



BCH 297

Introduction to Biochemistry

Number of credits: 3

Prerequisite:
BIO 131, BIO 133, CHE 251

Semester: Winter, 2015

Days: Mondays and Wednesdays,

Room: 1:00 – 2:15 PM

Lab – day: A2141

Lab–Room: Wednesdays, 4:00 – 6:30 PM
A2151

Instructor: Jessmi Ling, PhD

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Phone: 403-410-2919

Office: A2158

Office hours: By appointment

Course Description:

This course will study the structure and function of carbohydrates, amino acids, proteins, lipids, and enzymes, along with an introduction to metabolism and energy transduction.

Further Course Information:

Biochemistry explores the chemical makeup and reactions that are essential for life processes. The course will introduce the students to the composition of carbohydrate, protein, lipid and nucleic acids as well as the metabolism of these compounds. The course laboratory component will introduce students to some fundamental biochemistry experiments that will aid in the comprehension of the concepts covered during lectures. Students taking this course are required to enroll in Bch 297L, which encompass the laboratory accompaniment for this course.

Expected Learning Outcomes:

It is the aim of the course that students acquire the following skills:

1. Understand the chemistry of important biological macromolecules.
2. Understand the principles of enzymatic activities and analysis.
3. Comprehend various metabolic pathways and appreciate

Important Dates:

First day of classes: January 7, 2015

Registration revision period: January 18, 2015

Last day to request revised examination: March 2, 2015

Last day to withdraw from course: March 20, 2015

Last day to apply for time extension for coursework: March 30, 2015

Last day of classes: April 10, 2015

Final Exam: April 15, 2015

Time: 1:00 PM – 4:00 PM

Room: A2141

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Outline:

Date	Topic	Chapter
Jan 7	Introduction to the course (no lab) Bch 297L Tutorial: Tutorial on data analysis. Term paper instructions	1
Jan 12	Water	2
Jan 14	Energy Bch 297L Lab 1: Protein concentration (Lab report due Jan 28).	3
Jan 19	Biochemistry of genetics.	17, 18 and 19
Jan 21	Amino acids. Bch 297L Lab 2: Bioinformatics. (Laptop required. Please inform me if you have no laptop, one will be borrowed from IT) (Lab 2 worksheet due Jan 26). Term paper progress review.	5.1
Jan 26	Peptides, proteins and molecular machines.	5.2-5.4
Jan 28	Enzymes I: what are enzymes and how are they studied? Bch 297L Lab 3: Enzyme activity (Lab report due Feb 11).	6.1-6.3
Feb 2	Enzymes II: How enzymes work?	6.4 and 6.5
Feb 4	Carbohydrates Tutorial 1: Case study – Rough games (Tutorial 1 due Feb 9)	7
Feb 9	Test 1 (Ch 1, 2, 3, 17, 18, 19, 5 and 6)	
Feb 11	Carbohydrate metabolism Bch 297L Lab 4: Protein purification (rGFP) (Lab report due Feb 25).	8

	Term paper abstracts due.	
Feb 16-21	Family Day and Mid-semester break	
Feb 23	Aerobic metabolism I	9
Feb 25	Aerobic metabolism II Bch 297L Tutorial 2: Case study – Patrick (Tutorial 2 due Mar 2).	10
Mar 2	Photosynthesis.	13
Mar 4	Lipids and membranes: Lipid classes. Bch 297L Open lab: Course review. Term paper progress review.	11.1
Mar 9	Test 2 (Ch 7, 8, 9, 10 and 13)	
Mar 11	Lipids and membranes: Membrane lipids. Bch 297L Lab 5: Specific activity (Lab report due Apr 1).	11.2
Mar 16	Lipid metabolism: Fatty acids and triacylglycerols.	12.1
Mar 18	Lipid metabolism: Membrane lipids and isoprenoids. Bch 297L Tutorial 3: Case study – Fat facts (Tutorial 3 due Mar 23).	12.2 and 12.3
Mar 23	Nitrogen metabolism I: Fixation.	14.1
Mar 25	Nitrogen metabolism I: Amino acids. Nitrogen metabolism II: Protein turnover and degradation. (Lab time) Bch 297L Tutorial 4: Nitrogen metabolism and metabolic control (Tutorial 4 due Apr 6).	14.2 and 14.3 15
Mar 30	No classes. Term paper presentations at the Ambrose Research Conference (ARC 2015)	
Apr 1	Integration of metabolism.	16
Apr 6	Easter Monday. No class.	
Apr 8	Test 3 (Ch 11, 12, 14, 15 and 16)	A2151

Apr 15	Final Exam. 1:00 pm at A2141.	
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Requirements:

Study guides for tests or exams will not be provided in this course. Students are encouraged to make their own lecture notes to summarize the course material. Students are also encouraged to keep up with the readings, preferably reading the corresponding chapter before each lecture.

