



## OC302 August 3:0

# Asymmetric Catalysis: From Fundamentals to Frontiers

### Instructor

Prof. Santanu Mukherjee

Email: sm@iisc.ac.in

### Teaching Assistant

None

Email: NA

**Department: Organic Chemistry (OC)**

Course Time: Tue., Thu., 3:30 - 5:00 PM

Lecture venue: OC Lecture Hall

Detailed Course Page: NA

## Announcements

### Brief description of the course

This is an advanced synthetic organic chemistry course offered primarily for the PhD students and Int-PhD students. However, final year UG students (as part of their MS course work) can take this course.

Asymmetric catalysis is an area which covers a considerable part of organic synthesis. The objective of this course is to equip the students with the basics of asymmetric synthesis and catalysis. Various fundamental aspects are covered through the first part of the course while the rest of the course covers the selected recent examples from the contemporary literature.

### Prerequisites

Successful completion of OC 203/CD 213 and CD 223 (for UG and In-PhD students). No prerequisite for regular PhD students.

### Syllabus

Basics of asymmetric catalysis including energetics of reactions; Lewis acid & Lewis base catalysis; Kinetic, Dynamic Kinetic and Parallel Kinetic Resolution; Desymmetrization reactions; Mechanistic studies of

asymmetric reactions: nonlinear effects, autocatalysis and autoinduction; Bifunctional, Dual and Multifunctional catalyst systems; Modern aspects of asymmetric catalysis: counterion-directed catalysis, cooperative, dual and merged catalysis, asymmetric photocatalysis etc.; Applications of asymmetric catalysis.

### **Course outcomes**

Students are expected to learn the basics of asymmetric synthesis and catalysis such as various types of catalysis, modes of asymmetric induction, stereochemical models etc. Contemporary literature is covered so that students completing this course would be in a position to take up research projects in this area of organic synthesis.

### **Grading policy**

Relative grading is followed for this course. 40% of mid-term and 60% of final exam marks are combined to arrive at the final grade.

### **Assignments**

### **Resources**

Book: Walsh, P. J., Kozlowski, M. C., Fundamentals of Asymmetric Catalysis, University Science Books, California, 2008.

Primary literature.