Course Outcomes (Department of Plastic & Polymer Engineering)

Semester: I/II
Subject Code: BAST 101
Name of the subject: Engineering Chemistry

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

CO1	Analyze microscopic chemistry in terms of atomic and molecular orbital and intermolecular forces.
CO2	Rationalize bulk properties and processes using thermodynamic considerations.
CO3	Distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques
CO4	Rationalize periodic properties such as ionization potential, electro negativity, oxidation states and electro negativity.
CO5	List major chemical reactions that are used in the synthesis of molecules.

Semester: I
Subject Code: BAST 102
Name of the subject: Mathematics – I

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

CO1	Understand the concept of limit, continuity, differentiability and apply in the study of Rolle,s , Lagrange,s, Cauchy mean value theorem and Leibnitz theorems.
CO2	Identify the application of partial differentiation and apply for evaluating maxima & minima.
CO3	Illustrate the working methods of multiple integral and apply for finding area, volume, centre of mass and centre of gravity.
CO4	Remember the concept of vector and apply for directional derivatives, tangent and normal planes. Also evaluate line, surface and volume integrals.
CO5	Understand the concept of vector space, Basis of a vector and linear transformations.
CO6	Remember the concept of matrices and apply for solving linear simultaneous equations

Semester: I
Subject Code: (BAST 103)**Name of the subject:** English for communication

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

CO1	The student will acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.

Semester: I/II
Subject Code: BEET 101
Name of the subject: Basic Electrical & Electronics Engineering

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

CO1	The final outcome of the subject will result into an enhancement in understanding the basic concepts of Core Electrical Engineering subjects.
CO2	The topics covered under this subject will help to enhance the basic understanding of Electrical machines and power systems and basic electronics.

Semester: I/II
Subject Code: BMEP 103
Name of the subject: Engineering Graphics

Course Outcomes
At the end of the course students will get

CO1	Introduction to engineering design and its place in society
CO2	Exposure to the visual aspects of engineering design
CO3	Exposure to engineering graphics standards
CO4	Exposure to solid modeling
CO5	Exposure to computer-aided geometric design
CO6	Exposure to creating working drawings
CO7	Exposure to engineering communication

Semester: I/II
Subject Code: BMEP 101
Name of the subject: Manufacturing Practices/Workshop

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

CO1	Understanding different manufacturing techniques and their relative advantages/disadvantages with respect to different applications.
CO2	Selection of a suitable technique for meeting a specific fabrication need.
CO3	Acquire a minimum practical skill with respect to the different manufacturing methods and develop the confidence to design & fabricate small components for their project work and also to participate in various national and international technical competitions.
CO4	Introduction to different manufacturing methods in different fields of engineering.
CO5	Practical exposure to different fabrication techniques.
CO6	Creation of simple components using different materials.
CO7	Exposure to some of the advanced and latest manufacturing techniques being employed in

	the industry.

Semester: I/II
Subject Code: BAST 104
Name of the subject: Engineering Physics

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

CO1	Illustrate significance of Wave Particle Duality to realize the behavior of microscopic systems. Idea of group velocity and phase velocity. Deduce Schrodinger's equations (time independent & dependent) and apply it to one quantum mechanical problem& physical interpretation of wave function in terms of probability.
CO2	Describe the interference by division of wave front (Young double slit exp.) & division of amplitude (thin films) and to explore some application such as Newton ring, Michelson interferometer. Explain diffraction of light and develop hands-on experience.
CO3	To know fundamental principles and working of laser. Explain working of semiconductor, solid and gases laser system. Extend it to understand the applications of laser in diverse fields.
CO4	Understand basics of Solid State Physics. Idea of semiconductor and its applications. Fermi energy level, energy states. On this basis, discuss functioning of few semiconductor devices like zener diode, solar cell. Demonstrate it in practical experiments. Summarize basics of superconductors and explore their technological applications in diverse fields.
CO5	Understanding of Gauss law of electrostatics and its application like calculation of electric field and potential due to a charge distribution in conductors and dielectrics, development of Maxwell Equations and its applications.

Semester: II
Subject Code: BAST 105
Name of the subject: MATHEMATICS-II

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

CO1	Understand the concept of differentiation and apply for solving differential equations.
CO2	Understand the concept of second order differential equations with variable coefficients by different techniques.
CO3	Understand the concept of linear and non linear partial differential equations.
CO4	Understand the concept of convergence of sequence and series.
CO5	Illustrate the working methods of complex functions and apply for finding analytic functions.
CO6	Apply the complex functions for finding Taylor’s series, Laurent’s series and evaluation of definite integrals.

