VISHNU INSTITUTE OF TECHNOLOGY:: BHIMAVARAM
(Autonomous)
Approved by AICTE, Accredited by NBA, NAAC & Affiliated to JNTUK, Kakinada

MECHANICAL ENGINEERING DEPARTMENT

II-Year I-Semester

S.No	Category	Course Title	Hours per week			Credits
			L	**T**	**P**	**C**
1	BSC	Mathematics – III (Complex variables & PDE)	3	0	0	3
2	PCC	Thermodynamics	3	0	0	3
3	PCC	Materials Science and Metallurgy	3	0	0	3
4	PCC	Mechanics of Solids	3	0	0	3
5	PCC	Manufacturing Processes	3	0	0	3
6	PCC (LAB)	Machine Drawing	0	0	3	1.5
7	PCC (LAB)	Metallurgy & Mechanics of Solids Lab	0	0	3	1.5
8	PCC (LAB)	Manufacturing Processes Lab	0	0	3	1.5
	SOC*	Computer Aided Engineering Modelling	1	0	2	2
	Mandatory course (AICTE suggested)	Constitution of India	2	0	0	0
		Total credits				**21.5**

II B.Tech. I - Semester

MATHEMATICS III (COMPLEX VARIABLES& PDE)

L	T	P	C
3	0	0	3

COURSE OBJECTIVES:

To enable the students to:

- Make use the significance of differentiability and analyticity for complex variable functions and be familiar with the Cauchy-Riemann equations.
- Find integrals along a path in the complex plane using the Cauchy's theorem and Residue theorem.
- Solve the singularities of complex variable function by expanding them into Taylor's and Laurent's series and finding residues.
- Make the students learn modeling various physical phenomena as first and higher order PDE and applications.

UNIT I

Functions of Complex Variables

Continuity and differentiability, Analyticity, properties, Cauchy Riemann equations in Cartesian and polar coordinates, harmonic and conjugate harmonic functions, Milne – Thompson method.

UNIT II

Complex Integration

Integration of complex functions – Line Integrals, Cauchy's Integral theorem, Cauchy's Integral Formula - Generalized Cauchy's Integral formula (without proofs).

UNIT III

Complex power series and Residues

Complex power series-Taylor's Series and Laurent's Series, Singularities, Poles and Residues-Cauchy Residues theorem (without proof),evaluation of integrals of type $\int_{-\infty}^{\infty} f(x)dx$ and $\int_0^{2\pi} f(cos\theta, sin\theta)d\theta$ using Residue theorem.

UNIT IV

First Order Partial Differential Equations

Formation of Partial differential equations by elimination of arbitrary constants and arbitrary functions– solutions of first order linear (Lagrange) equations and nonlinear equations-standard types.

UNIT V

Higher Order Partial Differential Equations and Applications

Solutions of Linear Partial differential equations with constant coefficients. RHS terms of the type e^{ax+by}, Sin(ax+by), Cos (ax+by), $x^m y^n$. Classification of second order partial differential equations-parabolic, elliptical and hyperbolic.

Method of Separation of Variables, Applications to wave equation, heat conduction equation in one dimensions and Laplace equation in two dimensions.

COURSE OUTCOMES:

After undergoing this course, students will be able to

1. Understand the differentiability and analyticity for complex variable functions and learn sufficient conditions for analyticity.
2. Evaluate the integration of complex valued functions.
3. Expand the functions in power series, classify the singularities of complex function.
4. Model first order linear and non-linear partial differential equations and solve analytically.
5. Model higher order partial differential equations and solve analytically and physical problems of engineering like steady and unsteady heat conduction, vibration of string, etc.

TEXT BOOKS:

1. B. S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 42nd Edition, 2012.
2. Erwin Kreyszig, Advanced Engineering Mathematics, Wiley, 9thEdition, 2012.

