

**SARDAR PATEL UNIVERSITY**  
**Programme & Subject: M.Sc (Industrial Chemistry)**  
**Semester: IV**  
**Syllabus with Effect from: June - 2015**

<b>Paper Code: PS04CICH10</b>	<b>Total Credit: 4</b>
<b>Title Of Paper: Introduction to Reaction Engineering &amp; Steam Generation</b>	

<b>Unit</b>	<b>Description in Detail</b>	<b>Weightage (%)</b>
I	<b>Kinetics of Homogeneous reactions:</b> Single and Multiple Reactions, Elementary and Non-elementary reactions, Molecularity and order of reactions, Kinetic models for non-elementary reactions, Temperature dependency and reaction rate prediction from Arrhenius, transition and collision theories. Integral and Differential analysis for constant volume and variable volume reactors-irreversible & reversible.	25%
II	<b>Design of reactors:</b> Design of Ideal batch, CSTR and plug flow reactors, determination of the best system for a given conversion, residence time distribution- determination of exit age curve	25%
III	<b>Kinetics of Heterogeneous reactions:</b> Global rate of reaction, Effect of transport processes on selectivity in series and parallel reactions, Rate equations for surface reactions, Three phase reactors – Slurry and Trickle bed reactors. Determination of surface area, porosity, density and particle size of catalyst	25%
IV	<b>Steam &amp; Steam generation:</b> Introduction and thermodynamics of steam generation, steam generators, Indian boiler act, Calculations for boilers	25%

**Basic Text & Reference Books:-**

- Chemical Reaction Engineering, Octave Levenspiel, Wiley Eastern Ltd. 3<sup>rd</sup> edition.
- Chemical Engineering Kinetics, J.M.Smith, Mc.Graw Hill Book Co. 3<sup>rd</sup> edition.
- Chemical Kinetics, S. K. Jain, Vishal Publication, Jallander.
- Fundamentals of Chemical reaction Engineering., Holland & Anthony
- Chemical Reactor Theory, Lenbigh & Turner, University of Cambridge.
- Reaction Engg. Through solved problems, G.M.Pande & S.M. Shrivastava
- Chemical Engg. Handbook, Robert Perry. 7<sup>th</sup> edition.
- A text book of plant utilities, D. B. Dhone, Nirali Prakasan 6<sup>th</sup> edition

