

Articulation Matrix of B.Tech Courses_(III – VIII semester)_2018-19

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES												CORRELATION WITH PROGRAM SPECIFIC OUTCOMES		
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CHT201.1	Student understood the concept of units and dimensions essential for various chemical process calculations.	3	3	1	2	--	1	1	1	--	2	--	1	3	1	2
CHT201.2	Student understood the concept of steady state and unsteady state, mass and energy balances for reactive and non-reactive process were made clear.	2	3	2	1	1	2	1	--	--	1	--	1	3	2	1
CHT201.3	Student understood the concept of the reaction between different state of matter and the concept of equilibrium occurring between these states.	1	3	2	1	--	1	1	1	--	1	2	2	3	2	2
CHT201	Chemical Process Calculations	3	3	2	2	1	2	1	1	--	2	2	2	3	2	2

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES												CORRELATION WITH PROGRAM SPECIFIC OUTCOMES		
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CHT202.1	Students understood the basic fundamentals of heat transfer and also various mode of heat transfer along with governing laws and conductive mode of heat transfer in different bodies and for extended surfaces.	3	3	1	2	1	--	2	--	1	1	--	1	3	2	1
CHT202.2	Students understood the concept of heat transfer coefficient and its calculation for natural and forced convection using various empirical correlations.	3	3	1	2	1	--	2	--	1	1	--	1	3	2	1
CHT202.3	Students understood concept of boiling and condensation phenomenon and correlation for the various heat transfer coefficient.	3	3	1	2	1	--	2	--	1	1	--	1	3	2	2
CHT202.4	Students understood the concepts of radiation and calculations for radiative heat transfer between bodies of different size and shapes	3	3	1	2	1	--	2	--	1	1	--	1	2	2	1
CHT202.5	Students were trained to design heat exchanger and evaporators for different applications in a chemical process plant	3	3	3	3	2	--	2	--	2	2	2	2	3	2	2
CHT202	Heat Transfer	3	3	3	3	2	--	2	--	2	2	2	2	3	2	2

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES												CORRELATION WITH PROGRAM SPECIFIC OUTCOMES		
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CHT203.1	To understand types of flows, various laws related to fluid flow and concept of fluid friction and its determination	3	2	1	--	--	1	--	--	2	1	--	1	2	1	2
CHT203.2	To understand principles and working of various fluid moving devices.	3	3	2	2	--	--	--	--	1	2	--	1	3	1	1
CHT203.3	To illustrate the principles of fluid flow on some real systems such as piping, porous beds, fluidized beds, metering devices and fluid machinery.	3	3	2	2	--	--	--	--	1	2	--	1	2	2	3
CHT203.4	To understand and apply the concept of Boundary layer	3	3	2	1	--	--	--	1	1	2		1	3	2	3
CHT203	Momentum Transfer Operations	3	3	2	2	--	1	--	1	2	2	--	1	3	2	3

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES												CORRELATION WITH PROGRAM SPECIFIC OUTCOMES		
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CHT204.1	Ability to generate appropriate reaction schemes for a given set of reactants	3	2	1	1	--	1	--	1	2	--	--	1	2	2	1
CHT204.2	Ability to perform kinetics analysis for chemical reactors and reaction systems	3	3	1	2	--	1	--	2	2	--	--	1	3	2	1
CHT204.3	To provide practice at developing critical and creative thinking skills related to reaction engineering	3	3	2	2	--	2	1	2	2	1	--	2	3	2	2
CHT204.4	To provide experience for students to solve open-ended reaction engineering problems in terms of performing non-ideal reactor analysis	3	3	3	3	--	2	2	2	2	1	2	2	2	2	3
CHT204	Chemical Reaction Engineering-I	3	3	3	3	--	2	2	2	2	1	2	2	3	2	3

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES												CORRELATION WITH PROGRAM SPECIFIC OUTCOMES		
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CHT205.1	Understand principles of chemical engineering thermodynamics to solve chemical engineering problems and analyze thermodynamic feasibility	3	3	1	1	3	2	3	1	2	1	1	3	3	2	2
CHT205.2	Understand the concepts of thermodynamic system, surrounding, internal energy, enthalpy, entropy, work, heat, and apply to calculate their changes for ideal gases.	3	3	1	1	3	2	3	1	2	1	1	3	3	2	2
CHT205.3	Understand the use and applications of the first and second laws of thermodynamics.	3	3	1	1	3	2	3	1	2	1	1	3	3	3	3
CHT205.4	Understand behaviour of substances, equation of states such as ideal gas equation, Virial equation etc, tables, charts and databases.	3	3	1	1	3	2	3	1	2	1	1	3	3	3	3
CHT205	Chemical Engineering Thermodynamics-I	3	3	1	1	3	2	3	1	2	1	1	3	3	3	3