REFERENCES:

1. T.K.V. Iyengar, B. Krishna Ghandhi, S. Ranganatham and M.V.S.S.N. Prasad, Engineering Mathematics, Volume-I, S. Chand Publishers, 12th Edition, 2014.
2. B. V. Ramana, Engineering Mathematics, Tata McGraw Hill, 3rd Edition, 2018.
3. S. KaleshaValli, G. VenkataRao and A.V. Papa Rao, Engineering Mathematics-I, Cengage Publications, 1st Edition, 2018.

II B.Tech. I - Semester

THERMODYNAMICS

L	T	P	C
3	0	0	3

COURSE OBJECTIVES:

- To understand the basic concepts of thermodynamics, heat and work interactions between system and its surroundings.
- To learn the applications of first and second law of thermodynamics to thermal engineering devices.
- To learn the significance of Carnot cycle and to understand the concept of entropy.
- To understand the properties of pure substances and gases.
- Apply the knowledge of thermodynamics to air power cycles.

UNIT I

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

First law of thermodynamics: Joule‘s Experiment, equivalence of heat and work, Statement of first law of thermodynamics, first law applied to a system undergoing a cyclic process and a change of state.

Corollaries; First law applied to a flow system: general energy equation, steady flow energy equation and important applications (boiler, turbine, heat exchangers, pumps & nozzles), Limitations of the First Law of Thermodynamics, PMM 1.

UNIT III

Second law of thermodynamics:, Definitions: Thermal reservoir, Heat Engine, Heat pump, refrigerator, Parameters of performance (thermal efficiency and the coefficient of performance), statement of the second law of thermodynamics (Kelvin planck&Clausius), equivalence of two statements.PMM2, Carnot cycle and its specialties, Carnot’s theorem, Thermodynamic scale of Temperature.

Entropy, Clausius Inequality, Principle of Entropy Increase. Concept of Availability, Unavailability and Irreversibility (Theory), Elementary Treatment of the Third Law of Thermodynamics.

UNIT IV

Properties of Pure Substances and Gases

Properties of Pure Substance: Introduction, Phases of pure substance, p-v, p-T, T-s and h-s diagrams for pure substance, p-v-T Surface, Properties of steam, quality or dryness fraction, phase change processes, Mollier diagram for a pure substance.

Properties of Ideal Gases: Equation of state of a gas, Avogadro's law, Ideal gas, perfect gas, real gas, properties of mixture of gases: Dalton's law and Amagat's law of partial pressures, Internal energy, enthalpy and specific heats of gas mixtures, Entropy of gas mixtures.

UNIT V

Power Cycles: Assumptions of air standard cycles, Analysis of Otto, Diesel, Dual combustion, Joule/Brayton cycles, Atkinson Cycle, Ericson Cycle, Lenoir Cycle and Miller Cycle.

COURSE OUTCOMES:

Students will be able to:

1. Apply energy balance to systems and control volumes, in situations involving heat and work interactions.
2. Apply first law of thermodynamics to energy conversion devices.
3. Apply second law of thermodynamics to energy conversion devices and analyze the entropy on thermal energy devices.
4. Evaluate the properties of pure substance and mixture of perfect gases.
5. Analyze the performance of gas power cycles.

TEXT BOOKS:

1. P K Nag, Engineering Thermodynamics, Tata Mcgraw Hill, 6th Edition, 2017.
2. YunusCengel and Boles, Thermodynamics-An Engineering Approach, Tata Mcgraw Hill, 18thEdition, 2017.

REFERENCE BOOKS:

1. R.K Rajput, A Text book of Engineering Thermodynamics, Laxmi Publications, 5th Edition, 2016.
2. J. P. Holman, Thermodynamics, McGraw-Hill, 4th Edition, 1987.
3. Moran, M. J. Shapiro, Daisie D. Boettner and Margaret B. Bailey, Fundamentals of Engineering Thermodynamics, Wiley and sons, 7th Edition, 2010.

