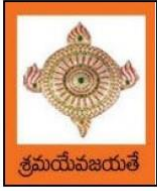
Introduction – Hypothesis – Null and Alternative Hypothesis – Type I and Type II errors – Level of significance – One tail and two-tail tests – Tests concerning one mean and two means (Large and Small samples) – Tests on proportions.

Text Books:

1. **B. S. Grewal**, Higher Engineering Mathematics, 44th Edition, Khanna Publishers.
2. **Miller and Freund's**, Probability and Statistics for Engineers, 7/e, Pearson, 2008.

Reference Books:

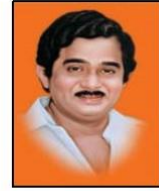
1. **J. W. Brown and R. V. Churchill**, Complex Variables and Applications, 9th edition, Mc-Graw Hill, 2013.



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DEPARTMENT OF MECHANICAL ENGINEERING

II Year-II Semester		L	T	P	C
		3	0	0	3
DYNAMICS OF MACHINERY					

Course Objectives:

1. To analyze the forces in clutches, brakes and dynamometers involving friction.
2. Understand the effect gyroscopic couple in motor cycles, aero planes and ships.
3. To understand the static and dynamic force analysis of four bars and slider crank mechanisms.
4. To study the turning moment diagrams of reciprocating engines and to learn design procedure of a flywheel
5. To learn analytical and graphical methods for calculating balancing of rotary and reciprocating masses
6. Understanding of vibrations and its significance on engineering design.

Course outcomes:

1. To compute the frictional losses and transmission in clutches, brakes and dynamometers
2. To determine the effect of gyroscopic couple in motor vehicles, ships and aero planes
3. To analyze the forces in four bar and slider crank mechanisms and design a flywheel
4. To determine the rotary unbalanced mass in reciprocating equipment
5. To determine the unbalanced forces and couples in reciprocating and radial engines

UNIT – I

FRICITION: Inclined plane, friction of screw and nuts, pivot and collar, uniform pressure, uniform wear, friction circle and friction axis: lubricated surfaces, boundary friction, film lubrication.

CLUTCHES: Friction clutches- single disc or plate clutch, multiple disc clutch, cone clutch, centrifugal clutch.

BRAKES AND DYNAMOMETERS: Simple block brakes, internal expanding brake, band brake of vehicle. General description and operation of dynamometers: Prony, Rope brake, Epicyclic, Bevis Gibson and belt transmission,

UNIT – II

STATIC AND DYNAMIC FORCE ANALYSIS: Dynamic force analysis of four bar mechanism and slider crank mechanism, inertia torque, angular velocity and acceleration of connecting rod, crank effort **TURNING MOMENT DIAGRAMS:** Turning moment diagrams – fluctuation of energy – fly wheels and their design.

UNIT-III

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

GOVERNERS: Watt, porter and proell governors, spring loaded governors – Hartnell and Hartung with auxiliary springs. sensitiveness, isochronism and hunting.

UNIT – IV

BALANCING: Balancing of rotating masses single and multiple – single and different planes, use analytical and graphical methods. Primary, secondary, and higher balancing of reciprocating masses. analytical and graphical methods, unbalanced forces and couples – examination of “V” multi cylinder in line and radial engines for primary and secondary balancing, locomotive balancing, hammer blow, swaying couple, variation of tractive effort.

UNIT – V

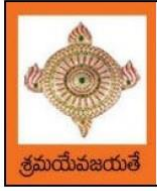
VIBRATIONS: Free Vibration of spring mass system –Natural frequency-types of damping – damped free vibration, Simple problems on forced damped vibration, vibration isolation and transmissibility transverse loads, vibrations of beams with concentrated and distributed loads. Dunkerly’s methods, Raleigh’s method, whirling of shafts, critical speeds, torsional vibrations, two and three rotor systems.

Text Books:

1. Theory of Machines -S.S Rattan - Mc. GrawHill
2. Theory of Mechanisms and Machines -Dr.JagadishLal - Metropolitan Pvt.Ltd.

References:

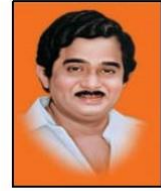
1. Mechanism and machine theory - JS Rao & RV Dukkipati - New AgePublishers.
2. Theory of Machines - Shigley – McGrawHillPublishers
3. Theory of Machines - Thomas Bevan - PearsonPublishers



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DEPARTMENT OF MECHANICAL ENGINEERING

II Year - II Semester		L	T	P	C
		3	0	0	3
THERMAL ENGINEERING - I					

Course Objectives:

1. To make the student learn and understand the reasons and affects of various losses that occur in the actual engine operation.
2. To familiarize the student with the various engine systems along with their function and necessity.
3. 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.
4. To make the student learn to perform testing on S.I and C.I Engines for the calculations of performance and emission parameters.