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES												CORRELATION WITH PROGRAM SPECIFIC OUTCOMES		
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CHT206.1	Gained knowledge of the Environmental legislation and standards	--	--	--	--	--	2	3	2	--	1	--	1	1	2	2
CHT206.2	Gained insights of characteristics of water and wastewater and capable of process design of wastewater treatment plant.	2	2	3	2	--	2	3	1	1	1	--	1	3	2	2
CHT206.3	Made aware of fundamentals of air pollution and its control devices	2	2	3	1	--	2	3	1	1	1	--	1	3	2	1
CHT206.4	Learned the characteristics of solid wastes and their management.	1	1	3	1	--	2	3	1	1	1	--	1	2	2	2
CHT206	Industrial Pollution Abatement	2	2	3	2	--	2	3	2	1	1	--	1	3	2	2

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES												CORRELATION WITH PROGRAM SPECIFIC OUTCOMES		
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CHT207.1	This course prepared students for future work in energy-related fields by providing an overview of the challenges related to energy production.	--	1	--	--	--	2	3	--	--	--	--	1	3	2	2
CHT207.2	Students were familiarized with environmental and economic issues related to energy production	--	--	--	--	--	2	3	--	--	--	--	1	2	3	2
CHT207.3	Students understood several major energy systems. The details of such energy systems were examined using engineering principles, particularly focusing on relevant chemical processes.	2	1	1	--	--	1	1	--	--	--	--	1	3	2	2
CHT207.4	Students understood different energy sources such as fossil fuels, the hydrogen economy, biofuels, nuclear energy, fuel cells, batteries, and the electricity grid	2	--	--	--	--	2	2	--	--	--	--	1	2	3	2
CHT207	Energy Resources Utilization	2	1	1	--	--	2	3	--	--	--	--	1	3	3	2

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES												CORRELATION WITH PROGRAM SPECIFIC OUTCOMES		
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CHT208.1	Students understood the concepts of bulk solid handling and their size-based differentiation and reduction techniques.	1	1	1	1	--	1	--	1	1	1	--	1	1	1	1
CHT208.2	Fundamentals and use of screens for size-based separations and analysis were successfully understood by the students.	3	3	2	1	--	1	--	1	1	1	--	1	3	2	1
CHT208.3	The essential theories of solid-liquid and solid-gas separation and the instruments used to achieve the same were taught both theoretically and experiment.	1	1	1	1	--	1	--	1	1	1	--	1	1	1	1
CHT208.4	The concepts and use of Fluidization techniques along with transport techniques were well demonstrated.	3	3	2	1	--	1	--	1	1	1	--	1	3	2	1
CHT208.5	Storage and handling of materials and principles of solid-liquid mixing were understood both theoretically and experimentally by the students.	1	1	1	1	--	1	--	1	1	1	--	1	1	1	1
CHT208	Fluid Particle Mechanics	3	3	2	1	--	1	--	1	1	1	--	1	3	2	1

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES												CORRELATION WITH PROGRAM SPECIFIC OUTCOMES		
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CHT209.1	To understand scientific concepts, principles and theories appropriate to instrumentation.	3	2	1	--	--	1	--	--	2	1	--	1	2	1	2
CHT209.2	Students developed an understanding of various process instruments, control valves, pressure measurement, temperature measurement, flow measurement devices.	3	3	2	2	--	--	--	--	1	2	--	1	3	1	1
CHT209.3	Students gained understanding of the performance criteria of instruments (range: precision, accuracy, sensitivity and range ability).	3	3	2	2	--	--	--	--	1	2	--	1	2	2	3
CHT209	Process Instrumentation	3	3	2	2	--	1	--	--	2	2	--	1	3	2	3

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES												CORRELATION WITH PROGRAM SPECIFIC OUTCOMES		
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CHT210.1	Students understood the basic fundamentals of mass transfer operations such as distillation, absorption, liquid-liquid extraction, adsorption and leaching, stage equilibrium stages and operating conditions	3	3	2	1	2	1	2	1	--	--	--	2	3	2	1
CHT210.2	Students developed understanding of various design aspects of stage type columns, multi component distillation and various methods of designing stage type distillation	3	3	3	2	2	2	2	1	--	--	--	2	3	2	1
CHT210	Mass Transfer-I	3	3	3	2	2	2	2	1	--	--	--	2	3	2	1

