

Chemistry of Biological Macromolecules

Instructor **Dr. Len Luyt**

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Description A survey of the chemistry of monosaccharides, amino acid and nucleosides with modern synthetic methods to oligosaccharides, polypeptides and polynucleotides.

Lectures Chemistry Building Room 115
Monday, Wednesday, Friday 11:30 am to 12:30 pm

Course Prerequisite Chemistry 373F, or the former Chemistry 353a.

Unless you have either the requisites for this course or written special permission from your Dean to enroll in it, you will be removed from this course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites.

It is the policy of this department that when a student takes a test or examination, they have deemed themselves fit to do so. Claims of distress or medical issues after the fact will not be considered for the basis of a grade appeal.

Plagiarism is a serious Scholastic Offence.

Plagiarism: Students must write their essays and assignments in their own words. Whenever students take an idea, or a passage from another author, they must acknowledge their debt both by using quotation marks where appropriate and by proper referencing such as footnotes or citations. Plagiarism is a major academic offence (see Scholastic Offence Policy in the Western Academic Calendar).

Evaluation

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|----------------------------------|-----|
| Problem Sets (4) | 10% |
| Independent Study | 20% |
| In-class Test | |
| Friday February 15 th | 20% |
| Final Examination (3 hours) | 50% |

Problem-sets will be collected on the following days:

 Wednesday January 23rd, discussed Friday January 25th
 Monday February 11th, discussed Wednesday February 13th

Wednesday March 12th, discussed Friday March 14th

Monday April 7th, discussed Wednesday April 9th

The assigned mark (10%) will be based on selected problems and on participation during the discussion period.

Texts

There is no required textbook. The student's organic chemistry textbook will provide some of the introductory material. Various other sources will be used throughout the course, and are available through the library. In addition, the following books may be useful and are available through the library:

Peptide chemistry : a practical textbook / Miklos Bodanszky. QD431.B75 1993

Peptides : synthesis, structures, and applications / edited by Bernd Gutte. QU68.P4247 1995

Carbohydrate chemistry / edited by Geert-Jan Boons. QD321.C273 1998

Nucleic acids in chemistry and biology / edited by G. Michael Blackburn and Michael J. Gait. QD433.N83 1996

Course Outline

- I. Peptides
 - a. Introduction
 - structure and biological roles
 - b. Amino acids
 - structures, nomenclature, stereochemistry
 - acid-base chemistry
 - synthesis and reactions of amino acids
 - c. Peptides
 - protecting group chemistry
 - coupling methods
 - solid-phase synthesis of peptides, resins and automation
 - applications (eg. peptidomimetics)
- II. Carbohydrates
 - a. Introduction
 - structures and biological roles
 - b. Monosaccharides
 - stereochemistry, nomenclature, depiction
 - anomers and conformation
 - reactions, glycoside bond formation
 - b. Oligosaccharides and polysaccharides
 - protecting groups
 - solid-phase synthesis
- III. Nucleotides
 - a. Introduction
 - nucleotides, nucleosides and nucleic acids
 - a. Nucleosides and nucleotides
 - nomenclature, structures, base pairing
 - synthesis of nucleosides and nucleotides
 - phosphate ester formation
 - b. Oligonucleotides
 - protecting groups
 - solid-phase synthesis
 - applications