STEREOCHEMISTRY

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INTENDED AUDIENCE : Chemistry, Biotechnology, Bioscience and Pharmacy.
PRE-REQUISITES : 12th Chemistry
INDUSTRIES APPLICABLE TO : Pharmaceutical industries, Perfumery Industries

COURSE OUTLINE :

Stereochemistry of molecules dictates isomerism, chemical and biochemical reactivity. These days, chiral drugs have become an integral part of pharmaceutical industry. A basic concept on 3D structures and conformations of molecules and asymmetric synthesis and other stereochemical principles and attributes are essential. This course will lay the foundation on to which further advanced topics can be built up.

ABOUT INSTRUCTOR :

Prof. Amit Basak offering this course at the first year level at IIT Kharagpur for many years. Before that, I had taught UG students of Presidency University for more than 10 years. Due to my interaction with Sir Prof J. Baldwin (my PhD supervisor at Oxford) and Prof Talapatra (PhD supervisor, both of whom are renowned stereochemists, my interest in teaching stereochemistry at UG and PG level grew up immensely.

COURSE PLAN :

Week 01 : Constitution and Configuration; Chemistry in 3D space Chirality and its origin, symmetry criterion;
Week 02 : Stereogenicity and topicity; Enantiomers, Diastereomers, Epimers, Anomers, Atropisomers
Week 03 : Nomenclature: Absolute (R/S and D,L) and relative configurations (Threo/erythro , syn/anti and like/unlike)
Week 04 : Prochirality, pro-R and pro-S designations; related problems
Week 05 : Conformations of acyclic systems: X-CH2-CH2-X and of cyclic systems: cyclopropane, cyclobutane, cyclopentane
Week 06 : Conformations of cyclohexane (including mono and disubstituted), cis and trans-decalins
Week 07 : Stereoelectronic and steric principles in reactions: Substitution, elimination and addition; selectivity and specificity
Week 08 : Stereoelectronic and steric principles in reactions: Substitution, elimination and addition; selectivity and specificity (contd); Importance of stereochemistry in real life: some examples