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES												CORRELATION WITH PROGRAM SPECIFIC OUTCOMES		
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CHT211.1	Understood the difference among all types of mathematical function, like Linear equations, Nonlinear Equations , Ordinary differential Equations, Partial differential Equations	2	2	2	2	1	1	--	--	1	1	1	1	3	1	1
CHT211.2	Understood different numerical techniques to solve the linear algebraic equations, Eigen value and Eigen vectors of matrix, various numerical methods, solve the nonlinear algebraic equations and coding in C/C+	3	3	3	3	3	--	1	--	2	1	1	2	2	1	1
CHT211.3	Understood different numerical technique for function approximation for best data fittings and regression, to interpolate and extrapolate for the missing data and coding in C/C with initial and boundary condition.	3	3	3	3	3	--	--	2	2	--	--	2	3	1	2
CHT211	Numerical Methods in Chemical Engineering	3	2	--	2	3	1	1	--	2	1	1	2	3	1	2

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES												CORRELATION WITH PROGRAM SPECIFIC OUTCOMES		
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CHT301.1	The fundamentals of diffusion-molecular and bulk diffusion, diffusion theories-film, two film, penetration, boundary layer theory. One component diffusion and equimolar diffusion, mass transfer coefficients, mass transfer correlations etc. Diffusion in solids.	3	3	1	1	0	0	1	1	2	1	0	1	2	1	1
CHT301.2	Separation of gaseous mixtures using gas absorption and its design. Packed bed column design for gas absorption and distillation. Cooling of hot water using cooling towers, humidification of air and other gases.	3	3	3	2	0	1	1	0	1	1	0	1	2	2	1
CHT301.3	Basics of drying, design equipments types, and design. Crystallization process fundamentals, solid-liquid equilibrium process types and equipments types and their design.	3	3	2	2	0	1	1	1	0	0	1	1	3	2	2
CHT301.4	Basics of membrane separation process Types of membrane - symmetric and asymmetric membranes, composite membranes - Overview of processes -reverse osmosis, ultrafiltration, microfiltration, dialysis, electrodialysis, pervaporation etc.	3	3	2	2	0	2	2	1	0	1	1	1	3	2	1
CHT301	Mass Transfer-II	3	3	3	2	0	2	2	1	2	1	1	1	3	2	2

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES												CORRELATION WITH PROGRAM SPECIFIC OUTCOMES		
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CHT302.1	Understand the concept of Chemical Project design and hierarchy of a Chemical Project design	2	3	2	1	--	1	1	1	3	--	2	1	2	3	2
CHT302.2	Understand the concept of Designing and the fundamental of different chemical processes and other advanced processes for designing	1	2	3	--	1	2	3	3	--	2	1	2	1	2	3
CHT302.3	Understand the concepts of engineering and economics for chemical plant design and optimization	1	--	1	3	3	1	--	3	1	3	1	--	3	2	--
CHT302	Process Engineering and Plant Design	3	3	3	3	2	3	3	3	2	3	2	2	3	3	2

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES												CORRELATION WITH PROGRAM SPECIFIC OUTCOMES		
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CHT303.1	Students developed the capability to diagnose non ideal flow in process vessels.	3	3	3	2	2	2	1	1	1	--	1	3	2	2	1
CHT303.2	Understood the fundamentals of Catalyst manufacture and its characterization.	3	3	3	2	2	2	1	1	1	--	1	3	3	1	1
CHT303.3	Gained knowledge of fundamentals of effects of intra-pellet diffusion on reaction rates in isothermal pellets.	3	3	3	2	2	2	1	1	1	--	1	3	3	2	2
CHT303	Chemical Reaction Engineering-II	3	3	3	2	2	2	1	1	1	--	1	3	3	2	2

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES												CORRELATION WITH PROGRAM SPECIFIC OUTCOMES		
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CHT304.1	Select the appropriate characterization parameters.	2	1	3	2	--	1	2	--	2	1	--	1	2	1	1
CHT304.2	Specify the properties of petroleum products.	2	2	2	2	--	1	2	--	1	2	--	1	2	2	1
CHT304.3	Attain knowledge of various separation & conversion processes involved in petroleum refining.	3	3	2	1	--	2	2	--	2	2	1	1	3	2	2
CHT304.4	Attain knowledge of manufacturing of various petrochemical products.	2	2	3	2	1	1	3	1	2	2	1	1	3	2	1
CHT304	Petroleum Refining	3	3	3	2	1	2	3	1	2	2	1	1	3	2	2