Semester: I/II
Subject Code: BMET 102
Name of the subject: Basic Mechanical Engineering

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

CO1	The students would be able to understand Mechanical properties and classification of ferrous material.
CO2	The students would be able to understand Concept of measurements and how to measure Temperature, Pressure, Velocity, Flow strain etc.
CO3	The students would be able to understand basics of fluid mechanics and analysis of Bernoulli's equation for incompressible fluid.
CO4	The students would be able to understand Classification and working of boilers.
CO5	Student will be able to understand different laws of thermodynamics, their limitation and applicability in Engineering field
CO6	The students would be available to understand the efficient working of different engines

Semester: I/II
Subject Code: BCET 101
Name of the subject: Basic Civil Engineering & Mechanics

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

CO1	Identified and characterize Building materials
CO2	Understand the working principle of survey instruments and calculate angles, distance and levels
CO3	Retrieve the information content of remotely served data and interpret survey data to compute area and volume
CO4	Determine the resultant force and moment for a given system of forces
CO5	Determine the centroid & second moment of area

Semester: I/II
Subject Code: BEST 101
Name of the subject: Environmental Studies

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

CO1	It provides concepts and methods from ecological and physical sciences and their application in environmental problem solving.

CO2	It provides concepts and methods from economic, political, and social analysis as they pertain to the design and evaluation of environmental policies and institutions
CO3	Appreciate the ethical, cross-cultural, and historical context of environmental issues and the links between human and natural systems
CO4	Understand the transnational character of environmental problems and ways of addressing them, including interactions across local to global scales
CO5	Reflect critically about their roles and identities as citizens, consumers and environmental actors in a complex, interconnected world
CO6	Demonstrate proficiency in quantitative methods, qualitative analysis, critical thinking, and written and oral communication needed to conduct high-level work as interdisciplinary scholars and/or practitioners

Semester: I/II
Subject Code: BCST 101
Name of the subject: Fundamentals of Computer & Programming in C

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

CO1	The student will learn to formulate simple algorithms for arithmetic and logical problems.
CO2	To translate the algorithms to programs (in C language).
CO3	To test and execute the programs and correct syntax and logical errors.
CO4	To implement conditional branching, iteration and recursion.
CO5	To decompose a problem into functions and synthesize a complete program using divide and conquer approach.
CO6	To use arrays, pointers and structures to formulate algorithms and programs.
CO7	To apply programming to solve matrix addition and multiplication problems and searching and sorting problems.
CO8	To apply programming to solve simple numerical method problems, namely rot finding of function, differentiation of function and simple integration

Semester: III
Subject Code: BPPT-301
Name of the subject: Introduction to Polymer Science

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

CO1	Different kind of polymers and their properties.
CO2	Concept of Molecular Weight and distribution.
CO3	Variation of properties of polymer by crystallinity and glass transition temperature.
CO4	Process of polymer degradation.
CO5	Behaviors of polymer solution at different concentrations.

Semester: III
Subject Code: BAST 301
Name of the subject: Mathematics – III

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

CO1	Understand the concept of Fourier transform to evaluate engineering problems
CO2	Remember the concept of Laplace transform and apply in solving real life problems.
CO3	Understand to evaluate roots of algebraic and transcendental equations.
CO4	Understand interpolation, numerical differentiation, integration and the solution of differential equations.
CO5	Understand the concept of correlation, regression, moments, skewness , kurtosis and curve fitting.

Semester: III
Subject Code: BMET-302
Name of the subject: Basic Thermodynamics& Instrumentation

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

CO1	To learn about work and heat interactions, and balance of energy between system and its surroundings
CO2	To learn about application of I law to various energy conversion devices
CO3	To evaluate the changes in properties of substances in various processes
CO4	To understand the difference between high grade and low grade energies and II law. limitations on energy conversion

Semester: III
Subject Code: BMET 303
Name of the subject: Materials Science & Technology

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

CO1	To Understand about the Different types of Materials and their Properties
CO2	To understand the various ferrous materials and their production process and Properties
CO3	To study and examine the Non Ferrous metals and Testing of Materials
CO4	To study the magnetic and electric properties of materials
CO5	To understand the various Non-Metallic Materials and their uses.

