

**FACULTY OF SCIENCE
DEPARTMENT OF CHEMISTRY
COURSE INFORMATION – WINTER 2020**

1. **Course:** CHEM 553, Bio-Organic Chemistry – Winter 2020
Lecture 01: TR 12:30 – 13:45 in SA 235

INSTRUCTOR	EMAIL	PHONE	OFFICE	OFFICE HOURS
Dr. C.-C. Ling	ccling@ucalgary.ca	220-2768	SB 235	Open Office

Tutorial: W 9:00 – 9:50 in ST064

2. **Requisites:**
See section 3.5.C in the Faculty of Science section of the online Calendar.

Prerequisite(s): Chemistry 453.

3. **TEXTBOOK / RECOMMENDED MATERIALS FOR THE COURSE:**

There is no text required for the course. Any standard “Organic Chemistry” text that has chapters on amino acids, peptides, proteins, carbohydrates, and nucleic acids may prove useful. Handouts and other relevant references will be provided throughout the course.

4. **TOPICS COVERED (Subject to Changes):**

Foundation to Bioorganic Chemistry:

- Brief reviews of some organic concepts
- Tools for molecular visualization
- Molecular interactions (including Host-Guest Chemistry), polyvalency
- Introduction to simple bioorganic molecules

Amino Acids, Peptides and Proteins:

- Amino acids, structure and properties
- Amino acid synthesis
- Amide bond and formation
- Proteins, primary, secondary, tertiary, and quaternary structure
- Protein structure and function:
 - Enzymes and enzyme mechanisms

Carbohydrate Chemistry:

- Monosaccharides and their reactions
- Conformation and stereo-electronic effects
- Glycosidic linkages
- Reactions at the anomeric center
- Stereocontrol in Glycosylations
- Chemoenzymatic synthesis of glycoconjugates
- Application of synthetic carbohydrate chemistry to real life problems

Nucleic Acid Chemistry:

- Pyrimidine and Purine and Base pairs
- Structures of DNA/RNA
- Synthesis of nucleotides
- Interactions of DNA/RNA with small organic molecules

Lipids

- Structures of different classes of natural lipids
- Biosynthesis of lipids
- Chemistry of lipids