SHRI JAWAHARLAL DARDA EDUCATION SOCIETY'S
JAWAHARLAL DARDA
INSTITUTE OF ENGINEERING AND TECHNOLOGY, YAVATMAL
AN AUTONOMOUS INSTITUTE
Affiliated to Sant Gadge Baba Amravati University, Approved by AICTE, New Delhi and DTE Maharashtra
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Department of Chemical Engineering
Course Outcomes (COs)
Semester III

3CH201PC1-Chemical Engineering Thermodynamics
Course Outcomes:
After completing the course students will be able to:

CO	Course Outcome
3CH201PC1.1	Apply fundamental thermodynamic principles including system classification, process variables, equilibrium criteria, and the First Law with Cp–Cv relations to analyze and quantify energy interactions in chemical engineering systems.
3CH201PC1.2	Evaluate thermodynamic systems using entropy concepts, Second-Law statements, Carnot efficiency limits, and Third-Law implications to assess the feasibility and performance of engineering processes.
3CH201PC1.3	Analyze the behavior of pure substances using P–V–T relations, real-gas equations of state, compressibility factors, and phase-rule applications to predict phase behavior in single- and multi-component systems.
3CH201PC1.4	Evaluate colligative property variations and steady-flow energy interactions in throttling devices, compressors, nozzles, and diffusers to perform energy balance calculations for practical engineering equipment.
3CH201PC1.5	Interpret thermodynamic behavior of mixtures through partial molar properties, pressure–temperature effects, and vapor–liquid equilibrium models to design and analyze separation and mixing processes.
3CH201PC1.6	Use thermodynamic equilibrium relations and Gibbs free-energy criteria to determine equilibrium constants, predict reaction direction, and evaluate reaction extent in chemical processes.

3CH202PC1-Chemical Engineering Analysis

Course Outcomes:

After completing the course students will be able to:

CO	Course Outcome
3CH202PC1.1	Analyze reaction rates, molecularity, order and integrated rate laws for determining kinetic parameters and predicting chemical reaction behavior.
3CH202PC1.2	Illustrate adsorption types, isotherms and catalytic characteristics to interpret surface phenomena and optimize heterogeneous and enzymatic catalytic processes.
3CH202PC1.3	Apply chromatographic principles, classifications and GC-HPLC instrumentation for selecting effective separation techniques in chemical engineering applications.
3CH202PC1.4	Apply photochemical laws, Lambert-Beer principles and quantum yield concepts to analyze photochemical reactions and evaluate light-induced processes.
3CH202PC1.5	Analyze UV-Vis, IR and NMR spectroscopic principles, instrumentation and applications to characterize molecular structure and determine chemical properties.
3CH202PC1.6	Examine electrochemical concepts, cell types and conductometric-pH metric methods for obtaining analytical measurements and interpreting chemical system behavior.

3CH203PC-Process Instrumentation

Course Outcomes:

After completing the course students will be able to:

CO	Course Outcome
3CH201PC1.1	Understand basic measurement methods, types of errors, transducers, and instrument characteristics to ensure accurate and reliable industrial measurements.
3CH201PC1.2	Apply temperature measurement techniques using RTDs, thermistors, thermocouples, and infrared sensors to monitor and control thermal processes.
3CH201PC1.3	Analyze pressure sensing methods and low-pressure measurement instruments to measure and regulate process pressure effectively.
3CH201PC1.4	Evaluate fluid-flow measurement systems such as differential pressure and positive displacement methods to determine flow rates in process industries.
3CH201PC1.5	Select and compare appropriate level measurement techniques for different liquids and applications to achieve safe and efficient level control.
3CH201PC1.6	Measure and interpret pH, humidity, and concentration using electrochemical and physical sensing methods to assess process quality and environmental conditions.

3CH204MD1-Environmental Pollution: Policies and Regulations

Course Outcomes:

After completing the course students will be able to:

CO	Course Outcome
3CH204MD1.1	Apply pollution control strategies and waste management techniques to propose feasible solutions for common environmental problems.
3CH204MD1.2	Interpret the principles of sustainable development, SDGs, and the precautionary principle for the context of environmental management.
3CH204MD1.3	Interpret the updated waste management rules and evaluate their contribution to improved compliance and sustainability.

3SH205OE1-Soft Skills & Profile Building

Course Outcomes:

After completing the course students will be able to:

CO	Course Outcome
3SH205OE1.1	Apply advanced interpersonal, analytical, and persuasive communication techniques in professional contexts for effective professional interactions.
3SH205OE1.2	Demonstrate professional workplace etiquette, business communication, and group discussion skills to enhance employability.
3SH205OE1.3	Analyze leadership styles, emotional intelligence, and team dynamics for effective collaboration.
3SH205OE1.4	Design a structured and realistic career plan aligned with industry expectations and personal goals for professional growth.
3SH205OE1.5	Create ATS-friendly résumés, professional portfolios, and digital profiles for personal branding.
3SH205OE1.6	Perform effectively in interviews, workplace simulations, and job-search processes with professional confidencefor enhanced employability.

