ORGANIC CHEMISTRY IN BIOLOGY AND DRUG DEVELOPMENT

PROF. AMIT BASAK
Department of Chemistry
IIT Kharagpur

PRE-REQUISITES : Basic Organic Chemistry

INTENDED AUDIENCE : Chemistry, Biochemistry, Chemical Biology, Pharmacy Students/faculty

COURSE OUTLINE :
In the biosphere, the chemistry must be considered in the context of the cell, or an organ, or even a whole organism. That makes mimicking of biological processes to be extremely challenging as the reaction needs to be performed with perfect orthogonality to other functional entities present in a biological system. Today, with the advancement of various spectroscopic and molecular biology techniques and with a better understanding of chemical principles, functions of various bio molecules have been unravelled which has paved the way for development of newer drugs. The present course is an attempt to bridge the gap in our understanding of biological systems and processes at the molecular and functional level. The course first introduces the various kinds of bio molecules, macro to medium size to small, their structures and functions followed by molecular engineering to manipulate their activity and biosynthesis. That creates a perfect platform for the next module on drug design and discovery

ABOUT INSTRUCTOR :
Prof. Amit Basak offering this course at the first year PG level at IIT Kharagpur for many years. Before that, he had taught UG students of Presidency College (now University) for more than 10 years. Due to his interaction with Sir Prof J. E. Baldwin (his PhD supervisor at Oxford), an extraordinary chemical biologist and Prof S. K. Talapatra (PhD supervisor), renowned stereo chemists, his interest in teaching subjects at the interface of chemistry and biology PG level grew immensely

COURSE PLAN :

Week 1: Introduction,Amino Acids,Peptides and proteins

Week 2: Peptides and proteins

Week 3: Peptides and proteins (contd.)

Week 4: Proteins as biological catalyst,Concept of inhibition

Week 5: Nucleic acids

Week 6: Metabolism,Synthetic biology,Molecular Biology

Week 7: Chemistry of cofactors/coenzymes

Week 8: Principle of drug design,Modern day drug discovery

Week 9: Chemistry of diseases and Drug development

Week 10: Chemistry of diseases and Drug development (contd.)

Week 11: Proton pump inhibitors,Gene replacement and delivery

Week 12: Revision and Problem solving