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES												CORRELATION WITH PROGRAM SPECIFIC OUTCOMES		
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CHT305.1	Identify different types of optimization problems.	3	3	--	2	--	2	3	2	1	2	--	1	2	1	1
CHT305.2	Understanding of different optimization techniques.	2	3	2	3	2	--	--	--	--	1	1	3	3	2	1
CHT305.3	Ability to solve various multivariable optimization problems.	2	3	3	3	2	--	1	--	--	1	1	2	3	2	2
CHT305.4	Ability to solve optimization using Excel Solver and MATLAB.	1	1	1	2	3	1	--	--	--	1	3	2	2	3	2
CHT305	Optimization of Chemical Processes	3	3	2	3	3	3	3	2	1	3	3	3	3	2	2

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES												CORRELATION WITH PROGRAM SPECIFIC OUTCOMES		
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CHT306.1	Students understood the complex problem solving approach, which help them in solving the practical problems given in the project.	3	3	2	2	3	1	2	1	--	1	--	2	3	2	2
CHT306.2	Students understood the basic fundamentals of heat, mass and momentum transfer.	3	3	2	2	3	1	2	1	--	1	--	2	3	3	2
CHT306	Mathematical Methods in Chemical Engineering	3	3	2	2	3	1	2	1	--	1	--	2	3	3	2

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES												CORRELATION WITH PROGRAM SPECIFIC OUTCOMES		
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CHT307.1	Understand the concepts of multi-component systems	1	1	1	1	1	--	--	1	1	--	--	1	1	1	1
CHT307.2	To apply phase equilibria using various thermodynamic models	3	3	3	3	3			2	2			2	3	2	1
CHT307.3	To grasp the calculation of chemical reaction equilibria	1	1	1	1	1	--	--	1	1	--	--	1	1	1	1
CHT307	Chemical Engineering Thermodynamics-II	3	3	3	3	3	--	--	2	2	--	--	2	3	2	1

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES												CORRELATION WITH PROGRAM SPECIFIC OUTCOMES		
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CHT308.1	develop transfer function models for linear dynamical processes	3	3	1	2	3	1	1	2	1	--	1	1	3	2	2
CHT308.2	characterize the dynamics and stability of processes based on mathematical analysis	3	3	1	2	3	1	1	2	1	2	1	1	3	3	3
CHT308.3	understand the principles of feedback controllers	3	3	3	2	3	3	1	2	1	2	1	1	3	3	3
CHT308.4	design PID controllers using different tuning rules	3	3	3	2	3	3	1	2	1	1	1	1	3	3	3
CHT308.5	carry out a frequency-response analysis of control loop systems	3	3	1	2	3	1	1	2	1	2	1	1	3	3	3
CHT308	Process Dynamics and Control	3	3	3	2	3	3	1	2	1	2	1	1	3	3	3

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES												CORRELATION WITH PROGRAM SPECIFIC OUTCOMES		
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CHT309.1	To be able to design shell and tube heat exchanger design	3	3	3	2	3	--	2	1	3	3	1	3	3	2	2
CHT309.2	To be able to design distillation column	3	3	3	2	3	--	2	1	3	3	1	3	3	2	2
CHT309.3	To be able to design packed bed, absorption column	3	3	3	2	3	--	2	1	3	3	1	3	3	2	2
CHT309.4	To be able to design agitated vessels and evaporators	3	3	3	2	3	--	2	1	3	3	1	3	3	2	2
CHT309	Process Equipment Design	3	3	3	2	3	--	2	1	3	3	1	3	3	2	2

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES												CORRELATION WITH PROGRAM SPECIFIC OUTCOMES		
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CHT310.1	Identify different types of chemical process industries classified as inorganic, organic and natural product industries and their applications	3	2	2	1	--	2	2	1	1	1	--	1	1	--	--
CHT310.2	Recall various unit operation techniques and their use to synthesize a particular chemicals	3	2	2	2	--	2	3	--	--	1	--	2	2	1	1
CHT310.3	Understand the process flow diagram and various process parameters for the manufacture of various inorganic, organic and natural chemicals	3	1	1	--	--	1	1	1	1	2	--	3	1	2	--
CHT310.4	Recognize and solve engineering problems during production	3	3	2	2	2	2	1	--	1	1	--	--	2	1	1
CHT310.5	Interpret and illustrate the material balance involved in process synthesis	3	2	--	2	2	--	--	--	--	2	2	1	3	1	1
CHT310	Chemical Technology	3	3	2	2	2	2	3	1	1	2	2	3	3	2	1