Semester: III
Subject Code: BCSP 307
Name of the subject: Programming Practices (Introduction to MATLAB)

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

CO1	Use MATLAB for programming purposes
CO2	Learn and explore MATLAB further on their own
CO3	Use this learning experience to learn other programming languages.

Semester: III
Subject Code: BCST 308
Name of the subject: Cyber Security

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

CO1	Know about various attacks and viruses in cyber systems
CO2	Know about how to prevent digital attacks
CO3	Know about how to prevent Phishing Attacks
CO4	Know about how to do secure transactions

Semester: IV
Subject Code: BPPT 401
Name of the subject: Polymer Chemistry

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

CO1	Different techniques of polymerization of polymers.
CO2	Kinetics, mechanism of condensation polymerization & methodology used of control molecular weight of polymers.
CO3	Kinetics, mechanism of free radical polymerization & methodology used of control molecular weight of polymers.
CO4	Phenomena of auto-acceleration & role of chain transfer agents, retarders, inhibitors for controlling molecular weight and shelf life of polymer.
CO5	Utility of copolymerization reaction mechanism & preparation techniques for block & graft copolymers.

Semester: IV
Subject Code: BPPT 402
Name of the subject: Thermoplastic Materials

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

CO1	Preparation, properties & application of various commodity plastics.
CO2	Preparation, properties & application of various Engineering plastics.
CO3	Concept of improvement of impact strength of plastic materials.

Semester: IV
Subject Code: BPPT 403
Name of the subject: Thermoset Materials

Course Outcomes

CO1	Upon completion of the course, the students will have the knowledge of formulation for manufacturing, properties and applications of variety of thermoset plastic materials
CO2	Effect of variation in the quantities & type of curing agents & curing condition on the properties of thermoset material

Semester: IV
Subject Code: BECT 402
Name of the subject: Energy and Environmental Engineering

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

CO1	Apply advanced level knowledge, techniques, skills and modern tools in the field of Energy and Environmental Engineering.
CO2	Distinguish the different energy generation systems and their environmental impacts.
CO3	Respond to global policy initiatives and meet the emerging challenges with sustainable technological solutions in the field of energy and environment.

Semester: IV
Subject Code: BMET 404
Name of the subject: FLUID MECHANICS

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

CO1	Use of various properties in solving the problems in fluids
CO2	Use of Bernoulli‟s equation for solutions in fluids
CO3	Determination of forces drag and lift on immersed bodies

Semester: V
Subject Code: TPP 501
Name of the subject: Polymer Structure Property Relationship

Course Outcomes

CO1	The student will able to understand various structure of polymers and their effect on different properties of polymers.
CO2	They can also able to predict the different properties of polymers using group contribution technique
CO3	

Semester: V
Subject Code: TPP 502
Name of the subject: Polymer Rheology

Course Outcomes

CO1	Student should be able to understand various rheological parameters of polymers.
CO2	Student should be able to understand effect of rheology in polymer properties and processing of polymers.
CO3	The students Will understand Measurement and instrumentation of rheological parameters.
CO4	The students Will understand Different types of flow behaviour involved in polymers.
CO5	The student will gain knowledge about viscoelastic behavior of polymers by using different models

Semester: V
Subject Code: TPP 503
Name of the subject: Characterization Polymer

Course Outcomes

CO1	Upon completing this course, the students will have deep understanding of the various analytical techniques used for identification and characterization of polymeric materials
CO2	Will understand the basic concepts , operation and applications of various

	techniques used for molecular weights of polymers
CO3	Will understand basic elements, operation and applications of various microscopy techniques such as SEM,TEM and XRD for analysis of surface and structure of plastic products.

Semester: V
Subject Code: TPP 504
Name of the subject: Plastic Processing I

Course Outcomes

CO1	Concept of processing and effect of rheology in polymer processing of various polymers.
CO2	Basics of extrusion process along with different screws & flow analysis involved in this process.
CO3	Detailed process of manufacturing of pipes, films, cables, sheets, profiles etc using extrusion process.
CO4	The students Will understand Details of twin screw extrusion and co-extrusion process.
CO5	Details of compression and transfer moulding processa along with their parameter and process control.

