TRANSITION METAL ORGANOMETALLICS IN CATALYSIS AND BIOLOGY

PROF. P. GHOSH

Department of Chemistry

IIT Bombay

PRE-REQUISITES : Basic undergraduate inorganic and organic chemistry courses are pre-requisite to take this course

INTENDED AUDIENCE : All of Chemistry and possibly some of Chemical Engineering students
INDUSTRIES APPLICABLE TO : BASF, Dow Chemicals, GE, Reliance, DuPont, BAYER and otherpetrochemical & polymer companies.

COURSE OUTLINE :

The course would cover application aspects of organometallic compounds in industrial processes with particular emphasis on various types of polymerization reactions that have had tremendous impact on society at large. The course would also highlight the importance of organometallic chemistry in biology in the form of bioorganometallic chemistry. In short, the course would provide a wholistic overview of the applications of organometallic chemistry in the dual worlds of chemical synthesis and biology.

ABOUT INSTRUCTOR :

Prof. Prasenjit Ghosh is a Professor of Inorganic Chemistry at the Indian Institute of Technology Bombay (IIT Bombay), India. He received his PhD in Bioinorganic Chemistry under the supervision of Professor Gerard Parkin from Columbia University, New York, in 1998. Following two post-doctoral stints in the laboratories of Dr. R. Morris Bullock (Brookhaven National Laboratory, 1998–2001) and Professor Guillermo C. Bazan (University of California, Santa Barbara, 2001–2003), he joined the Department of Chemistry at IIT Bombay as an Assistant Professor in 2003 and was finally promoted to Professor in June, 2012. He received the CRSI Bronze Medal (2014) of the Chemical Research Society of India and The Distinguished Lectureship Award (2011) of the Chemical Society of Japan among many others in the recent years. He is an Editorial Advisory Board member of the ACS journal Organometallics from 2017 for a three-year period and of Polyhedron since 2011.

COURSE PLAN :

Week 1**:** Reppe synthesis,

Week 2**:** Alkene metathesis reactions: history, development, classifications, mechanism

Week 3**:** Alkyne metathesis reactions: history, development, classifications, mechanism,cont'd

Week 4**:** Olefin oligomerization reactions

Week 5**:** Olefin polymerization reactions: polyethylene, polypropylene

Week 6**:** Ziegler-Natta catalyst

Week 7**:** Other catalysts in olefin polymerization reactions

Week 8**:** Homo polymerization with functionalized olefins, cycloolefins, diolefins

Week 9**:** Copolymerization with functionalized olefins, cycloolefins, diolefins

Week 10**:** Non-Group 4 catalysts

Week 11**:** Bioorganometallic Chemistry, metal ions in biology, metalloenzymes

Week 12**:** Coenzyme B12, nitrogenase, urease and other relevant metalloenzymes