



CHEMICAL REACTION ENGINEERING - I

PROF. BISHNUPADA MANDAL

Department of Chemical Engineering
IIT Guwahati

INTENDED AUDIENCE : B.Tech in Chemical Engineering and allied disciplines

INDUSTRY SUPPORT : Almost all chemical industries including IOCL, OIL, ONGC, etc.

COURSE OUTLINE :

This course will provide an overview of chemical kinetics and reactor design at basic to an intermediate level. This course applies the concepts of reaction rate, stoichiometry and equilibrium to the analysis of chemical and biological reacting systems such as derivation of rate expressions from reaction mechanisms and equilibrium or steady state assumptions and design of chemical and biochemical reactors via synthesis of chemical kinetics, and mass and energy balances. The goal is to provide students with the theoretical/analytical background to understand chemical kinetics and reactor design and to tackle complex problems.

ABOUT INSTRUCTOR :

Prof. Bishnupada Mandal is currently a Professor and Head in the Department of Chemical Engineering at the Indian Institute of Technology Guwahati. Dr. Mandal has over 15 years of teaching and research experience at IIT Guwahati. He was Visiting Research Professor at The Ohio State Engineering, Columbus, USA during May-July 2017. He has served as Vice Chairman as well as Chairman, IIT-JEE for IIT Guwahati Zone. He had been a recipient of the prestigious BOYSCAST fellow award of Department of Science and Technology (DST) Govt. of India. His research interest includes CO₂ capture and sequestration; wastewater treatment, etc. He has guided/ guiding 21 PhD students. He has published 2 monographs 3 book chapters, 56 research papers in reputed international journals and more than 120 papers in conference proceedings. He has over 2450 citations and h-index is 25. Dr. Mandal has served as the Editorial Board Member of Heliyon (Elsevier) and reviewer of more than 40 ACS, Elsevier and RSC journals. He is serving as the Chairman, IChE-GRC and Executive Council Member of IChE. He has served OIL, Duliajan; NTPCL, Netra; GAIL (India) Limited and BHEL, Bangalore as a consultant.

COURSE PLAN :

Week 1: Kinetics of Homogeneous Reactions

Week 2: Stoichiometry

Week 3: Interpretation of Batch Reactor Data

Week 4: Ideal Reactor Design

Week 5: Design for single reactions

Week 6: Design for parallel reactions

Week 7: Design for parallel reactions

Week 8: Temperature and Pressure Effects

Week 9: Temperature and Pressure Effects

Week 10: Residence Time Distribution

Week 11: Reactor modeling with RTD

Week 12: Reactor modeling with RTD