General Course Information

Instructor:
Tianning Diao
Silver 705, diao@nyu.edu, (212) 998-8436

Lectures Schedule:
9:30-10:45 Tu, Th in Silver 509

Textbooks (Not required):
Organometallic Chemistry: From Bonding to Catalysis by John Hartwig
The Organometallic Chemistry of the Transition Metals, 4th Edition by Crabtree

Grading: problem sets (30%), exam 1 (20%), exam 2 (20%), final exam (30%)
Exam 1: October 15
Exam 2: November 14
Final exam: December 12

Office hours: by appointment

Chem-GA 1113 Mission Statement: This course focuses on fundamental principles in transition metal chemistry and the applications of transition metal catalysts in organic synthesis. Special emphasis will be placed on the mechanism of related catalytic transformations.

Outline:
- Fundamentals:
  Bonding and electronic structure of transition metal complexes
  MO theory and d-orbital splitting diagrams
  Electron counting, 18 e\textsuperscript{-} rule
  Ligand types
- Basic transformations of organometallic chemistry
  Ligand substitution (association and dissociation pathways)
  Oxidative addition/reductive elimination
  Migratory insertion/elimination
  Cycloaddition
  σ-Bond metathesis
- Principles in catalysis: thermodynamics and kinetics
- Classic reactions
  Asymmetric hydrogenation
  Olefin metathesis
  Ziegler-Natta alkene polymerization
  Cross-coupling
  Hydroamination
  Photoredox catalysis