Semester: V
Subject Code: TPP 505
Name of the subject: Plastics Testing Techniques

Course Outcomes

CO1	Student should be able to understand the principle & methods of standardization & basic concept of standard: IS/BIS/ASTM etc,
CO2	Student should be able to understand in details about mechanical & thermal properties of plastics material & different types of test method like tensile, flexural, creep, VST, HDT etc.
CO3	Student should be able to understand in detail about the Flammability properties and different types of test methods like Oxygen index, critical temperature index & flammability test.
CO4	Student should be able to understand in detail about the optical properties and different types of test methods like gloss, haze, reflective index etc.

CO5	Ability to understand permeability properties, environment resistance, chemical resistance & standards methods of measuring and relation as well as to analyze and interpret data

Semester: V
Subject Code: TPP 506
Name of the subject: Plastic Product & Mould design

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

CO1	Plastic product and its design
CO2	Selection criteria of moulds on the basis of the product quality, quantity, geometry and accuracy
CO3	The design aspects of plastics such as product design and mould design.
CO4	Basic mould construction, feed system, ejection, cooling system etc.
CO5	Able to understand the design aspects of injection mould, compression mould, transfer mould, blow mould and extrusion.

Semester: V
Subject Code: TPP 551
Name of the subject: Synthesis and Polymerization Lab

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

CO1	Synthesis of polymer using Bulk, solution, suspension & emulsion polymerization techniques
CO2	The auto acceleration by solution polymerization method.
CO3	Synthesis of copolymers by emulsion Bulk, solution & suspension and emulsion
CO4	Synthesis of various thermoset resins (PF, UF, MF and Epoxy)

Semester: V
Subject Code: TPP 554
Name of the subject: Plastics Processing Lab

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

CO1	Components and working principle of Injection Molding process and microprocessor controlled injection molding process
CO2	Components and working of extrusion process
CO3	Components and working of compression molding process

CO4	Components and working of blow molding process , thermoforming etc.
CO5	Components and working of hand-layup process, protrusion, filament winding etc.

Semester: VI
Subject Code: TPP-601
Name of the subject: Polymeric Adhesive and Sealants

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

CO1	Mechanism of adhesion process, surface preparation for adhesion
CO2	Various types of adhesive types and application
CO3	Formulation and production techniques for different applications like packaging ,automotive, aerospace etc.
CO4	Types of sealants, their curing, formulation & their application.
CO5	Bonding of polymeric material to various substrates

Semester: VI
Subject Code: TPP-602
Name of the subject: Polymer Blends and Composites

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

CO1	Development of new polymeric materials for fulfillment of day today requirement.
CO2	Functions and requirements of different types of additives needed in the manufacture of plastics composites.
CO3	Designing of composites according to engineering applications.
CO4	Analysis of the mechanics of composite structures.
CO5	Characterization of developed materials

Semester: VI
Subject Code: TPP-603
Name of the subject: Plastics Packaging Technology

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

CO1	Identify packages and materials used for packaging of various stuffs.
CO2	Design Packages according to the requirement.
CO3	Details of various packaging processes.
CO4	Evaluation techniques involved in packaging.
CO5	Hazards related to packaging & their sustainability.

Semester: VI
Subject Code: TPP-604
Name of the subject: Additives and Compounding

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

CO1	The concept of modifying the of plastic and rubber materials by selecting appropriate additive among various additives available.
CO2	The mechanism of function and applications of various additives used for plastic and rubber materials.
CO3	Modification of the properties of rubber compounds by varying vulcanizing agents.

Semester: VI
Subject Code: TPP-605
Name of the subject: Plastic Waste Management and Recycling

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

CO1	The impact of plastic waste on environment and hazards related to it.
CO2	The technologies available for recycling and reusing of plastics wastes.
CO3	Familiarize with various policies and legislations related to environmental issues of plastics waste & their management.
CO4	Recycling methods used for thermosets and rubbers.
CO5	New developments in waste treatment methods.

