



I Semester:

S. No.	Course Code	Course Title	Category	Type	Credit	L	T	P
1.	22CET101	Engineering Drawing and Sketching	PC	Theory	2	1	0	2
2.	22CYT101	Engineering Chemistry	PC	Theory	3	3	0	0
3.	22HST101	Basic Economics	PC	Theory	2	2	0	0
4.	22HST102	English Communication Skills (Basic)	PC	Theory	2	2	0	0
5.	22MAT101	Mathematics I	PC	Theory	4	3	1	0
6.	22MET101	Introduction to Mechanical Systems	PC	Theory	2	2	0	0
7.	22CHT101	Introduction to Chemical Engineering	PC	Theory	3	3	0	0
8.	22CHT102	Chemical Engineering Thermodynamics-I	PC	Theory	4	3	1	0
9.	22CYP102	Engineering Chemistry Lab	PC	Lab	1	0	0	2
10.	22HSP104	Communication Skills lab (Basic)	PC	Lab	1	0	0	2
11.	22MEP102	Product Realization through Manufacturing	PC	Lab	1	0	0	2
Total					25			



SEMESTER – I



1. Subject Code: 22CHT101 **Course Title: Introduction to Chemical Engineering**

2. Contact Hours: L:3 T:0 P:0

3. Credits: 3 Semester: I

4. Pre-requisite: Nil.

5. Objective: To introduce the basic features and concepts of Chemical Engineering to the students.

6. Course Outcomes: Upon completion of this course, the students will be able to:

- i. Understanding the chemical engineering and its future prospects
- ii. To acquire knowledge of chemical process industries
- iii. To acquire knowledge of basic principles of chemical engineering
- iv. Knowledge of new developments in chemical engineering and career prospects

7. Details of Course:

Unit No.	Contents	Contact Hours
1.	Introduction: Definition of chemical engineering, historical perspective and contribution; job description and attributes of a chemical engineer, chemical engineering and its seamless integration with other sciences and engineering disciplines; Societal needs and role of chemical engineer for society development; Economic scale of production; Waste utilization and recycle, sustainable technology; Employment opportunities, knowledge resources; Frontiers & future roadmap; Challenges of chemical engineering practice.	8
2.	Chemical Process Industries: Framework of chemical industry and its classification, Evolution of chemical industries, Technological developments in major challenges; Chemical industries structure and segments of chemical industry, raw material and production pattern; Petroleum, petrochemical and fertilizer industry integration; Cleaner and greener technologies.	8
3.	Basic Principles of Chemical Engineering: Basic principles of chemical processes, unit processes and unit operations and various routes to produce chemicals; Material and Energy balances; Basic concept of mass, energy, and momentum transport; Equilibrium and rate-based processes.	8
4.	Reaction engineering and reactors; Measuring instruments, automation, and control; Concept of equipment design, modelling and simulation.	8
5.	Process Engineering Design Software (Aspen Plus, Hysys, Matlab, etc.), Engineering computation using Microsoft Excel, Process Flow and Instrumentation Diagram, Important developments and milestones in chemical engineering, R&D in chemical engineering; Recent advances in Chemical Engineering	8

8. Books:



(A) Text Books

S.No.	Authors / Name of Book / Publisher	Year of Publication
1	Nnaji, U., "Introduction to Chemical Engineering: For Chemical Engineers and Students", Wiley.	2019
2	Solen, K.A. and Harb, J.N., "Introduction to Chemical Engineering Tools for Today and Tomorrow", 5 th edition, John-Wiley.	2011
3	Denn, M.M., "Chemical Engineering: An Introduction", Cambridge University Press.	2012

(B) Reference Books

S.No.	Authors / Name of Book / Publisher	Year of Publication
1	Pushpavanam, S., "Introduction to Chemical Engineering", PHI Learning Pvt. Ltd.	2012
2	Ghosal, S.K., Sanyal, S.K., Datta, S., "Introduction to Chemical Engineering", Tata McGraw Hill.	1997
3	Himmelblau D.M. and Riggs J.B., "Basic Principles and Calculations in Chemical Engineering", 8 th Edition, PHI.	2014
4	Austin, G. T., "Shreve's Chemical Process Industries", 5 th Edition, McGraw-Hill, Company.	1984



1. Subject Code: 22CHT102 Course Title: Chemical Engineering Thermodynamics-I

2. Contact Hours: L:3 T:1 P:0

3. Credits: 4 Semester: I

4. Pre-requisite: Nil.

5. Objective: To learn the principles of work and energy and understand the laws of thermodynamics to apply in industries.

6. Course Outcomes: Upon completion of this course, the students will be able to:

- i. To understand the basic concepts and first law of thermodynamics
- ii. To understand the PVT behaviour of fluids
- iii. To understand the heat effects
- iv. To understand the second law of thermodynamics
- v. To understand the concepts of statistical thermodynamics

7. Details of Course:

Unit No.	Contents	Contact Hours
1.	Introduction: Definitions and Concepts: System, Surroundings, Property, Energy, Work, Thermodynamic equilibrium, stability of equilibrium states. Zerth Law of Thermodynamics: Perfect gas scale. First Law of Thermodynamics: First law of Thermodynamics and Its Applications, First law analysis of processes, Control mass and control volume analysis, Steady state, and Transient state flow processes.	8
2.	Volumetric Properties of Pure Fluids: PVT behavior of pure substances, virial equation and its applications, cubic equations of state, generalized correlations for gases and liquids.	8
3.	Heat Effects: Sensible heat effects, heat effects accompanying phase changes of pure substances, standard heats of reaction, formation and combustion, effect of temperature on the standard heat of reaction.	8
4.	Second law of Thermodynamics: Limitation of First Law, Kelvin-Planck and Clausius Statements, Reversible and Irreversible Processes, Carnot cycle, Entropy, Second Law analysis of a control volume. Exergy.	8
5.	Basic Concepts & Application of Statistical Thermodynamics: Need of statistical thermodynamics, Macrostates and microstates, Degenerate energy levels, Bose-Einstein statistics, Fermi-Dirac statistics, Entropy, Ideal gas, Maxwell speed distribution, Einstein model of solid, Debye model of solid	8



8. Books:

(A) Text Books

S.No.	Authors / Name of Book / Publisher	Year of Publication
1	Smith, J. M., Van Ness, H. C. and Abbott, M. M., "Introduction to Chemical Engineering Thermodynamics", 8 th Ed., McGraw-Hill.	2019
2	Rao, Y. V. C., "An Introduction to Thermodynamics," University Press.	2004

(B) Reference Books

S.No.	Authors / Name of Book / Publisher	Year of Publication
1	Cengel, Y.A., "Thermodynamics: An Engineering Approach," 9 th Ed., McGraw-Hill.	2019
2	Nag, P.K., "Engineering Thermodynamics", 6 th Ed., McGraw-Hill	2017