Course Outcomes: Student must able to,

- CO1: Derive the actual cycle from fuel-air cycle and air- standard cycle for all practical applications. CO2: Explain working principle and various components of IC engine
CO3: Explain combustion phenomenon of CI and SI engines and their impact on engine variables. CO4: Analyze the performance of an IC engine based on the performance parameters. CO5: Explain the cycles and systems of a gas turbine and determine the efficiency of gas turbine. CO6: Explain the applications and working principle of rockets and jet propulsion

UNIT – I

Air standard Cycles: otto, diesel and dual cycles, its comparison, Brayton cycle

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 – II

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

UNIT – III

Combustion in S.I. Engines : Normal Combustion and abnormal combustion – Importance of flame speed and effect of engine variables – Types 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

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

GAS TURBINES: Simple gas turbine plant – ideal cycle, essential components – parameters of performance – actual cycle – regeneration, inter cooling and reheating –closed cycle type gas turbines.

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 (Definitions and Simple Problems).

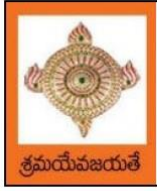
ROCKETS: Application – working principle – classification – propellant type – thrust, propulsive efficiency – specific impulse – solid and liquid propellant rocket engines (Only Theoretical concepts).

Text Books:

1. I.C. Engines - V. Ganesan- Tata McGraw Hill Publishers
2. Gas Turbines – V.Ganesan – Tata McGraw HillPublishers

References:

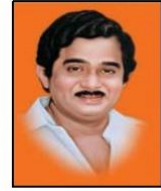
1. Thermal Engineering - Mahesh Rathore- McGraw Hillpublishers
2. I.C.Engines–AppliedThermosciences–C.R.Ferguson&A.T.Kirkpatrick-2ndEdition- WileyPubl
3. I.C. Engines - J.B.Heywood/McGrawHill.
4. Heat engines, Vasandani& Kumar – Thermalpublications
5. Gas Turbine Theory – HIIH Saravanamuttoo, Cohen, Rogers –PearsonPublishers



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DEPARTMENT OF MECHANICAL ENGINEERING

II Year – II Semester	L	T	P	C
	3	0	0	3
INDUSTRIAL ENGINEERING AND MANAGEMENT				

Course outcomes:

Upon successful completion of this course you should be able to:

1. Design and conduct experiments, analyses, interpret data and synthesize valid conclusions
2. Design a system, component, or process, and synthesize solutions to achieve desired needs
3. Use the techniques, skills, and modern engineering tools necessary for engineering practice with appropriate considerations for public health and safety, cultural, societal, and environmental constraints
4. Function effectively within multi-disciplinary teams and understand the fundamental precepts of effective project management

UNIT – I

INTRODUCTION: Definition of industrial engineering (I.E), development, applications, role of an industrial engineer, differences between production management and industrial engineering, quantitative tools of IE and productivity measurement. concepts of management, importance, functions of management, scientific management, Taylor's principles, theory X and theory Y, Fayol's principles of management.

UNIT – II

PLANT LAYOUT: Factors governing plant location, types of production layouts, advantages and disadvantages of process layout and product layout, applications, quantitative techniques for optimal design of layouts, plant maintenance, preventive and breakdown maintenance.

UNIT – III

WORK STUDY: Importance, types of production, applications, work study, method study and time study, work sampling, PMTS, micro-motion study, rating techniques, MTM, work factor system, principles of Ergonomics, flow process charts, string diagrams and Therbligs,

UNIT – IV

STATISTICAL QUALITY CONTROL: Quality control, Queing assurance and its importance, SQC, attribute sampling inspection with single and double sampling, Control charts – X and R – charts X and S charts and their applications, numerical examples.

TOTAL QUALITY MANAGEMENT: zero defect concept, quality circles, implementation, applications, ISO quality systems. six sigma – definition, basic concepts

UNIT – V

RESOURCE MANAGEMENT: Concept of human resource management, personnel management and industrial relations, functions of personnel management, Job-evaluation, its importance and types, merit rating, quantitative methods, wage incentive plans, types.

