Course Type	Course Code	Name of Course		Т	Р	Credit
DE	NCYD543	Organic Synthesis and Process Technology		0	0	3

Course Objective					
• To develop synthetic routes that is safe, cost-effective, environmentally friendly, and efficient.					
Learning Outcomes					
• Knowledge about not only about reactions but also about impurities that may develop from side					

- Knowledge about not only about reactions but also about impurities that may develop from side reactions.
- Knowledge of taking synthesized drugs in milligram stage from laboratory to manufacturing scale.

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
1	Reagents and organic reactions: Nucleophilic substitution reactions, Suzuki-Miyaura coupling, Buchwald coupling, Chan-Lam coupling, amide bond formation, protection and deprotection, ester hydrolysis;	10L	Learn the key reactions and their mechanisms used in modern drug discovery
2	Heterocyclic chemistry: Nomenclature, synthesis and reactivity of key heterocycles- isoxazole, quinoline, quinazoline, imidazo[1,2-a]pyridine, indole, azaindole, pyrrolo[2,3- d]pyrimidine	9L	Understand the chemistry, including the synthesis and reactivity, of important heterocycles
3	Modern synthetic tools in pharmaceutical chemistry	9L	Role of impurities in final product and their impact on the quality, cost, etc. Means of identifying and minimizing impurity formation. Removal of impurities pharmaceutical grade product manufacture
4	Key starting materials and API manufacturing	8L	Techniques for scale up base on the study of prior literature on some important processes.
5	Green chemistry: Purpose of green chemistry, Principles of green chemistry, atom economy, green solvents, ionic liquids, enzymes of catalysts, microwave-assisted reactions, photocatalysis, examples of green chemistry reactions.	6L	Process technologies for some selected natural products.
Total		42	

Text Books:

- 1. Organic Chemistry J.Clayden N. Greeves, and S. Warren 2nd Edition, Oxford university press, 2012
- 2. Practical Process Research and Development, Neal G. Anderson, Academic Press, 2nd Edition (2012)

Reference Books:

 Process Chemistry in Pharmaceutical Industry, Kumar Gadamasetti, Vol I & II, CRC Press, 1st Edition (1999). 2) Advanced Organic Chemistry, Jerry March, Wiley-Blackwell, 3rd Edition (1985).