Course Type	Course Code	Name of Course	L	T	P	Credit
DE	NCYD505	Asymmetric Synthesis	3	0	0	3

Course Objective
• To enable the course student to design and execute the synthesis of chiral molecules in optically pure form with the knowledge gained from the course.
Learning Outcomes
• Grasp of the fundamentals of asymmetric synthesis. • Understanding the current tools of asymmetric synthesis. • Designing an asymmetric synthesis

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
1	Introduction –Introduction to and recapitulation of terminologies associated to stereochemistry and asymmetric synthesis. Concepts and necessity for asymmetric synthesis. Chiral induction – Concepts of substrate and reagent controlled asymmetric induction; Concepts of diastereoselective synthesis and double diastereoselective synthesis; Concepts of catalytic asymmetric synthesis, Chiral Pool approach: Advantages and Limitations "Chirons"– terpenes and carbohydrates as chiral source material – Steven"s steroid intermediate synthesis, Syntheses of biologically relevant compounds, Chiral auxiliary based asymmetric synthesis: Introduction, advantages and disadvantages. Basic requirements of a chiral auxiliary popular and generally adaptable chiral auxiliaries (Oppolzer, Evans, Enders, Davies, 8-phenyl-menthol, BINOL, etc.)	10L	Why asymmetric synthesis is required? History and progress of asymmetric synthesis. Understanding the major strategies, techniques and tools for asymmetric synthesis.
2	Chiral diasteroselective and catalytic reactions involving - Asymmetric alkylations of enolates and azaenolates based on organolithiums. Asymmetric 1,2 and 1,4 addition to C=X; Asymmetric aldol and related reactions.	14L	Designing and executing asymmetric synthesis of new compounds involving C-C bond formation reactions through application of the different strategies including catalytic methods.
3	Chiral diasteroselective and catalytic reactions involving - Asymmetric	18L	Designing and executing asymmetric synthesis of new compounds involving C-C

	Pericyclic reactions, Asymmetric hydroborations and other reductions. Asymmetric oxidations. Asymmetric organocatalysis: Chiral amine catalysis.		bond formation reactions as well as C-X bond formations through application of the different strategies including catalytic methods. Knowledge of the current methods for asymmetric synthesis using metal-free catalytic approaches. Application in designing new compounds using it as a tool.
Total		**42**	

Text Books:

1. Principles of Asymmetric Synthesis – R. E. Gawley and J. Aube, Pergamon, 2nd Edition, Elsevier, 2012.

Reference Books:

1. Catalytic Asymmetric Synthesis, I. Ojima (ed.), 3rd Edition, Wiley, 2010.
2. Principles and Applications of asymmetric synthesis - Guo-Qiang Lin, Yue-Ming Li, Albert S.C. Chan, John Wiley & Sons, 2001.