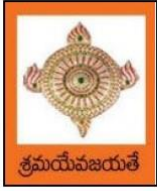
VALUE ANALYSIS: Value engineering, implementation procedure, enterprise resource planning and supply chain management

TEXT BOOKS:

1. Industrial Engineering and management / O.P Khanna/KhannaPublishers.
2. Industrial Engineering and Production Management/MartandTelsang/S.Chand& CompanyLtd. New Delhi

Reference Books:

1. Industrial Management / Bhattacharya DK/Vikaspublishers
2. Operations Management / J.G Monks/McGrawHillPublishers.
3. Industrial Engineering and Management Science/T.R. Banga, S.C.Sharma, N. K. Agarwal / Khanna Publishers
4. Principles of Management /Koontz O' Donnel/McGraw Hill Publishers.
5. Statistical Quality Control /Gupta/KhannaPublishers
6. Industrial Engineering and Management /NVS Raju/Cengage Publishers



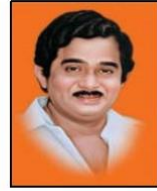
MVR

College of Engineering & Technology

(An Autonomous Institution)

Sponsored by Swarna Academy of Sciences, Vijayawada

(Approved by AICTE, Affiliated to JNTUK, certified by ISO: 9001-2008, Accredited by NBA(CSE) and NAAC with 'A')



DEPARTMENT OF MECHANICAL ENGINEERING

II Year - II Semester	L	T	P	C
	0	0	3	1.5
MACHINE DRAWING PRACTICE				

Course Objective: The student will acquire knowledge in national and International standards while drawing machine components students will also familiarize in drawing assembly, orthographic and sectional views of various machine components.

Course Outcome:

CO1. Draw and represent standard dimensions of different mechanical fasteners and joints and Couplings.

CO2. Draw different types of bearings showing different components.

CO3. Assemble components of a machine part and draw the sectional assembly drawing showing the dimensions of all the components of the assembly as per bill of materials

CO4. Select and represent fits and geometrical form of different mating parts in assembly drawings. CO5: To prepare manufacturing drawings indicating fits, tolerances, surface finish and surface treatment requirements.

Machine Drawing Conventions:

Need for drawing conventions – introduction to IS conventions-Standardization-Interchangeability-

Selective assembly-Tolerance

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 tapered features and surface finish indication

d) Title boxes, their size, location and details - common abbreviations & their liberal usage

e) Types of Drawings – working drawings for machine parts.

PART-A

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, setscrews.
- b) Keys, cotter joints, knuckle joint, Hook's joint
- c) Riveted joints for plates
- d) Shaft couplings.
- e) Journal, pivot and collar and foot step bearings.

PART-B

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 –Gear pump, Fuel pump, petrol Engine connecting rod, piston, stuffing box and eccentric assembly.
- b) Other machine parts - Screws jack, Machine swivel vice, Plummer block, Tailstock and Tool post.

III. Manufacturing Drawing

Introduction of Limits and fits, fundamental deviations for Hole based and Shaft based systems, alpha numeric designation of limits & fits. Types of Fits. Form and positional tolerances.

Conventional practices of indicating limits and fits, geometrical form and position tolerances, surface finish and surface treatments requirements. Study of Examples involving selection of fits and calculation of limits. Suggestion of suitable fits for mating parts.

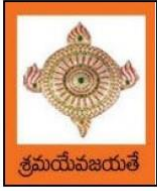
Representation of limits fits and tolerances for mating parts. Use any four parts of above assembly drawings and prepare manufacturing drawing with dimensional and geometric tolerances.

TEXT BOOKS:

1. Machine Drawing – N.Siddeswar, K.Kannaiah&V.V.S.Sastry -TMH
2. Machine Drawing –K.L.Narayana, P.Kannaiah&K. Venkata Reddy / New Age/Publishers
3. Production Drawing- K.L.Narayana, P.Kannaiah&K. Venkata Reddy / New Age/Publishers

REFERENCES:

1. Machine Drawing –P.S.Gill,
2. Machine Drawing –Luzzader
3. Machine Drawing –Rajput
4. Machine Drawing – N.D. Junnarkar,Pearson
5. Machine Drawing – Ajeeth Singh, McGrawHill
6. Machine Drawing – KC John,PHI .