3CH209EM1-Engineering Economics

Course Outcomes:

After completing the course students will be able to:

CO	Course Outcome
3CH209EM1.1	Identify economic analysis to evaluate the impact of financial factors on projects.
3CH209EM1.2	*Explain competition in the market and the effects of inflation in the economic structure* to understand *their impact on economic performance.*
3CH209EM1.3	Predict decisions to evaluate the scope of business in global scenario.

3SH210VE1-Constitutional Values and Fundamental Duties

Course Outcomes:

After completing the course students will be able to:

CO	Course Outcome
3SH210VE1.1	Explain the historical background, making, and significance of the Indian Constitution to Understand the Constitution, Preamble, and core values.
3SH210VE1.2	Interpret Fundamental Rights and Duties (Articles 12–35, 51A) to evaluate their implications through case studies in professional and civic life.
3SH210VE1.3	Apply constitutional principles to engineering ethics, sustainability concerns (Articles 48A, 51A(g)), and demonstrate social commitment, innovation, and inclusive growth as nation builders.

3CH400FP1-Field Project

Course Outcomes:

After completing the course students will be able to:

CO	Course Outcome
3CH400FP1.1	*Analyze* field observations, record essential data, and acknowledge community concerns to identify and define real-world chemical engineering problems and local issues.
3CH400FP1.2	*Interpret* literature sources, prepare data-collection tools, and appreciate community inputs to develop a structured and feasible plan for identified project issues.
3CH400FP1.3	*Apply* engineering principles, construct and adjust simple prototypes, and demonstrate responsible practice to propose practical low-cost solutions for community or process-related needs.

3AL001NC1-Disaster Management and Preparedness

Course Outcomes:

After completing the course students will be able to:

CO	Course Outcome
3CE001NC1.1	Identify the concepts of disaster, hazard, vulnerability and risk, and classify disasters to understand the basic nature, causes and profiles of disasters in India.
3CE001NC1.2	Analyze the disaster management cycle for risk assessment, mitigation, preparedness, response, recovery, and international disaster management frameworks.
3CE001NC1.3	Apply disaster management practices, including stakeholder roles, national policies, engineers' responsibilities, and preparedness measures for effective disaster risk reduction.

3CH211DH1-Biofuels- Types and Applications

Course Outcomes:

After completing the course students will be able to:

CO	Course Outcome
3CH211DH1.1	Explain energy sources and biomass types to understand the basics of renewable fuels.
3CH211DH1.2	Analyze biomass composition and pre-treatment to enable effective conversion processes.
3CH211DH1.3	Compare bio ethanol and bio butanol production and practice ethanol recovery to learn alcohol-based biofuel generation.
3CH211DH1.4	Examine lipid sources and perform transesterification to produce biodiesel.
3CH211DH1.5	Illustrate biohydrogen production and conduct pyrolysis with upgrading to explore advanced biofuel pathways.
3CH211DH1.6	Describe and assemble enzymatic and microbial fuel cells to develop basic bioelectrochemical systems.

3CH211DH2-Industrial Hygiene and Occupational Health

Course Outcomes:

After completing the course students will be able to:

CO	Course Outcome
3CH211DH2.1	Analysis and classification of industrial hygiene hazards with reference to real incidents.
3CH211DH2.2	Interpret toxicology data to calculate permissible exposure durations.
3CH211DH2.3	Perform selection and application of exposure assessment methods to prepare hazard communication charts.
3CH211DH2.4	Evaluate physical hazards using data such as noise dose and heat stress to propose appropriate control measures.
3CH211DH2.5	Perform assessment of ergonomic and biological risks to recommend practical redesign measures.
3CH211DH2.6	Analysis and summarization of occupational health requirements to prepare compliance and audit checklists

SEMESTER- IVth

4CH212PC1-Process Calculations

Course Outcomes:

After completing the course students will be able to:

CO	Course Outcome
4CH212PC1.1	Analyze engineering problems using systematic process calculations and dimensional analysis to ensure accurate unit conversions and reliable quantitative results.
4CH212PC1.2	Apply the concepts of mole fraction and mass fraction to determine and represent the composition of solid, liquid, and gaseous mixtures in process systems.
4CH212PC1.3	Integrate mass conservation principles and material balance classifications to evaluate and solve unit operation problems related to phase behavior and product distribution.
4CH212PC1.4	Apply stoichiometric relationships to formulate material balance equations for analyzing reacting systems in chemical processes.
4CH212PC1.5	Interpret thermo chemical data to assess energy efficiency and optimize heat utilization for improved performance of chemical processes.
4CH212PC1.6	Evaluate fuel performance using calorific value and combustion efficiency to assess overall combustion quality and energy effectiveness.

