

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

<b>Paper Code: PS04CICH11</b>	<b>Total Credit: 4</b>
<b>Title Of Paper: Process Development in Chemical Industries</b>	

<b>Unit</b>	<b>Description in Detail</b>	<b>Weightage (%)</b>
I	Introduction to process development, Goals of Process development, Stages in process development, Scope and Limitations of Project development	25%
II	Survey of Some organic reactions in relation to process development: Friedel craft acylation, witting reaction, ozonolysis, mitsunobu reaction, Very low temperature reactions, Reactions under high pressure and chiral chemistry, Strategies for simplification of organic reaction and processes. Reagent modification, Choosing a reagent: safety, Toxicity, cost, nasty byproducts, byproducts from side reactions	25%
III	Solvents: choosing a solvent, impurities in solvent, effect of solvents in organic reactions, mixed solvents, aqueous mediums for organic reactions, liquid products as solvents, some new solvents, no solvent is the best solvent. Phase transfer catalysis: Nature of phase transfer catalysis reactions, Factors effecting, Choosing a phase transfer catalyst, Important phase transfer catalysts	25%
IV	Work up, purity and purification: Classical workup, Environmental problems, Simplification of workup, purity, purification. Safety assessment of Chemical process technology: Early detection and prevention of chemical accidents, principles of chemical process safety, reaction runaway, chemical reaction hazards.	25%

**Basic Text & Reference Books:-**

- The chemistry of process development in fine chemicals and pharmaceutical industry, 2<sup>nd</sup> edition, By C.Someshwara Rao, Asian books pvt. Ltd. New Delhi.
- Developing an Industrial chemical process, By Joseph Mizrahi, Taylor and Francis Pub.
- Practical process research and development, N. G. Anderson, Science direct.
- Designing and operating safe chemical reaction process, HSE publishers

