VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

(CHEMICAL ENGG.)

SEMESTER – 6

Course No.	Course	TEACHING SCHEME *L*	*P*	*T*	Examination Scheme THEORY	PRACTICAL	T.W.	TUTORIAL	Grand total
601	Gen. Chem. Tech.-II	3	0	2	100	30	20	--	150
602	Chem. Engg. therm-II	3	1	0	100	--	--	25	125
603	Chem. Reac.Engg.-I	3	1	2	100	30	20	25	175
604	Chem. SystemModel.	3	0	0	100	--	--	--	100
605	Instrumentation	3	0	2	100	30	20	--	150
606	Mass Transfer – II	3	0	4	100	60	40	--	200
	TOTAL :-	**18**	**02**	**10**	**600**	**150**	**100**	**50**	**900**

VEER NARMAD SOUTH GUJARAT UNIVERSITY,SURAT

GENERAL CHEMICAL TECHNOLOGY – II

SEMESTER –VI

TEACHING SCHEME	**L=3; P/D=2; TA=0**
EXAMINATION SCHEME	**Theory = 3hours; marks= 100**
PRACTICAL / DRAWING	**Internal evaluation Marks: 20** **External evaluation Marks: 30** **Total Marks: 50**

1. Petroleum Refining
2. Petrochemical industry.
3. Polymer industry: Manufacture of phenol and urea formaldehyde resins, PVC, Polyethylene, Synthetic rubber etc.
4. Synthetic fiber industry : Nylon polyester, Acrylics, rayons.
5. Fine Chemicals and drugs : Classification of dyes, Azo dyes, Reactive dyes, disperse dyes., Sali cyclic Acid, Methye Sali cylate, Aspirin, Antibiotics & Uptimes
6. Intermediates & Dyes classification of dyes, Azo dyes, Reactive dyes & Disperse dyes.
7. Bio-chemical Engineering Fundamentals, micro-organisms,strains culture etc., kinetics of biochemical reaction, fermentation aeration.
8. Environmental aspects of various industries.

REFERENCE:-

1 R.N. Shreve, J.A. Brink, " Chemical Process Industries" 4th edition.International Students edition

2 G.F. Austin . "Shreve's Chemical Process Industries" 5th edition., Mcgraw Hill Publications G.F. Austin . "Shreve's Chemical Process Industries" 5th edition., Mcgraw Hill Publications.

3 M.Gopala Rao and M. Sitting, " Dryden's Outline of Chemical Technology" 2nd edition., East-West publications

4 Bailey & Ollis, 'Bio-chemical Engineering Fundamentals', 2nd edition., International Student Edition.

5 Nelson. 'Petroleum refinery Processes', McGraw Hill Publication.

VEER NARMAD SOUTH GUJARAT UNIVERSITY,SURAT

CHEMICAL ENGG. THERMODYNAMICS –II

SEMESTER –VI

TEACHING SCHEME **L=3; P/D=0; TA=1**

EXAMINATION SCHEME **Theory = 3hours; Marks= 100**
Tutorial = 25

1. Thermodynamic properties of fluids: Partial molar properties, chemical potential, non-ideal solutions, fugacity, fugacity coefficient, for pure component and for mixture of gases & For liquids- Lewis randall rule, Henry's law, excess property, activity and activity coefficient.

2. Phase equilibrium: Phase rule, Duhem theorem, miscible system, immiscible system, partially miscible systems, testing of vapor liquid equilibrium data, Gibbs, Duhem equation, Van laar equation, Margules equation, Redlich kister equation, P-x-y , T-x-y and x-y diagrams, Vapour liquid equilibrium of ideal and nonideal solutions, Raoult's and Henry's law.

3. Chemical equilibrium: criteria, equilibrium conversion(x), constant(k), effect of temperature and pressure on k, evaluation of k, evaluation of equilibrium conversion for gas phase reaction.

4. Introduction to Statistical thermodynamics: Stefan Boltzmann, Bose- Einstein and Fermi Dirac distributors, corrected Boltzmann statics, partition functions, etc.