II B.Tech. I - Semester

MATERIALS SCIENCE AND METALLURGY

L	T	P	C
3	0	0	3

COURSE OBJECTIVES:

- To acquire the knowledge of different crystal structures and constitution of alloys.
- To understand rules to form solid solution and different reactions in a phase diagram.
- To be able to correlate the concepts of phase structures and properties of different types of steels and their heat treatment methods.
- To understand the microstructure and properties of cast irons and non-ferrous alloys.
- To exemplify different types of ceramics and composite materials.
- To identify various advanced materials and their importance.

UNIT I

Structure of Metals: Crystallography, Miller Indices for Directions and Planes, Atomic PackingEfficiency for Cubic and Hexagonal Close Packed Structures, Grains and Grain Boundaries, Effect of Grain Size on the Properties, Determination of Grain Size by various methods.

Constitution of Alloys: Necessity of Alloying, Types of Solid Solutions, Hume - Rothery Rules,Intermediate Alloy Phases.

UNIT II

Phase Diagrams: Construction and Interpretation of Phase Diagrams, Phase Rule, Lever Rule, Binary PhaseDiagrams, Isomorphous, Eutectic and Eutectoid Transformations with examples, Study of Fe-Fe_3CPhase Diagram.

UNIT III

Engineering Materials–I (Steels): Classification of Steels, Structure, Properties& Applications of - Plain Carbon Steels, Low Alloy Steels, Hadfield Manganese Steels, Tool and Die Steels.

Engineering Materials–II (**Cast Irons):** Classification of Cast Irons, Structure, Properties& Applications of White Cast Iron, Malleable Cast Iron,Grey Cast Iron and Nodular Cast Iron.

UNIT IV

Engineering Materials-III (Non-Ferrous Metals and Alloys): Structure, Properties and Applications of - Copper and itsAlloys, Aluminum and its Alloys, Titanium and its Alloys. Al-Cu Phase Diagram.

Heat Treatment: Annealing, Normalizing, Hardening and Tempering of Steels, Construction of TTT Diagrams, Hardenability, Surface-Hardening Methods.

UNIT V

Engineering Materials-IV (Ceramics & Composites): Ceramics: Structure, Properties and Applications of Crystalline Ceramics, Glasses, Cermets. Composites: Classification, Properties & Applications.

Advanced Materials: Cryogenic Materials, Shape Memory Alloys, SmartMaterials and Nanomaterials.

COURSE OUTCOMES:

Students will be able to:

1. Know different crystal structures and the importance of alloying.
2. Construct different phase diagrams, understand microstructures and reactions with examples.
3. Acquire the knowledge of engineering materials – steels, cast irons.
4. Analyze various heat treatment processes, non-ferrous metals & alloys and their properties.
5. Characterize different non-metals such as ceramics and composites for engineering applications. Identify the need for some advanced materials and understanding their properties.

TEXT BOOKS:

1. V. D. Kodgire, Material Science and Metallurgy for Engineers, Everest Publishing House, 39th Edition, 2017.
2. Sidney H. Avner, Introduction to Physical Metallurgy, McGraw Hill, 2nd Edition, 2017.
3. Donald R. Askeland and Pradeep P Fulay, Essentials of Materials Science and Engineering, Cengage Learning, 2nd Edition, 2013.

REFERENCE BOOKS:

1. William D Callister& R. Balasubramaniam, Materials Science & Engineering, Wiley Publishing, 1st Edition, 2007.
2. V. Raghavan, Materials Science & Engineering, Eastern Economy Edition, 6th Edition, 2015.
3. A.K. Bandyopadhyay, Nanomaterials, New Age International, 1st Edition, 2009.

II B.Tech. I - Semester

MECHANICS OF SOLIDS

L	T	P	C
3	0	0	3

Prerequisites: Engineering Mechanics

COURSE OBJECTIVES:

- To provide the basic concepts and principles of mechanics of solids.
- Understand the principles of Mechanics, Stress and Strain, principal stresses applied to solid structural members under different types of loads.
- To give an ability to calculate stresses and deformations of objects under bending, shear and torsion loadings.

