METAL MEDIATED SYNTHESIS-I

Prof. DEBABRATA MAITI
Department of Chemistry
IIT Bombay

PRE-REQUISITES : Advance Organic and Inorganic Chemistry

INTENDED AUDIENCE : Students, PhD scholars, teachers, industry

INDUSTRIES APPLICABLE TO : All Pharmaceutical Industries

COURSE OUTLINE :

The course covers an advance level of organometallic chemistry. Recent development of cross coupling reactions and their applications in organic synthesis, starting from small molecule to naturally and pharmaceutically important compounds, has been described in the prescribed course. In this course, a brief overview about the carbine chemistry and oxidative cyclization is also portrayed.

ABOUT INSTRUCTOR :

Prof. Debabrata Maiti ,Associate Professor at IIT Bombay. I have completed PhD from Johns Hopkins University with Prof. Kenneth D. Karlin in bioinorganic chemistry. Then I moved to MIT where I did my Post-doctoral research with Prof. Steven Buchwald. I have started independent carrier at IIT Bombay in 2011 and since then involved actively in teaching bio-inorganic chemistry and organometallic chemistry. Our group is also active in research areas of bio-inorganic chemistry and C-H activation

COURSE PLAN :

Week 1 : Lecture 1: Assymetric Hydrogenation

Lecture 2: Transition metal carbenes,Fischer and Schrock carbenes

Lecture 3: Olefin metathesis

Lecture 4: Alkyne metathesis

Lecture 5: Cyclopropanation reaction

Week 2 : Lecture 6: Catalytic cyclopropanation reaction,Introduction to cross coupling reaction

Lecture 7: Kumada Coupling reaction

Lecture 8: Suzuki coupling reaction

Lecture 9: Stille coupling reaction

Lecture 10: Assymetric Suzuki coupling reaction

Week 3 : Lecture 11: Sonogashira coupling reaction

Lecture 12: Heck coupling reaction

Lecture 13: Assymetric Heck reaction,Introduction to Buchwald-Hartwig coupling reaction

Lecture 14: Buchwald-Hartwig coupling reaction

Lecture 15: Role of Ligands its influence in Buchwald-Hartwig coupling reaction

Week 4 : Lecture 16: Oxidative cyclization process

Lecture 17: Application of oxidative cyclization in natural product synthesis

Lecture 18: Synthesis of reactive metallacycle intermediate via-Beta-abstraction and their applications

Lecture 19: Kulinkovich Reaction and its mechanism

Lecture 20: Pauson–Khand reaction