



BIOCHEMISTRY II
CHMI 3226 Winter 2010
Information about the course

Course Instructor: Dr. Isabel Molina

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Office hours: Immediately following lectures or by appointment (send an e-mail indicating several times that suit you and I will pick one that fits my schedule).

Prerequisites: CHMI 2227

Method of Instruction:

The course will be delivered using a combination of lecture (2 lectures per week) and laboratory (one three - hour lab/week) instruction methods:

Lectures: Monday & Wednesday 11:30am (Rm WW 102).

Labs: Will be held at the Great Lakes Forestry Centre, 1219 Queen Street East, on Mondays at 5:30-8:30 p.m.

Required Text: Principles of Biochemistry. 4th Edition by Horton, Moran, Scrimgeour, Perry and Rawn (2006, Prentice Hall), ISBN 0-13-145306-8.

Lecture notes, problem sets and other materials for the class will be available as PDF files. You can access these files from the CHMI 3226 course website (<http://courses.algonau.ca/>). The enrolment key is CHMI3226A10W.

General course description:

This course is an introduction to the metabolic reactions in the cells, which produce and utilize energy. The course material will include metabolism of carbohydrates, lipids, amino acids and nucleotides, and regulation of metabolism. In addition, it will cover the basic processes that govern pathways of information flow. Emphasis will be placed on mechanisms of biosynthesis of proteins and nucleic acids and how these processes are controlled and integrated with the metabolism of the cell.

Course Contents:

The whole course consists of six main sections:

1. Bioenergetics
2. Carbohydrate Metabolism
3. Photosynthesis
4. Lipid Metabolism
5. Nitrogen Metabolism
6. Transmission of Biological Information

Learning Outcomes:

This course will enable students to:

- **Define and explain** key terminology in biochemistry.
- **Identify and differentiate** the chemical structures of metabolites involved in major metabolic pathways.
- **Define** the terms metabolism, anabolism, catabolism, glycolysis, gluconeogenesis, oxidative phosphorylation, photosynthesis, replication, transcription and translation.
- **Describe** the mechanism of DNA replication in eukaryotes and prokaryotes.
- **Describe** the mechanism of DNA transcription on in eukaryotes and prokaryotes.
- **Describe** the process on RNA translation.
- **Develop** critical thinking skills.
- **Become familiar** with writing and reporting scientific results.
- **Learn** basic computer skills (data analysis, graphing, literature search, databases)..

Method of Evaluation:

There will be a 15-min quiz every second Wednesday.

The final marks will be based on the following:

Class quizzes	12%
Laboratory	33%
Midterm	25%
Final	30%
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TOTAL	100%

Please note: *There will be no makeup exams, special assignments etc. to improve your grade.*

Penalty for Late Assignments: Late assignments will result in a deduction of 5% in your grade for every late day. If you have a legitimate reason that the work cannot be finished in a timely fashion, please discuss it with me beforehand.

Problem Sets: these will consist of two sections: A. Recommended problems from the textbook, and B. Additional problems. Although problems will not be graded, a portion of each exam will be composed of problems similar to those found in both sections of these assignments. Laboratory time will also be used to solve problems on the problem sets. You need to attend labs to understand exercises, answers will not be posted in the course website.

AUC Attendance Policy: Punctual and regular attendance is mandatory for lectures *and* laboratories. Students are responsible for all information presented in lectures and labs. If there are extenuating circumstances related to an absence, the instructor should be notified in advance. Absences in excess of 20% may jeopardize receipt of credit for the course.

Academic Integrity. Algoma University College values academic integrity and takes a very serious view of such offences such as cheating, plagiarism and impersonation. Penalties with dealing with such offences will be strictly enforced. For a comprehensive description of these offences and penalties, students are encouraged to consult the Student Code of Conduct and Disciplinary Procedures (please see the Academic Calendar and/or www.algomau.ca/policies for more information).

Date	Lecture and Topic	Book Chapters
Jan-04	Introduction to Metabolism	10
Jan-06	Thermodynamics and Principles of Bioenergetics	10
Jan-11	Glycolysis	11
Jan-13	Regulation of Glycolysis*	11
Jan-18	Gluconeogenesis, The Pentose Phosphate Pathway, and Glycogen Metabolism	12
Jan-20	Citric Acid Cycle	13
Jan-25	Electron Transport and ATP Synthesis	14
Jan-27	Photosynthesis*	15
Feb-01	Photosynthesis	15
Feb-03	Carbon Fixation	15
Feb-08	Lipid Biosynthesis	16
Feb-10	Lipid Catabolism*	16
Feb-15	READING WEEK-- NO CLASS	
Feb-17	READING WEEK—NO CLASS	
Feb-22	MIDTERM	
Feb-24	Nitrogen Metabolism I: Nitrogen cycle, Nitrogen fixation and amino acid synthesis	17
<i>Feb 26</i>	<i>Last date to withdraw without academic penalty</i>	
Mar-01	Nitrogen Metabolism II: Amino acid catabolism	17
Mar-02	Nitrogen Metabolism III: Nucleotide Metabolism	18
Mar-08	DNA Replication	19, 20
Mar-10	DNA Replication, Repair and Recombinantion	19, 20
Mar-15	Transcription*	21
Mar-17	Transcriptional Regulation and RNA Processing	21
Mar-22	Protein Synthesis I	22
Mar-24	Protein Synthesis II	22
Mar-29	Regulation of Gene Expression*	22
Apr-30	Class Review	

* 10 min quiz at the end of class