UNIT I

Simple Stresses & Strains: Elasticity and plasticity, Types of stresses & strains, Hooke's law, stress, strain diagram for mild steel, Working stress, Factor of safety, Lateral strain, Poisson's ratio & volumetric strain, Elastic moduli & the relationship between them, Bars of varying section, composite bars, Temperature stresses. 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

Principal Stresses and Strains: Introduction, Stresses on an inclined section of a bar under axial loading, compound stresses, Normal and tangential stresses on

an inclined plane for biaxial stresses, two perpendicular normal stresses accompanied by a state of simple shear, Mohr's circle of stresses, Principal stresses and strains, Analytical and graphical solutions.

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

UNIT V

Torsion of Circular Shafts: Theory of pure torsion, Derivation of Torsion equations, Assumptions made in the theory of pure torsion, Torsional moment of resistance, Polar section modulus, Power transmitted by shafts, Combined bending and torsion (Principle stress and Max. shear stress theory).

Thin Cylinders: Thin seamless cylindrical shells, Derivation of formula for longitudinal and circumferential stresses. Hoop, longitudinal and volumetric strains, changes in diameter, and volume of thin cylinders, Thin spherical shells.

COURSE OUTCOMES:

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

1. Discuss the basic properties of materials and analyze the behavior of the solid bodies subjected to various types of stresses.
2. Compute the shear force and bending moment for different types of beams with various load condition and also sketch the SF and BM diagram.
3. Determine the bending and shear stresses developed in beams and shafts.
4. Use the appropriate method to determine critical load for column with various end conditions.
5. Determine the different types of stresses involved in thin cylinders.

TEXT BOOKS:

1. Egor P. Popov, Engineering Mechanics of Solids, PHI, 2nd Edition, 2015.
2. R. K. Bansal, Strength of Materials (Mechanics of Solids), Laxmi Publication, 6thEdition, 2015.

REFERENCE BOOKS:

1. Stephen Timoshenko, Strength of Materials, CBS, 3rd Edition, 2002.
2. S. Ramamrutham, Strength of Materials, DhanapatRai, 16th Edition, 2011.
3. B. C. Punmia, Mechanics of Materials, Laxmi Publications, 10th Edition, 2019.
4. R.K Rajput, Strength of Materials, S. Chand, 7th Edition, 2018.

II B.Tech. I - Semester

MANUFACTURING PROCESSES

L	T	P	C
3	0	0	3

COURSE OBJECTIVES:

- To understand casting principles and different tools used for creating a sound casting.
- To specify various casting processes and gating systems.
- To demonstrate different types welding principles, welding defects - causes and remedies, testing of welds.
- To state various metal working and rolling processes.
- To study various metal forming processes such as forging, extrusion and drawing.
- To get familiarize with the sheet metal working, processing of plastics by injection moulding and blow moulding.

UNIT I

Casting: Steps involved in making a casting,Types of Patterns**,** Materials used for Patterns, Pattern Allowances andtheir Construction, Cores: Types of Cores, Merits, Demerits & Applications of Casting, Casting Defects.

Gating System: Elements of Gating System, Principles of Gating, Gating Ratio, Design of GatingSystems, Risers – Function, Types and Design, Special Casting Processes - Die Casting, Centrifugal Casting and Investment Casting.

UNIT II

Welding: Classification of Welding Processes, Types of Welds and Welded Joints, Their Characteristics, Edge Preparation, Gas Welding, Arc Welding, Submerged Arc Welding, Inert Gas Welding, TIG & MIG Welding, Thermit Welding, Resistance Welding, Friction Welding, Friction Stir Welding, Explosive Welding, Laser Welding, Welding Defects Causes, and Remedies, Oxy Acetylene Gas Cutting, Soldering & Brazing.

UNIT III

Bulk Deformation Processes - I:Fundamentals on Metal Forming Processes, Hot Working, Warm Working and Cold Working, Strain Hardening, Recovery,

Recrystallization and Grain Growth, Comparison of Properties of Cold and Hot Worked Parts. Rolling: Fundamentals, Theory of Rolling, Types of Rolling Mills and Products, Rolling Defects.