Semester: VI
Subject Code: TPP-606
Name of the subject: Plastics Processing-II

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

CO1	The basic concept of injection moulding for thermoplastics- principle, specification, construction, types etc,
CO2	The process variables & their importance and also understand concept of thermoset injection moulding & reaction injection moulding.
CO3	The concepts of thermoforming process, its types, process variable affecting etc.
CO4	The details about the blow moulding process and its different types, process variables, types of die used in process & their remedies.
CO5	Basic concept of Rotational moulding process, welding/ Joining of plastics , FRP Process, Autoclave, Filament winding, Pultusion etc

Semester: VI
Subject Code: TPP-651
Name of the subject: Plastic Material Testing Lab

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

CO1	Find Ash content, Moisture content and filler content of plastic materials
CO2	To check the grade of plastic material using MFI
CO3	To check the mechanical properties like tensile, impact and compression
CO4	Determine density and bulk density of plastic materials and products
CO5	Check the thermal and electrical properties of plastics

Semester: VII
Subject Code: TPP-701
Name of the subject: Industrial Safety and Hazard management

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

CO1	Analyze the effect of release of toxic substances
CO2	Understand the industrial laws, regulations and source models
CO3	Apply the methods of prevention of fire and explosions
CO4	Understand the relief and its sizing methods
CO5	Understand the methods of hazard identification and preventive measures

Semester: VII
Subject Code: TPP-702
Name of the subject: Nylon Technology

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

CO1	Basic amidation process and manufacturing of various Nylons.
CO2	Processing of nylons using injection moulding,blow moulding, extrusion processes.
CO3	Structure property relationship of various polyamides.
CO4	Mechanical, thermal ,chemical properties of different Nylons.
CO5	Additives used in nylons and their copounding process.
CO6	Fiber forming process of polyamides and their special applications.

Semester: VII
Subject Code: TPP-703
Name of the subject: Fiber Manufacturing Process

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

CO1	Gain knowledge of properties and relative merits and demerits of natural and synthetic fibers.
CO2	Understand various manufacturing techniques used for various types of synthetic fibers.
CO3	Understand the basic concepts and merits and demerits of spinning methods used for spinning of various types of fiber forming polymers and will able to select. appropriate technique

Semester: VII
Subject Code: TME-701
Name of the subject: CAD/CAM

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

CO1	Basic knowledge of CAD/CAM
CO2	Knowledge of Geometric modeling
CO3	Mathematical representation of synthetic surfaces along with surface manipulation
CO4	Knowledge of finite element methods for solving a problem
CO5	Practice of NC part program for milling

Semester: VII
Subject Code: TPP-701
Name of the subject: Polymer Characterization Lab

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

CO1	Find molecular weight of polymers using viscometry method
CO2	Check the rheological properties
CO3	Check the thermal properties of polymers using DSC, TGA techniques
CO4	Determination of K value and MFI

Semester: VIII
Subject Code: TME-020
Name of the subject:

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

CO1	Evaluate the principles of quality management and to explain how these principles can be applied within quality management systems.
CO2	Identify the key aspects of the quality improvement cycle and to select and use appropriate tools and techniques for controlling, improving and measuring quality.
CO3	Critically appraise the organizational, communication and teamwork requirements for effective quality management.
CO4	Critically analyse the strategic issues in quality management, including current issues and developments, and to devise and evaluate quality implementation plans.
CO5	Evaluate the principles of quality management and to explain how these principles can be applied within quality management systems.

Semester: VIII
Subject Code: TPP-801
Name of the subject: Surface Coating Technology

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

CO1	Constituents of paints, varnishes and lacqueres
CO2	Special coatings for special purposes
CO3	Surface treatment techniques for pretreatment

Semester: VIII
Subject Code: TPP-803
Name of the subject: Polyurethane Technology

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

CO1	Basic chemistry related to PU Synthesis, building blocks and vulcanization.
CO2	Processing of Polyurethane & equipments related to PU Processing.
CO3	Polyurethane foam manufacturing with their properties & application.
CO4	Identification, testing of properties and compositions of PU.

Semester: VIII
Subject Code: TPP-804
Name of the subject: Technology of Elastomers

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

CO1	Structure and properties of natural rubber and other synthetic elastomers.
CO2	Manufacturing processes involved in various synthetic and natural rubber.
CO3	Machineries used for production and compounding process of different elastomers
CO4	Vulcanization reaction and vulcanizing agents for different synthetic elastomers.
CO5	Production of rubber components and their quality controls.

Semester: VIII
Subject Code: TOE-05
Name of the subject: EDP

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

CO1	Basic knowledge of entrepreneurship and types of industry.
CO2	Project identification, evaluation, demand analysis.
CO3	Basics of accountancy and project planning and control.
CO4	Understand the systematic process to select and screen a business idea.
CO5	Income tax and other laws concerning entrepreneur.