REFERENCE:

1. J.M.Smith and H.C. Vanness, 'Introduction to Chemical Engg. Thermodynamics', 3rd and 4th Ed., MGH.
2. Nag P.K "Engineering "
3. B.F. Dodge, 'Chemical Engineering Thermodynamics', MGH.
4. Sonntag and Van Wylen, "Fundamentals of statistical thermodynamics"

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CHEMICAL REACTION ENGINEERING – I

SEMESTER –VI

TEACHING SCHEME	**L=3; P/D=2; TA=1**
EXAMINATION SCHEME	**Theory = 3hours; marks= 100**
PRACTICAL / DRAWING	**Internal evaluation Marks: 20**
	External evaluation Marks: 30
	Tutorial: 25
	Total Marks:75

1. Introduction: Chemical Kinetics, Classification of reactions, variable affecting reaction.
2. Kinetics of homogenous reactions.
3. Instrumentation of Batch Reactor data.
4. Introduction to Reactor Design : Material and energy balances, single ideal reactor, ideal batch reactor.
5. Design of single reaction : Size comparison of single reactors, batch reactor-mixed versus plug flow reactors, first & second order reactions, Gen. Graphical comparison.
6. Multiple reaction system : Plug flow reactors in series and/or parallel, equal sized mixed reactors, recycle factor.
7. Temperature & pressure effects : Single & Multiple reactions.
8. Industrial applications.

REFERENCES:

1. Octave Levenspiel , 'Chemical Reaction Enfineering' , 2nd ed. , John-Wiley.
2. J.M. Smith, 'Chemical Engg. Kinetics' , McGraw Hill Co.
3. S.M.Nallas, " Reaction Kinetics for chemical Engineering, McGraw Hill company.

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CHEMICAL SYSTEM MODELLING

SEMESTER –VI

TEACHING SCHEME **L=3; P/D=0; TA=0**

EXAMINATION SCHEME **Theory = 3hours; marks= 100**

1. Introduction; Physical and mathematical modelling, principle of similarity, definition of independent variables and dependent variables, boundary conditions.
2. Mathematical modelling of Chem. Engg. Systems: single, two and n-stage extraction steady state mass transfer processes, Un steady state formulations of a single stage extraction, steady state heat conduction through hollow cylindrical pipe using various boundary conditions, unsteady process of steam heating of a liquid, heat transfer through extended surface(triangle and rectangular), steady state counter current cooling of a tank, diffusion with chemical reaction in a tubular reactor etc.
3. Laplace Transforms: Thermometer systems, mixing tanks, fixed bed reactor formulations
4. Partial differential equations and finite differences; a review
5. Numerical methods: a review
6. Treatment of experimental results
7. Optimization

REFERENCES:

1. V.G.Jenson and G.V. Jeffers, ‘ Mathematical methods in chemical engineering’, Academic press, NY.
2. H.S. Mickley, T.S. Shrewood and C.E. Reed, ‘Applied mathematics in chemical engineering’, TMGH, New Delhi.
3. Kafarov, "Cybernetic methods in chemistry and chemical Engineering", Mir Publishes, Moscow.

VEER NARMAD SOUTH GUJARAT UNIVERSITY,SURAT
INSTRUMENTATION

SEMESTER –VI

TEACHING SCHEME	**L=3; P/D=2; TA=0**
EXAMINATION SCHEME	**Theory = 3hours; marks= 100**
PRACTICAL / DRAWING	**Internal evaluation marks :- 20** **External evaluation marks - 30** **Total Marks - 50**

INSTRUMENTATION:

1. Measuring instruments for temperature, pressure, level and flow.

MICRO-PROCESSOR APPLICATIONS:

1. Micro-processor architecture & instruction set for Intel, Zilog and Motorola.
2. Logic structure, combinational logics.
3. Karnaugh Maps, assembly language programming.
4. Timing diagrams, counter & timing delays, stack & subroutines.
5. Interfacing, parallel & seriel, programmable peripheral interface, interrupts, data conversion.
6. Data conversion – ADC & DAC data logging, microcontrollers, program logic controllers, application to process control and drafting.

REFERENCES:

1. Donald Eckman, ‘ Industrial Instrumentation ‘.

VEER NARMAD SOUTH GUJARAT UNIVERSITY,SURAT

MASS TRANSFER-II

SEMESTER –VI

TEACHING SCHEME	**L=3; P/D=4; TA=0**
EXAMINATION SCHEME	**Theory = 3hours; marks= 100**
PRACTICAL / DRAWING	**Internal evaluation Marks: - 25** **External evaluation Marks - 75** **Total Marks - 100**

1. Absorption: Equilibrium, material balances for single component transfer, multistage and packed tower operation.
2. Humidification: Vapor gas mixtures, gas liquid contact operations, adiabatic and nonadiabatic operation.
3. Liquid extraction: stage wise, stage type contactor etc.
4. Adsorption and ion exchange: stagewise operation etc.
5. Drying: Batch drying, mechanism, continuous drying.
6. Leaching: Steady state and unsteady state operations.
7. Crystallization: Equilibria, operations, equipments.
8. Introduction to recent separation techniques using mass transfer.

REFERENCES:

1. R. E. Treybal, Mass transfer operations, 3rd Edition, McGraw Hill Publication
2. McCabe and Smith, Unit operation in chemical engineering, McGraw Hill Publication