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES												CORRELATION WITH PROGRAM SPECIFIC OUTCOMES		
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CHT312.1	The students understood the chemical and physical transport processes and their mechanism, heat, mass and momentum transfer analysis of simple processes.	3	2	3	1	3	--	--	1	1	1	--	3	2	2	1
CHT312.2	The students understood how to solve differential momentum, heat, and mass balances for 1-D steady state problems and quasi-steady-state problems occurring in laminar and turbulent flows in terms of vector and tensor fluxes.	3	2	3	1	3	--	--	1	1	1	--	3	3	1	1
CHT312.3	The students understood how to formulate conservation statements in heat, mass, and momentum at multi-scales from microscopic to macroscopic in both steady and unsteady modes.	3	2	3	1	3	--	--	1	1	1	--	3	3	2	1
CHT312.4	The students understood how to analyze transport problems in heat, mass, and momentum, both macroscopic and microscopic formulate simultaneous energy and mass balances in chemical processes.	3	2	3	1	3	--	--	1	1	1	--	3	3	2	2
CHT312	Transport Phenomena	3	2	3	1	3	--	--	1	1	1	--	3	3	2	2

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES												CORRELATION WITH PROGRAM SPECIFIC OUTCOMES		
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CHT321.1	Develop understanding of petroleum engineering in particular within the oil, gas and petroleum industries.	2	1	1	2	--	1	2	1	--	1	--	--	2	1	1
CHT321.2	Introduction to the most recent principles and concepts of refining process ensure you are up to date with the most progressive ideas in the field.	3	2	1	2	--	2	2	--	--	1	--	--	2	2	1
CHT321.3	Students will be equipped with the necessary skills to identify, formulate and solve engineering problems related to petroleum refining process.	3	3	2	2	--	2	3	2	--	2	1	1	3	2	2
CHT321.4	Explain different area safety classifications used in the process industry and the impact these classifications have on maintenance work.	3	3	2	2	--	2	3	2	1	2	2	2	3	2	1
CHT321	Petroleum, Petrochemicals and Natural Gas Engineering	3	3	2	2	--	2	3	2	1	2	2	2	3	2	2

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES												CORRELATION WITH PROGRAM SPECIFIC OUTCOMES		
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CHT403.1	Able to understand how physical world can be modeled	3	3	1	--	1	--	--	--	--	--	--	1	2	2	2
CHT403.2	Understood several mathematical techniques to solve and analyze the physical problems.	3	3	2	2	2	--	--	--	1	--	--	1	3	2	2
CHT403	Modelling and Simulation	3	3	2	2	2	--	--	--	1	--	--	1	3	2	2

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES												CORRELATION WITH PROGRAM SPECIFIC OUTCOMES		
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CHT404.1	Choose a suitable separation technique for separation of product mixture	3	3	1	1	--	1	2	--	1	--	--	1	2	2	1
CHT404.2	Understated the concept of membrane based separation technique	2	2	3	2	1	--	3	2	--	1	2	2	3	2	--
CHT404.3	Understand the fundamental of ion exchange and other advanced separation techniques	1	--	2	3	2	3	1	3	2	3	1	--	1	3	2
CHT404	Advanced Separation Processes	3	3	3	3	2	3	3	3	2	3	2	2	3	3	2

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES												CORRELATION WITH PROGRAM SPECIFIC OUTCOMES		
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CHT 405.1	Student got knowledge of uses and techniques of plastics materials, processing, including life cycle analysis of plastic materials.	1	1	2	--	--	2	2	2	--	1	--	1	2	1	1
CHT405		1	1	2	--	--	2	2	2	--	1	--	1	2	1	1