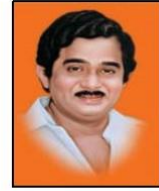
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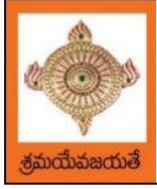


DEPARTMENT OF MECHANICAL ENGINEERING

II Year-II Semester	L	T	P	C
	3	0	0	3
PRODUCTION TECHNOLOGY LAB				

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

1. Design and making of pattern
 - i. Single piece pattern
 - ii. Split pattern
2. Sand properties testing
 - i. Sieve analysis (dry sand)
 - ii. Clay content test
 - iii. Moisture content test
 - iv. Strength test (Compression test & Shear test)
 - v. Permeability test
3. Mould preparation
 - i. Straight pipe
 - ii. Bent pipe
 - iii. Dumble
 - iv. Gear blank
4. Gas cutting and welding
5. Manual metal arcwelding
 - i. Lap joint
 - ii. Butt joint
6. Injection Molding
7. Blow Molding
8. Simple models using sheet metal operations
9. Study of deep drawing and extrusion operations
10. Study of Basic powder compaction and sintering
11. Study of TIG/MIGWelding
12. Study of Resistance Spot Welding
13. Study of brazing and soldering
14. Study of Plastic MouldingProcess



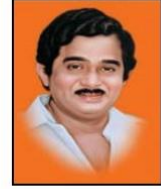
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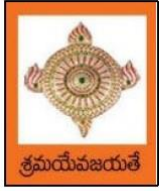


DEPARTMENT OF MECHANICAL ENGINEERING

II Year-II Semester		L	T	P	C
		3	0	0	3

THEORY OF MACHINES LAB LAB

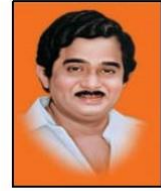
1. To determine whirling speed of shaft theoretically and experimentally.
2. To determine the position of sleeve against controlling force and speed of a Hartnell governor and to plot the characteristic curve of radius of rotation.
3. To analyze the motion of a motorized gyroscope when the couple is applied along its spin axis
4. To determine the frequency of undamped free vibration of an equivalent spring mass system.
5. To determine the frequency of damped force vibration of a spring mass system
6. To study the static and dynamic balancing using rigid blocks.
7. To find the moment of inertia of flywheel
8. To plot follower displacement vs cam rotation for various Cam Follower systems.
9. To plot slider displacement, velocity and acceleration against crank rotation for single slider crank mechanism/Four bar mechanism
10. To find coefficient of friction between belt and pulley.
11. To study simple and compound screw jack and determine the mechanical advantage , velocity ratio and efficiency
12. To study various types of gears- Spur, Helical, Worm and Bevel Gears.



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II Year-II Semester		L	T	P	C
		2	0	0	0
MAT LAB PROGRAMMING					

Course Objectives:

1. To know about fundamentals of MATLAB tool.
2. To provide an overview to program curve fitting & solve Linear and Nonlinear Equations.
3. To understand the concept and importance of Fourier transforms.
4. To gain knowledge about MATLAB Simulink & solve Electrical engineering problems.

Course Outcomes:

CO1: Able to implement loops, branching, control instruction and functions in MATLAB Programming environment.

CO2: Able to program curve fitting, numerical differentiation and integration, solution of linear equations in MATLAB and solve electrical engineering problems.

CO3: Able to understand implementation of ODE using ode 45 and execute Solutions of nonlinear equations and DFT in MATLAB.

CO4: Able to simulate MATLAB Simulink examples.

SYLLABUS:

UNIT -I

Introduction to MATLAB Programming: Basics of MATLAB Programming, array operations in MATLAB, loops and execution of control, working with files: Scripts and functions, plotting and programming output, examples.

UNIT -II

Numerical Methods and their applications: Curve Fitting: Straight line fit, Polynomial fit.

UNIT -III

Numerical Integration and Differentiation: Trapezoidal method, Simpson method.

Linear and Nonlinear Equations: Eigen values, Eigen vectors, Solution of linear algebraic equations using Gauss Elimination and LU decomposition, Solution of nonlinear equation in single variable using Gauss siedal and Newton-Raphson method.

UNIT-IV

Ordinary Differential Equations: Introduction to ODE's, Euler's method, second order RungeKutta method, MATLAB ode45 algorithm in single variable and multivariable's.

Transforms: Discrete Fourier Transforms,

UNIT -V

Applications To Mechanical Engineering Problems.

MATLAB Simulink. The application of MATLAB to the engineering mechanics (statics and dynamics), mechanical vibration analysis.

Text Books:

1. Agam Kumar Tyagi, “**MATLAB and Simulink for Engineers**”, OXFORD Higher Education.
2. Dr. Shailendra Jain, “**Modeling& Simulation using MATLAB – Simulink**”, Wiley – India.

Reference Books:

1. Won Y.Tang, Wemun Cao, Tae-Sang Ching and John Morris, “**Applied Numerical Methods Using MATLAB**”, A John Wiley & Sons.
2. Steven T. Karris, “**Introduction to Simulink with Engineering Applications**”, Orchard Publications.