UNIT IV

Bulk Deformation Processes - II: **Forging Processes:** Principles of Forging,Tools and Dies**,** Types of Forging: Smith Forging, Drop Forging, Roll Forging, Rotary Forging, Forging Defects.

Bulk Deformation Processes - III: **Extrusion of Metals**: Basic Extrusion Process and its Characteristics, Hot Extrusion and Cold Extrusion, Forward Extrusion and Backward Extrusion, Impact Extrusion, Hydrostatic Extrusion, Extrusion Defects, Wire Drawing and Tube Drawing.

UNIT V

Sheet Metal Working & Plastics: Blanking and Piercing, Estimation of Blank Size, Deep Drawing, Stretch Forming, Bending, Coining, Spinning, Types of Presses and Press Tools.

Processing of Plastics: Injection Moulding and Blow Moulding.

COURSE OUTCOMES:

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

1. Illustrate the importance of casting and various pattern and cores used for making a sound casting, design a gating system and study various special casting processes.
2. Evaluate the role of metal joining processes, welding principles, welding defects, causes and remedies.
3. Illustrate the necessity of metal working and forming processes, rolling mills.
4. Relate the bulk deformation processes such as forging, extrusion and drawing processes on metals.
5. Infer sheet metal operations and plastic processing to develop engineering components.

TEXT BOOKS:

1. Kalpakjian Sand Steven R Schmid, Manufacturing Engineering and Technology, Pearson Publishing, 7th Edition, 2018.
2. P.N. Rao, Manufacturing Technology –Vol. I, Tata McGraw Hill Publishers, 4th Edition, 2017.

REFERENCE BOOKS:

1. Philip C Rosenthal, Principles of Metal Casting, McGraw-Hill Education, 2nd Edition, 2017.
2. P. L. Jain, Principles of Foundry Technology, Tata McGraw Hill Publishers, 5th Edition, 2017.

3. Amitabha Ghosh, Asok Kumar Mallik, Manufacturing Science, East West Press Pvt. Ltd, 2nd Edition, 2010.
4. R.S. Parmar, Welding Processes & Technology, Khanna Publishers, 1st Edition, 1996.

II B.Tech. I - Semester

MACHINE DRAWING

L	T	P	C
0	0	3	1.5

COURSE OBJECTIVES:

- Conventional representation of materials, common machine elements and parts such as screws, nuts, bolts, keys, gears.
- Able to draw various Keys, Cotters, Joints and Couplings with proper standards.
- To familiarize in drawing assembly, orthographic and sectional views of various machine components.
- Able to Create 2-D and 3-D models by standard CAD software.

PART 1

Preparation of 2D views for Machine Elements and simple parts

1. Conventional representation of materials, standard machine elements and parts such as screws, nuts, bolts, keys, gears, etc.
2. Screw joints, bolted joints and Riveted joints for plates.
3. Keys, cotter joints and knuckle joint.
4. Shaft coupling, spigot and socket pipe joint.
5. Journal, pivot and collar and foot step bearings.

PART II

Assembly modelling: top-down approach, bottom-up approach, applying constraints to parts in assembly, Explode & Manipulation.

Developing orthographic views of assembled product from the given individual part drawings.

1. Engine parts:
    a. Stuffing box
    b. Steam engine cross head
    c. Eccentric
    d. Piston.
2. Machine Tool Parts:
    a. Lathe Tail-stock

   b. Machine Vice
   c. Clapper block
3. Other machine parts:
   a. Screw jack
   b. Machine vice
   c. Plummer block

4. Valves:
   a. Steam stop valve
   b. Spring loaded safety valve
   c. Feed check valve

COURSE OUTCOMES:

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

1. Conventional representation of different materials and mechanical components.
2. Model a part, joints and couplings using Computer-Aided Design software.
3. Create complex engineering assemblies using appropriate assembly constraints.
4. Developing different views for assembled products using drafting in CAD software.

TEXT BOOKS:

1. N. Sidheshwar, Shastry, Kanhaiah, Machine Drawing, McGraw Hill Education, 1st Edition, 2017.
2. N.D.Bhatt, Machine Drawing, Charotar, 50th Edition, 2016.

REFERENCES BOOKS:

1. P.S.Gill, Machine Drawing, S.K. Kataria& Sons, 18th Edition, 2020.
2. K.L.Narayana, P. Kannaiah& K. Venkata Reddy, Machine Drawing, New Age International, 6th Edition, 2019.

II B.Tech. I - Semester

METALLURGY &MECHANICS OF SOLIDS LAB

L	T	P	C
0	0	3	1.5

COURSE OBJECTIVES:

- To provide practical understanding on mechanical properties of materials through various tests.
- To estimate practical strength of given material and compare it with actual value.
- To know the procedure of specimen preparation for performing microstructure study.
- To study and identify the microstructures of various metals and alloys.
- To understand the effect of heat treatment on the microstructure and hardness of low-carbon steel.

LIST OF EXPERIMENTS

(A) MECHANICS OF SOLIDS LAB:

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

(B) METALLURGY LAB:

1. Preparation and study of the microstructure of pure metals like Iron, Copper and Aluminum.
2. Preparation and study of the microstructure of mild steel, medium-carbon steel and high-carbon steel.
3. Preparation and study of the microstructure of cast irons.
4. Preparation and study of the microstructure of non-ferrous alloys.
5. Preparation and study of the microstructure of heat treated steels.
6. To find out the hardness of the heat treated and untreated steels.

7. Hardenability of steels by Jominy End Quench Test.

COURSE OUTCOMES:

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

1. Estimate tensile, compressive and shear strengths of given material using UTM.
2. Conduct deflective tests on beams and springs for finding mechanical constants of materials.
3. To find mechanical properties like Hardness, resilience, toughness, etc. by conducting various tests.
4. Know the procedure of specimen preparation for performing microstructure study.
5. Study and identify the microstructures of given metal / alloys.
6. Understand the influence of heat treatment on the microstructure and hardness of low-carbon steel.

II B.Tech. I - Semester

MANUFACTURING PROCESSES LAB

L	T	P	C
0	0	3	1.5

COURSE OBJECTIVES:

- To prepare a wooden pattern using carpentry tools.
- To make a sand mold using pattern.
- To perform various operations done on press tools.
- To prepare simple welded joints like T-joint, butt joint, lap joint using arc, oxy-acetylene, MIG, TIG welding.
- To fabricate a bottle and cap using blow and injection molding machines.

Structured Enquiry

1. Determining sand properties – a) Grain Size, b) Permeability c) Hardness and d) Compressive strength of moulding sand.
2. Preparation of a welded joint by TIG welding.
3. Preparation of plastic bottle using blow moulding.
4. Preparation of a wooden pattern as per the given dimensions of the casting considering all the possible allowances.
5. Joining of sheet metal joint by Spot Welding.
6. Performing blanking and piercing operations using a fly-press attachment.
7. Performing 'V' bend in a sheet metal by using a hydraulic press.
8. Performing pipe bending operation using a hydraulic press.
9. Preparation of an air tight plastic bottle cap using injection moulding.
10. Making a metal joint using brazing process.
11. Making an aluminium casting for a given pattern using a moulding process.

Open ended

1. Preparation of sand mould cavity.
2. Preparation of i) Butt joint ii) Lap joint and iii) T-joint by Arc Welding.

COURSE OUTCOMES:

At the end of the course, students able to:

1. Make the wooden pattern using carpentry tools.
2. Use the pattern for creating mould cavity.
3. Perform blanking and piercing operations on press tools.
4. Fabricate welded structures for engineering applications.
5. Prepare components using blow and injection molding.

II B.Tech. I - Semester

COMPUTER AIDED ENGINEERING MODELLING

L	T	P	C
1	0	2	2

COURSE OBJECTIVES:

- To enhance the student's engineering drawing knowledge by introduce Computer Aided Design software (CAD).
- To understand steps involved in creating and editing a solid part.
- Creating a component by joining different parts using assembly tools.
- To generate projection drawings from a solid part or from a assembled part.

COURSE CONTENT

Introduction to CAD software for modelling: Understanding the interface, tools and workbenches available.

2D Sketch: Basic 2D sketch tools (line, rectangle, circle etc.), Sketch editing operations (Trim, split, mirror….) and dimensioning.

3D Modelling: Creating solids from 2d Sketches using extrusion, revolve, sweep etc. Various operations solid parts.

Part Assembly: Creating assembled components by joining individual parts using assembly tools.

Drafting: Developing 2D projection drawings from solid parts and assembled components.

LIST OF EXPERIMENTS

1. Producing 2D drawings with dimensions using CAD.

2. Developing a solid using Extrude operation.
3. Developing a solid using Revolve operation.
4. Developing a solid using Sweep operation.
5. Developing a hollow solid using Shell operation.
6. Use of chamfer, fillet and ribs in solid body.
7. Developing solids with pattern and mirror tools.
8. Assembly of Beam engine.
9. Assembly of Quick return mechanism.
10. Assembly of Electric blower.
11. Developing 2D projections of Given solid.
12. Developing 2D projections (Including Sectional projections) of given assembled component.

COURSE OUTCOMES:

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

1. Draw complex geometries of machine components in sketcher mode.
2. Model a Solid using different 3D tolls in CAD software.
3. Create complex engineering assemblies using appropriate assembly constraints.
4. Develop 2D projections of solids and assembled elements using CAD software.

II B.Tech. I - Semester

CONSTITUTION OF INDIA

L	T	P	C
2	0	0	0

COURSE OBJECTIVES:

- To train students in understanding the basic structure of Indian Constitution.
- To prepare students to live better and happily with other fellow beings through the application of Fundamental Rights in their lives.

UNIT I

Introduction to Indian Constitution

Meaning of the term Indian Constitution –Preamble- Constituent Assembly- Salient Features of Indian Constitution.

UNIT II

Fundamental Rights

Fundamental Rights -Fundamental Duties -The Directive Principles of State Policy.

UNIT III

Union Government

Union Government -Union Legislature (Parliament) -Lok Sabha and Rajya Sabha (with Powers and Functions) -Union Excecutive -President of India (with Powers and Functions) -Prime Minister of India (with Powers and Functions) -Union Judiciary (Supreme Court) -Jurisdiction of the Supreme Court.

UNIT IV

State Government

State Government -State Legislature (Legislative Assembly / Vidhan Sabha, Legislative Council/ VidhanParishad) -Powers and Functions of the State Legislature -State Executive-Governor of the State (with Powers and Functions) -The Chief Minister of the State (with Powers and Functions) -State Judiciary (High Courts).

UNIT V

Local Self Governance

Powers and functions of Municipalities – Panchyats - ZP's and Co – Operative Societies.

COURSE OUTCOMES:

Upon the completion of the course, the student will be able to:

1. Examine salient features of Indian Constitution and live accordingly in society.
2. Interpret the meaning of Fundamental Rights and Directive Principles of State Policy and, develop an attitude which paves the way for better living conditions.
3. Discover various aspects of Union Government legislation and live up to the expectations of the rules.
4. Critically examine State Government legislation and improve your living standards by

following the rules strictly.

5. Examine powers and functions of local bodies such as Municipalities and Panchayats and, take advantage of available resources for better living.

BOOKS:

1. Durga Das Basu, Introduction to constitution of India, Lexis Nexis Publications, 22nd Edition, 2015.
2. Constitution of India by professional book publishers.
3. Arun K Tiruvengadam, The Constitution of India, Blooms bury publishers, 1st Edition, 2017.

4. PM Bakshi, The constitution of India, Universal law publishing, 14th Edition, 2017.