Syllabus for CHM1045 – Modern Physical Organic Chemistry

Time: Wed 10:00am - 11:50am starting on Sep 14, 2022
Place: WE 76 (Wetmore Hall-New College, 300 Huron Street)

This course is given in two parts. The first half will be presented by Prof. Ronald Kluger (r.kluger@utoronto.ca) and the second part by Prof. Jik Chin (jik.chin@utoronto.ca). The first half will cover applications of physical organic chemistry as shown below. The second half will cover hands-on approach to computational physical organic chemistry using both laptop and main frame computers as shown below.

First half topics:

1-Transition State Theory

2- Kinetic Theories

3 - Controversies in Mechanisms for Reactions of Cyclic Phosphates

4 - Formation of CO2 and the Complexities of Decarboxylation

5 - Applying Stereochemistry to Testing Mechanisms

6 - Isotopically Chiral Phosphates

7 - Carboxylic Participation Mechanisms

8 - Associative Mechanism for Decarboxylation!

9 - Formation of Carbanions

10 - The Role of Reversibility in Slowing Decarboxylation and How It Is Overcome

Second half topics in computational physical organic chemistry:

1-Acid/base catalysis

2-Organocatalysis

3-Pericyclic reactions

4-Jacobsen-Katsuki epoxidation

5-Noyori hydrogenation

6-Molecular receptiors

Reference books:

a)-Advanced Organic Chemistry: Part A by Carey and Sundberg 5th ed (available online from UT library)
b)-Modern Physical Organic Chemistry by Anslyn and Dougherty

Course evaluation:

First half: Mid-term test at the end of first half of the course (45%)

Second half: Student computational project presentation (45%)

Attendance and participation (10%)

Medical excuses will be needed if a graded item is missed