4CH213PC1-Chemical Engineering Mechanical Operations

Course Outcomes:

After completing the course students will be able to :

CO	Course Outcome
4CH210PC1.1	Perform size reduction and screening operations to analyze industrial solid processing.
4CH210PC1.2	Understand the principles and operation of classifiers and thickeners to achieve effective solid separation.
4CH210PC1.3	Select appropriate solid transportation systems to ensure efficient material handling.
4CH210PC1.4	Understand filtration equipment to separate solids from liquids effectively.
4CH210PC1.5	Understand the principles of centrifuges and cyclones to enhance solid–fluid separation.
4CH210PC1.6	Understand adsorption mechanisms to apply adsorption in industrial separation processes.

4CH214PC1-Fluid Flow Operation

Course Outcomes:

After completing the course students will be able to:

CO	Course Outcome
4CH214PC1.1	**Explain** fluid properties and static pressure relations **to** build conceptual understanding **for** analyzing fluid at rest.
4CH214PC1.2	**Apply** laminar–turbulent flow concepts and dimensional analysis **to** determine velocity profiles **for** engineering flow applications.
4CH214PC1.3	**Apply** Bernoulli and Navier–Stokes laws **to** determine flow behaviour **for** solving dynamic fluid problems.
4CH214PC1.4	**Demonstrate** flow measuring devices **to** measure discharge and velocity **for** industrial fluid flow monitoring.
4CH214PC1.5	**Analyze** performance of pumps, compressors and flow machinery **to** select suitable equipment **for** process industries.
4CH214PC1.6	**Evaluate** drag, settling and packed bed flow **to** design systems **for** solid–fluid separation efficiency.

4CH215MD1-Air Pollution and Control

Course Outcomes:

After completing the course students will be able to:

CO	Course Outcome
4CH215MD1.1	Perform identification and classification of major air pollutants to evaluate their sources and impacts on humans, materials, and vegetation.
4CH215MD1.2	Understanding of basic atmospheric elements and meteorological factors to explain fundamental principles of air sampling.
4CH215MD1.3	Perform analysis of simple air pollution control methods for particulate and gaseous pollutants to outline basic air quality standards.

4SH216OE1-Quantitative and Logical Reasoning

Course Outcomes:

After completing the course students will be able to:

CO	Course Outcome
4SH216OE1.1	Apply arithmetic and numerical techniques to solve quantitative problems accurately.
4SH216OE1.2	Solve algebraic and equation-based problems using simplification and approximation methods to improve problem-solving efficiency.
4SH216OE1.3	Analyze logical reasoning problems using structured and critical thinking approaches to improve decision-making skills.
4SH216OE1.4	Interpret and analyze data using graphical and tabular methods for decision making for strategic planning.
4SH216OE1.5	Solve complex logical puzzles and advanced reasoning problems efficiently for competitive examination success.
4SH216OE1.6	Demonstrate effective aptitude test strategies integrating quantitative and logical reasoning skills for career advancement opportunities.

4SH216OE2-Critical Thinking & Decision Making

Course Outcomes:

After completing the course students will be able to:

CO	Course Outcome
4SH216OE2.1	Apply critical thinking frameworks to analyze problems systematically.
4SH216OE2.2	Evaluate information, assumptions, and arguments for logical consistency and validity.
4SH216OE2.3	Analyze complex situations and identify feasible alternatives for decision making.
4SH216OE2.4	Design rational and ethical decision-making strategies under uncertainty to ensure sustainable organizational outcomes.
4SH216OE2.5	Apply quantitative and qualitative tools to support decision-making processes.
4SH216OE2.6	Demonstrate effective decision making in simulated professional and team-based scenarios to resolve workplace challenges effectively

4CH219VS1-Machine Design & Drawing

Course Outcomes:

After completing the course students will be able to:

CO	Course Outcome
4CH2119VS1.1	Prepare the design data, design analysis, and design synthesis.
4CH2119VS1.2	Apply design standards for the proposed design safety
4CH2119VS1.3	Analyse and perform the design assignment, their aims and objectives, scope, special emphasis and limitation.

4SH220AE1-Technical Writing

Course Outcomes:

After completing the course students will be able to:

CO	Course Outcome
4SH220AE1.1	Apply principles of technical writing in engineering documents.
4SH220AE1.2	Apply technical writing skills to prepare professional documents.
4SH220AE1.3	Create ethical, well-structured technical and research documents using IEEE referencing for professional and academic communication.

4SH221EM1-Fundamentals of Book Keeping and Accounting

Course Outcomes:

After completing the course students will be able to:

CO	Course Outcome
4SH221EM1.1	Apply basic principles of bookkeeping and accounting for recording and maintaining financial transactions accurately.
4SH221EM1.2	Analyze financial statements such as income statement, balance sheet, and cash flow statement for supporting financial understanding and business decision-making.
4SH221EM1.3	Apply accounting tools and techniques for evaluating financial performance and improving business efficiency.

4CE222VE1-Environmental Science

Course Outcomes:

After completing the course students will be able to:

CO	Course Outcome
4CE222VE1.1	Analyze renewable and non-renewable natural resources and associated problems to promote sustainable utilization for future generations.
4CE222VE1.2	Analyze food chains, webs, and ecological pyramids to evaluate ecological interactions and succession processes.
4CE222VE1.3	Examine shift from unsustainable to sustainable development to promote responsible resource planning for society.