Math 468

Topics in Topology

Prof. Taylor

This is a course in topological chemistry, in particular the subject of stereoisomers. These are long molecules which can be considered as graphs and how the graph is embedded in three–space profoundly affects the chemical behavior of the compound. Examples range from limonene, which smells either like lemon or like orange depending on the embedding, to Thalidomide, which is a cure for morning sickness in one embedding but causes severe birth defects in another. There also are interesting problems involving DNA.

Since this is a mathematics course we will abstract chemistry questions to questions about the embeddings of graphs into three–space and develop techniques for distinguishing such embeddings. The book concentrates on distinguishing chiral embeddings from non–chiral ones, a central problem in knot theory and its generalizations to graphs. This is an active area of current mathematical research.

The text for the course is the book
"When Topology Meets Chemistry" by Erica Flapan
(http://www.maa.org/pubs/books/tpc.html).
Additional material will be supplied by the instructor.