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES												CORRELATION WITH PROGRAM SPECIFIC OUTCOMES		
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CHT408.1	Show an understanding of the fundamental principles underlying safety and risk management.	3	2	1	--	--	3	2	3	--	2	2	1	3	2	1
CHT408.2	Demonstrate an understanding of issues related to the practical application of safety and risk management.	2	3	3	2	1	--	1	--	1	1	--	--	2	2	2
CHT408.3	Establish expertise relevant to the practice of safety and risk management.	2	3	3	3	--	2	1	--	--	1	1	--	3	2	2
CHT408.4	Demonstrate management skills related to planning, developing and report writing activities.	2	--	--	--	3	3	2	1	2	2	2	1	1	2	3
CHT408	Process Safety and Hazards	3	3	3	3	3	3	2	3	2	2	2	1	3	2	3

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES												CORRELATION WITH PROGRAM SPECIFIC OUTCOMES		
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CHT411.1	Understand the basic concept of monomer, polymer and repeating units and their properties.	3	2	1	--	--	1	--	--	2	1	--	1	2	1	2
CHT411.2	Understand the basic concepts of degree of polymerization.	3	3	2	2	--	--	--	--	1	2	--	1	3	1	1
CHT411.3	Understand in detail about the chemistry of polymers and the possible chemical modification.	3	3	2	2	--	--	--	--	1	2	--	1	2	2	3
CHT411.4	Understand the physical and chemical characterization of raw materials.	3	3	2	1	--	--	--	--	2	1	--	2	3	2	2
CHT411	Polymer Science and Technology	3	3	2	2	--	1	--	--	2	2	--	2	3	2	3

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES												CORRELATION WITH PROGRAM SPECIFIC OUTCOMES		
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CHT412.1	Student understood the more advance control techniques such as discrete control system	0	3	1	1	2	2	3	2	0	1	2	3	3	2	2
CHT412.2	Student understood the analysis of discrete control systems by Z-transforms.	1	2	0	0	2	2	2	1	0	1	0	3	3	2	1
CHT412.3	Student understood the multivariable control with interaction among control loops, more applicable Industrial applications	2	2	3	2	3	2	2	1	0	0	2	3	3	2	3
CHT412	Advanced Process Control	2	3	3	2	3	2	3	2	--	1	2	3	3	2	3

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES												CORRELATION WITH PROGRAM SPECIFIC OUTCOMES		
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CHT413.1	Student understood role of chemical engineers in bioprocess industries	3	3	1	--	--	2	3	2	2	--	--	2	3	2	1
CHT413.2	Student understood concept of Enzyme and its working, cell growth kinetics and inhibition kinetics	3	3	3	2	2	1	2	1	2	--	--	2	2	2	1
CHT413.3	Recall various unit operation techniques and their use in bioprocess industries	3	3	3	2	1	2	2	2	2	--	--	2	2	2	2
CHT413.4	Design of downstream equipments for product separation	3	3	3	3	2	2	2	2	2	--	--	2	3	2	2
CHT413.5	The students took a lead for the design of a bioreactor/ fermenter	3	2	3	2	2	3	--	--	2	2	1	2	3	2	2
CHT413	Bioprocess Engineering	3	3	3	3	2	3	3	2	2	2	1	2	3	2	2

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES												CORRELATION WITH PROGRAM SPECIFIC OUTCOMES		
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CHT415.1	Gained knowledge of fundamentals of non-conventional energy sources, e.g. solar energy, bio-fuels, wind power, tidal power, geothermal energy etc.	1	1	1	1	--	1	--	1	1	1	--	1	1	1	1
CHT415.2	Understanding of details of energy supply in India and storage and distribution of energy.	3	3	2	1	--	1	--	1	1	1	--	1	3	2	1
CHT415	Non-Conventional Energy Sources	3	3	2	1	--	1	--	1	1	1	--	1	3	2	1

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES												CORRELATION WITH PROGRAM SPECIFIC OUTCOMES		
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CHT416.1	Understood the fundamentals of heterogeneous Catalysts, characteristics, selectivity and deactivation Kinetics	3	3	1	--	--	2	3	2	2	--	--	2	3	2	1
CHT416.2	Learn synthesis and characterization of heterogeneous catalysts	3	3	3	2	--	1	2	1	2	--	--	2	2	1	1
CHT416.3	Understood the fundamentals of transport processes in heterogeneous catalyst and reactors	3	3	3	2	2	2	2	2	2	--	--	2	3	2	2
CHT416.4	Design of various heterogeneous reactors operating isothermally, adiabatically, and under non-adiabatic conditions.	3	3	3	3	2	3	3	2	2	--	--	2	3	3	1
CHT416	Catalytic Processes	3	3	3	3	2	3	3	2	2	--	--	2	3	3	2

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation