Vidyasagar University

Curriculum for Industrial Chemistry (Major)

[Choice Based Credit System]

Semester-II

Course	Course Code	Name of the Subjects	Course Type/ Nature	Teaching Scheme in hour per week			Credit	Marks
				L	T	P		
CC3		**C3T:** Material and Energy Balance	Core Course-3	5	1	0	6	75
CC4		**C4T:** Industrial aspects of Physical Chemistry	Core Course-4	5	1	0	6	75
GE2		**TBD**	Generic Elective-2				4/5	75
							2/1	
AECC		ENVS	AECC (Elective)				4	100
Semester Total							**22**	**325**

L=Lecture, **T**=Tutorial, **P**=Practical, **CC**- Core Course, **TBD** - To be decided, **AECC**- Ability Enhancement Compulsory Course

Generic Elective (GE) (Interdisciplinary) from other Department [Paper will be of 6 credits]. Papers are to be taken from following discipline: **Computer Science/Mathematics/Physics/ Chemistry/Economics**

Modalities of selection of Generic Electives (GE): A student shall have to choose **04** Generic Elective (**GE1 to GE4**) strictly from **02** subjects / disciplines of choice taking exactly **02** courses from each subjects of disciplines. Such a student shall have to study the curriculum of Generic Elective (GE) of a subject or discipline specified for the relevant semester.

Semester –II
Core Course (CC)

CC-3: Material and Energy Balance — Credits 06

C3T: Material and Energy Balance

Course Contents:

Unit I: Dimensions and units:

Basic Chemical Calculations –Atomic weight, Molecular weight, Equivalent weight, Mole, composition of - (i) Liquid mixtures and (ii) Gaseous mixtures, Ideal gas law, Vapour pressure, Humidity and Saturation.

Unit II: Material Balance without Chemical Reactions

Flow diagram for material balance, simple material balance with or without recycle or by-pass for chemical engineering operations such as distillation, absorption, crystallization, evaporation, extraction, etc.

Unit III: Material Balance involving Chemical Reactions

Concept of limiting reactant, conversion, yield, Liquid Phase reaction, Gas Phase reaction with or without recycle or bypass.

Unit III: Energy Balance

Heat capacity of pure gases and gaseous mixtures at constant pressure, sensible heat changes in Liquids, Enthalpy changes.

CC-4: Industrial aspects of Physical Chemistry Credits 06

C4T: Industrial aspects of Physical Chemistry

Course Contents

Unit I: Surface Chemistry and Interfacial phenomenon:

Absorption isotherm, sols, Gels, Emulsions, Micro emulsion, Micelles, Aerosols, Effects of surfactants, hydrotropes.

Unit II: Catalysis

Introduction Types – Homogeneous and Heterogeneous. Basic principles, mechanism, Factors affecting the performance, Introduction to phase. Transfer catalysis. Enzyme catalyzed reactions rate model, industrially important reactions.

Unit III: Kinetics

Order, Molecularity, Rate equation for 1^{st} & 2^{nd} order reaction. Effect of temperature on rate constant, energy of activation, Chain reaction.

Unit IV: Thermodynamics

Gibbs Free energy, van't Hoff equation and its application in industry.
Gibbs Phase rule. Simple systems equation. Phase equilibrium of H_2O and sulphur. Thermal analysis.