Vision of the Institution

To ignite the minds of the students through academic excellence so as to bring about social transformation and prosperity.

Mission of the Institution

- To expand the frontiers of knowledge through Quality Education.
- To provide valued added Research and Development.
- To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
- To provide a platform for synergy of Academy, Industry and Community.
- To inculcate high standards of Ethical and Professional Behavior.

Vision of Mechanical Engineering Department

To foster prosperity through technological development by means of education, innovation and collaborative research.

Mission of Mechanical Engineering Department

- To produce effective and responsible graduate and post-graduate engineers for global requirements by imparting quality education.
- To improve the Department's infrastructure to facilitate research productivity and success.
- To integrate teaching and research for preservation and effective application of knowledge and skills.
- To strengthen and expand collaboration and partnerships with industry and other organizations.
- To provide consultancy to the neighborhood and inculcate a spirit of entrepreneurship.
- To serve society through innovation and excellence in teaching and research.

Program Educational Objectives(PEOs)

PEO1: Graduates apply a deep working knowledge of technical fundamentals in areas such as Design, Thermal, Production, Industrial and related fields to address needs of the customer and society.

PEO2: Graduates pursue advanced education, Research and Development in Engineering, Technology and other professional careers.

PEO3: Perform themselves in a responsible, professional and ethical manner.

PEO4: Graduates participate as leaders in their fields of specialization and in activities that contribute to service and overall economic development of society.

Program Outcomes(POs) of Mechanical Engineering Department

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSO's):

PSO1: Able to apply the knowledge learned as a part of the curriculum to provide solutions for problems related to Mechanical Engineering.

PS**O**2: Think innovatively, design and develop products with modern CAD/CAM tools and with optimized manufacturing processes.

II-Year I-Semester

S. No	Course Title	L	T	P	C
1	Material Science and Metallurgy	3	-	-	3
2	Manufacturing Processes	3	-	-	3
3	Mathematics-III (Numerical Methods & Applied Statistics)	3	-	-	3
4	Engineering Mechanics	3	-	-	3
5	Thermodynamics	3	-	-	3
6	Metallurgy Lab	-	-	3	1.5
7	Manufacturing Processes Lab	-	-	3	1.5
8	Quantitative Aptitude - I	-	-	2	-
	Total	15	-	8	18

Course Name	**MATERIALS SCIENCE AND METALLURGY**				
Year/Semester	II B. Tech/I Sem	L	T	P	C
Regulation Year	2020-2021	3	0	0	3

COURSE OBJECTIVES:

1. To acquire the knowledge of different crystal structures and constitution of alloys.
2. To understand rules to form solid solution and different reactions in a phase diagram.
3. To be able to correlate the concepts of phase structures and properties of different types of steels and their heat treatment methods.
4. To understand the microstructure and properties of cast iron and few non-ferrous metal alloys.
5. To exemplify different types of ceramics, polymers and composite materials.
6. To identify various advanced materials and their importance.

UNIT I

Structure of Metals: Crystallography, Miller indices, Packing Efficiency, Density calculations-Grains and Grain Boundaries-Effect of grain size on the properties-Determination of grain size by different 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 phase diagrams, Isomorphous, Eutectic and Eutectoid transformations with examples, Study of Fe-Fe_3Cphase diagram.

UNIT III

Engineering Materials–I (Steels): Classification of Steels, Structure and properties of plain carbon steels, Low alloy steels, Hadfield manganese steels, Tool and Die Steels.

Engineering Materials–II (**Cast Irons):** Structure and properties of White Cast iron, Malleable Cast iron,Grey cast iron and Nodular cast iron

UNIT IV

Heat Treatment: Annealing, Normalizing, Hardening and Tempering of Steels, Construction of TTT diagrams, Hardenability, Surface-hardening methods.

Engineering Materials-III: Non-ferrous Metals and Alloys: Structure and properties of Copper and its alloys, Aluminum and its alloys, Al-Cu phase diagram, Titanium and its alloys.

UNIT V

Engineering Materials-IV: Ceramics, Polymers and Composites: Crystalline Ceramics, Glasses, Cermets - Structure, Properties and Applications; Composites - Classification, properties and applications; Polymers - Classification, Properties and applications

UNIT VI

Advanced Materials: Special Purpose Materials, Cryogenic Materials, Shape Memory Alloys, Smart Materials and Nanomaterials.

COURSE OUT COMES:

Students will be able to:

1. Know different structure of metals and the constitution of alloys
2. Construct different phase diagrams, microstructures and reactions with examples
3. Acquire the knowledge of engineering materials – steels with iron-carbon phase diagram and various heat treatment properties.
4. Analyze various cast irons and few non-ferrous metals& alloys and their properties
5. Characterize different non-metals such as ceramics, polymers and composites for engineering applications.
6. Identify the need for some advanced materials and 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.

Course Name	**MANUFACTURING PROCESSES**				
Year/Semester	II B. Tech/I Sem	L	T	P	C
Regulation Year	2020-2021	3	0	0	3

COURSE OBJECTIVES:

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

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, Properties of mold sand - Applications – Cores – Core making

UNIT II

Gating System: Elements of Gating System-Principles of Gating, Gating Ratio and Design of Gating Systems, Risers – Types, Function and Design

Different Casting Processes: Sand Casting; Die Casting; Centrifugal and Investment Casting, Casting Defects.

UNIT III

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 IV

Bulk Deformation Processes -I: **Fundamentals**: On Metal Forming Processes -Hot Working, Warm Working, 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,

UNIT V

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

Extrusion Of Metals: Basic Extrusion Process and its Characteristics- Hot Extrusion and Cold Extrusion -Forward Extrusion and Backward Extrusion – Impact Extrusion, Hydrostatic Extrusion, Wire Drawing and Tube Drawing.

UNIT VI

Sheet Metal Working &Plastics: Blanking and Punching–Bending and Deep Drawing - Other Forming Processes - Stamping, Forming and Other Cold Working Processes– Coining – Hot and Cold Spinning – Types of Presses and Press Tools -Defects and Estimation of Blank Size.

Processing of Plastics: Blow Moulding& Injection Moulding methods.

COURSE OUT COMES:

Students will be able to:

1. Know different structure of metals and the constitution of alloys
2. Construct different phase diagrams, microstructures and reactions with examples
3. Acquire the knowledge of engineering materials – steels with iron-carbon phase diagram and various heat treatment properties.
4. Analyze various cast irons and few non-ferrous metals& alloys and their properties
5. Characterize different non-metals such as ceramics, polymers and composites for engineering applications.
6. Identify the need for some advanced materials and their properties.

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. AmitabhaGhosh&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.
5. E. P. De Garmo, J.T. Black and R. A. Kohser, Materials & Processes in Manufacturing, Wiley Publishing, 8th edition, 1997.

Course Name	**MATHEMATICS-III (Numerical Methods & Applied Statistics)**				
Year/Semester	II B. Tech/I Sem	L	T	P	C
Regulation Year	2020-2021	3	0	0	3

COURSE OBJECTIVES:

- Know the standard numerical methods to find roots of functionsin practical engineering problems
- Identify the concepts of interpolation, to estimate the unknown functional values.
- Identify the methods for finding the values of derivatives and finite integrals using numerical techniques
- Make use of method of least squares to fit a best curve for the given data and apply the regression analysis to fit the curves
- Understand various statistical distribution
- Decide the null or alternative hypotheses using the suitable test statistic

UNIT-I: Solution of Algebraic and Transcendental Equations

Introduction- algebraic function and transcendental function - Bisection method, Regula –Falsi Method, Iteration Method, Newton- Raphson method.

UNIT-II: Interpolation

Introduction, Finite Differences, Forward –Backward- Central Differences – Newton's forward and backward formulae – Gauss Forward and Backward formulae – Lagrange's Interpolation Formula.

UNIT-III: Numerical Integration and Solution of Ordinary Differential Equations

Numerical Integration-Trapezoidal rule – Simpson's 1/3 rd Rule –Simpson's 3/8 th Rule. Solution by Taylor's method, Picard's method, Euler's & Modified Euler's method, Runge- Kutta Methods.

UNIT-IV: Curve Fitting &Correlation and Regression

Least Squares Method - Quadratic, Power and Exponential models.

Correlation and Regression**:** Simple Bivariate Correlation: Karl Pearson's coefficient of correlation, Spearman's Rank correlation coefficient.

Linear Regression - Regression lines, Regression coefficients, properties.

UNIT-V: Distributions

Random variables, Discrete and continuous distributions- Normal and Sampling distributions

UNIT-VI: Tests of Hypothesis

Null and Alternative Hypothesis, One tail and two tailed tests, Type I and Type II errors. Tests of hypotheses concerning single mean, difference of means using Z- distribution and Student's t-test.

COURSEOUT COMES:

After undergoing this course, students will be able to

- apply standard numerical methods to solve fundamental and practical engineering problems
- understand the concepts of interpolation, extrapolation to estimate the unknown functional values.
- find approximate values of derivatives and finite integrals using numerical techniques
- make use of method of least squares to fit a best curve for the given data and apply the regression analysis to fit the curves
- use various statistical distribution to solve engineering problems
- decide the null or alternative hypotheses using the suitable test statistic

TEXT BOOKS:

1. A text book of Engineering Mathematics - N.P. Bali and Manish Goyal – 9th Ed-Laxmi Publications, 2010.
2. Engineering Mathematics- B. V. Ramana, , 4th Ed.- Tata McGraw Hill, New Delhi – 2009.
3. Fundamentals of Mathematical Statistics a Modern Approach - S.C. Gupta, V.K. Kapoor - 11th Ed. - 2018 - Sultan Chand & Sons.

REFERENCE BOOKS:

1. Engineering Mathematics- T.K.V.Iyengar, B. Krishna Ghandhi, S. Ranganathan and M.V.S.S.N.Prasad -12th Ed. - S. Chand Publishers - 2014
2. Introductory methods of Numerical Analysis - S.S.Sastry - 5th Ed. -Prentice Hall of India Pvt. Ltd. - 2012

Course Name	**ENGINEERING MECHANICS**				
Year/Semester	II B. Tech/I Sem	L	T	P	C
Regulation Year	2020-2021	3	0	0	3

COURSE OBJECTIVES:

1. Understand particle, body, rigid body, concept of force, analysis of forces acting on a rigid body
2. Understand moment and the principle of moments
3. Understand friction and its implications
4. Understand the concept of centre of gravity and moment of inertia
5. Understanding kinematics and kinetics parts of machines

UNIT I:

STATICS OF PARTICLES AND RIGID BODIES

Introduction: Fundamental concepts and principles of engineering mechanics – Forces on particles – vector addition – Concurrent forces in a plane – Resolution of forces – Resultant of several concurrent forces.

Equilibrium of Particles: Free body diagram –Equilibrium of rigid bodies.

UNIT II

Moment of a force –Varignon's theorem – Equivalent system of forces – Reduction of system of forces into single force and couple – Equilibrium of rigid bodies in two dimensions- Equilibrium of a two, three force body.

Analysis of trusses – statically determinate and indeterminate structures – Method of Joints.

UNIT III

FRICTION AND ITS APPLICATIONS

Friction: Introduction-Types of friction – laws of Friction – Limiting friction – Cone of friction-static and Dynamic Frictions. Applications of Friction: Wedges – Ladder friction.

UNIT IV

PROPERTIES OF SURFACES AND VOLUMES

Centre of Gravity: Centroids of lines, areas, and volumes – Determination of centroids by integration – Theorem of Pappu's.

Moment of Inertia: Second moment or Moment of inertia of an area – Determination of moment of inertia of area by integration – Radius of gyration – Parallel and perpendicular axis theorems – Polar moment of inertia – Mass moment of inertia

UNIT V

KINEMATICS

Rectilinear motion: **U**niform velocity and uniformly accelerated motion – Rectangular components of velocity and acceleration, Variable acceleration

Curvilinear motion: Normal and tangential components – Radial and transverse components – Motion of Projectile

UNIT VI

KINETICS

Newton second law – D.Alembert's principle, Principle of work and energy for a rigid body – connected bodies – Principle of impulse and momentum – connected bodies.

COURSE OUTCOMES:

The students will be able to:

1. Explain the free bodydiagram of a body acted upon by a system of forces
2. Understand the concepts of equilibrium and moment
3. Determine the forces on truss members by using equations of equilibrium.
4. Apply concept of friction to practical applications.
5. Determine the centroid, center of gravity and moment of inertia of various surfaces.
6. Understand kinematics and kinetics and its principles.

TEXT BOOKS:

1. Timoshenko and Young, Engineering Mechanics, McGraw Hill Publishers, 5th Ed, 2017.
2. A Text book of Engineering Mechanics, S. S. Bhavakatti, New age international, 7th Ed, 2019.

REFERENCE BOOKS:

1. James L. Merriam, L. Glenn Kraige, Engineering Mechanics: Statics and Dynamics, John Wiley & Sons, 7th Ed, 2017.
2. A K Tayal, Engineering Mechanics, Statics and Dynamics, Umesh Publications, 14th Ed, 2011.
3. R. S. Kurmi, A Text book of Engineering Mechanics, S. Chand, 22nd Ed. 2018.

Course Name	**THERMODYNAMICS**				
Year/Semester	II B. Tech/I Sem	L	T	P	C
Regulation Year	2020-2021	3	0	0	3

COURSE OBJECTIVES:

1. To understand the basic concepts of thermodynamics and heat and work interactions between system and its surroundings.
2. To learn the applications of first and second law of thermodynamics to thermal engineering devices.
3. To learn the significance of Carnot cycle and to understand the concept of entropy.
4. To understand the properties of pure substances.
5. To understand the basis of Ideal, real gases and mixture of perfect gases.
6. Apply the knowledge of thermodynamics to air power cycles.

UNIT-I

Fundamentals: Thermodynamic definition and scope, Macroscopic and Microscopic approaches, System, Surroundings, Boundaries, Universe, types of systems, Thermodynamic Properties; definition and units, intensive, extensive properties, Thermodynamic state, state point, state diagram, path and process, quasi-static process, cyclic and non-cyclic processes, Thermodynamic Equilibrium. Temperature, Zeroth law of Thermodynamics, Principles of Thermometry: Temperature scales, Various thermometers.

Work and Heat: Thermodynamic definitions of work, examples, sign convention. Different forms of work, Displacement work, expressions for displacement work in various processes through p-v diagrams, Heat; Definition, units, sign conversion.

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, Concept of energy, energy as a property, modes of energy, Corollaries; First law applied to a flow system: general energy equation, steady flow energy equation and important applications (boiler, turbine, heat exchangers, pumps, nozzles).

Second law of thermodynamics: Limitations of the First Law of Thermodynamics, Definitions: Thermal reservoir, Heat Engine, Heat pump, refrigerator, Parameters of performance (thermal efficiency and the coefficient of performance), Kelvin-Planck statement of the second law of thermodynamics PMM 1 and PMM 2, Clausius Statements of the second law, equivalence of two statements.

UNIT-III

Carnot theorem and corollaries: reversible process, irreversible process, factors responsible for making a process irreversible, thermodynamic temperature scale, Carnot cycle and its specialties, Entropy, Clausius theorem, Clausius Inequality, Principle of Entropy Increase. Availability, Unavailability and Irreversibility; Thermodynamic Potentials, Gibbs and Helmholtz Functions, Maxwell Relations –Elementary Treatment of the Third Law of Thermodynamics.

UNIT-V

Definition of Pure substance, Phase Transformations of Pure Substance, P-v-T- surfaces; Definitions of saturated states; Triple Point and critical state properties during change of

phase; Dryness Fraction; Clausius-Clapeyron Equation; Mollier's Chart; Various Thermodynamic processes and energy Transfer; Steam Calorimetry.

UNIT-V

Ideal Gas and Real Gas: Ideal gas, relation among the specific heats, internal energy, enthalpy. Analysis of isochoric, isobaric, isothermal, isentropic, isenthalpic processes, representation of the above processes on P-v, T-s planes. Determination of work, heat, entropy and enthalpy changes during the above processes, problems. Deviations from perfect Gas Model, Vander Waals Equation of State, Compressibility charts; Variable Specific Heats.

Mixtures of perfect Gases: Mole Fraction, Mass fraction, Gravimetric and volumetric Analysis, Dalton' slaw of partial pressures, Avogadro's Laws of additive volumes; Volume fraction and partial pressure; Equivalent Gas constant and Molecular weight; Internal Energy, Enthalpy, specific heats and Entropy of Mixture of perfect Gases and Vapor, Atmospheric air.

UNIT-VI

Power Cycles: Assumptions for 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 and second law of thermodynamics to energy conversion devices.
3. Analyze the entropy on thermal energy devices.
4. Evaluate the properties of pure substance.
5. Evaluate the properties of mixture of perfect gases.
6. Analyze the performance of gas and air power cycles.

TEXT BOOKS:

1. PK 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.

Course Name	**METALLURGY LAB**				
Year/Semester	II B. Tech/I Sem	L	T	P	C
Regulation Year	2020-2021	0	0	3	1.5

COURSE OBJECTIVES:

- To apply the knowledge of Engineering Metallurgy and Mechanics of Solids for a given material.
- To understand the microstructures of various ferrous and non-ferrous alloys.
- To plan a heat treatment process for an alloy and test for its improved properties.

LIST OF EXPERIMENTS:

Any 10 experiments are to be conducted

1. Preparation and Study of Microstructure of pure Copper.
2. Preparation and Study of Microstructure of Cu alloy – Brass.
3. Preparation and Study of Microstructure of Cu alloy – Bronze.
4. Preparation and Study of Microstructure of Aluminum alloy.
5. Preparation and Study of Microstructure of plain carbon steel – Low Carbon Steel.
6. Preparation and Study of Microstructure of plain carbon steel – High Carbon Steel.
7. Preparation and Study of Microstructure of alloy steels – HSS.
8. Preparation and Study of Microstructure of cast iron – Grey Cast Iron.
9. Preparation and Study of Microstructure of metal after annealing process.
10. Preparation and Study of Microstructure of metal after normalizing process.
11. Preparation and Study of Microstructure of metal after Hardening process.
12. Hardness measurement of different types of plain carbon steels.
13. Hardenability test of steels on Jominy End Quench test equipment.
14. Hardness measurement of heat treated and untreated steels.

COURSE OUTCOMES:

Students will be able to:

- Independently operate a metallurgical microscope to observe and document the microstructures.
- Identify the microstructures of various types of ferrous and non-ferrous alloys.
- Check the hardness of steels at different untreated and heat treated conditions.
- Perform the Jominy End Quench test and determine the hardenability of steel.

Course Name	**MANUFACTURING PROCESSES LAB**				
Year/Semester	II B. Tech/I Sem	L	T	P	C
Regulation Year	2020-2021	0	0	3	1.5

COURSE OBJECTIVES:

- To prepare 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 analuminium 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 will:

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

Course Name	**QUANTITATIVE APTITUDE - I**				
Year/Semester	II B. Tech/I Sem	L	T	P	C
Regulation Year	2020-2021	0	0	2	0

COURSE OBJECTIVES:

Enable the students to

- Understand different number systems, factorization, divisibility and concept of LCM and HCF.
- Find averages, relation between ratio and proportion, average price of mixture of different quantities and relation between fraction and percentage.
- Know the concepts of CP, SP, MRP, profit or loss incurred in a transaction.
- Know the concepts of principal, interest, difference between SI and CI, EMIs.
- Understand the relation between speed, distance and time for trains and boats in a river.
- Understand the relation between time and efficiency, combined work and wages paid for the work.

UNIT –I: Number Systems

Basic number systems –Face and Place Value, Digital sum-Applications, Factors, Multipliers, Prime & Composite Numbers, Divisibility Rules, LCM and HCF-Remainder Rules.

UNIT- II: Averages, Ratio& Proportion

Average-Weighted average, Ratio-Concept and properties, Proportions-Mean, Third and Fourth proportions, Mixtures &Alligations-Definition-Alligation Rule, Percentages-Conversion of Percentages to Fractions and Vice-Versa.

UNIT –III: Profit& Loss

Cost Price- Selling Price- Marked Price, Discount- Successive Discounts, Profit or Loss Percentage, False Weights- Dishonest Dealer.

UNIT –IV: Simple & Compound Interest

Principal-Interest Rate-Tenure, Simple Interest-Formula-Sum, Compound Interest-Formula-Relation Between Simple & Compound Interest, loan-EMI, Investments-Shares.

UNIT – V: Time & Distance

Time-Distance-Speed-Relation, Conversion of Speed, Average Speed, Trains-Relative Speed- Same and Opposite –Platform, Races, Boats-Streams-Upstream and Downstream.

UNIT –VI: Time & Work

Work-Time-Efficiency, Combined Work-Partnership-Division of Wages, Chain Rule, Pipes and Cisterns-Inlet-Outlet.

COURSE OUTCOMES:

After completing this course, the students will be able to

- Find number of factors, LCM and HCF of numbers and fractions, least and greatest number divisible by given numbers and leaving some remainder(s).
- Evaluate average of numbers, Proportions of given ratio, ratio or average price of two quantities of different prices when mixed to get new mix, use relation between fractions and percentages in calculation.
- Identify the profit or loss incurred in a transaction and how cheating is possible by an unfair trader.

TEXT BOOKS:

1. Quantitative Aptitude for competitive Examinations- Dr. R.S. Aggarwal - Sultan Chand Publications - 2017.

REFERENCEBOOKS:

1. How to Prepare for Quantitative Aptitude for the CAT - Arun Sharma- Tata McGraw Hill Publishing Company - 2016.
2. The Pearson Guide to Quantitative Aptitude for Competitive Examinations - Dinesh Khattar - Pearson India – 2016.