Submission of Assignments:

Electronic submissions (via email) for all laboratory reports and tutorial assignments preferred. Tutorial assignments requiring drawings, such as metabolic pathways, should be scanned and inserted into the assignment document. All documents should be submitted as a Word file, unless otherwise stated.

Late submissions are not accepted unless sufficient reason is provided as a written request for extension to the instructor prior to the due date. Note that any request for extension is not automatically granted. Each request is assessed individually and the length of extension, if any, will vary. The instructor’s decision on the extension is final.

Attendance:

There are no penalties for absences from lectures or tutorials. However, attendance is compulsory for all laboratory, tests and exams. Allocated marks will not be awarded if student is absent from any laboratory, tests or exams without notice and sufficient reason.

Evaluation:

Bch 297	Term paper	8%
	Tests (3 × 14%)	42%
	Final exam	30%
	Bch 297L	20%
Bch 297L	Bioinformatics assignment (Lab 2)	4%
	4 laboratory reports (4 × 20%)	80%
	4 Tutorial assignments (4 × 4%)	16%

The term paper this year is an exploration of Biochemistry applied to current research in conjunction with the Ambrose Research Conference theme. Students will work in pairs or small groups. Evaluation of the term paper comprises of an abstract that summarizes the intent of the term paper, and a scientific poster presentation during the Ambrose Research Conference (ARC 2015). Tests consist of short answer questions based on topics covered during lectures. These tests are not cumulative. The final exam will consist of multiple-choice questions, short and long answer questions. Questions will be based on topics covered during lectures, labs and corresponding chapters from the required textbook. The final exam will cover topics from the whole course (cumulative, both lectures and labs).

There is no final exam for the laboratory component. However, students must score a minimum of 60% for the laboratory component in order to have it included in the final marks used to determine their grades. Submission deadlines differ for lab reports and tutorial assignments – please note deadlines for each in Moodle.

Grade Summary:

Grading scheme for this course:

A+	93.0 – 100%	C+	66.0 – 69.9%
A	86.0 – 92.9%	C	62.0 – 65.9%
A-	82.0 – 85.9%	C-	58.0 – 61.9%
B+	78.0 – 81.9%	D+	54.0 – 57.9%
B	74.0 – 77.9%	D	50.0 – 53.9%
B-	70.0 – 73.9%	F	Below 49.9%

The available letters for course grades are as follows:

<u>Letter Grade</u>	<u>Description</u>
A+	
A	Excellent
A-	
B+	
B	Good
B-	
C+	
C	Satisfactory
C-	
D+	
D	Minimal Pass
F	Failure

Because of the nature of the Alpha 4.00 system, there can be no uniform College-wide conversion scale. The relationship between raw scores (e.g. percentages) and the resultant letter grade will depend on the nature of the course and the instructor's assessment of the level of each class, compared to similar classes taught previously.

Please note that final grades will be available on student registration system. Printed grade sheets are no longer mailed out.

Textbooks:

McKee T and McKee JR. Biochemistry: the molecular basis of life. 5th Edition. 2011. Oxford University Press. New York. ISBN-13: 978-0199730841.

Older editions of this textbook are acceptable. However, please take note of any updates and all references to the textbook in lectures, such as figures and concepts, are based on the 5th edition.

Policies:

All students have received an Ambrose e-mail account upon registration. It is the student's responsibility to check this account regularly as the Ambrose email system will be the professor's instrument for notifying students of important matters (Cancelled class sessions, extensions, requested appointments, etc.) between class sessions. If students do not wish to use their Ambrose accounts, it is highly recommended that they forward all messages from the Ambrose account to the other account.

During the **Registration Revision Period** students may to enter a course without permission, change the designation of any class from credit to audit and /or voluntary withdraw from a course without financial or academic penalty. These courses will not appear on the student's transcript. Courses should be added or dropped on the student portal by the deadline date, please consult the List of Important Dates. After that date, the original status remains and the student is responsible for related fees.

Students intending to withdraw from a course after the Registration Revision Period must apply to the Office of the Registrar by submitting a Request to Withdraw from a Course by the **Withdrawal Deadline**, please consult the List of Important Dates. Withdrawal from courses after the Registration Revision period will not be eligible for tuition refund. A grade of "W" will appear on the student's transcript.

Students wishing to withdraw from a course, but who fail to do so by the applicable date, will receive the grade earned in accordance with the course syllabus. A student obliged to withdraw from a course after the Withdrawal Deadline because of health or other reasons may apply to the Registrar for special consideration.

Students, who find a conflict in their exam schedule must submit a **Revised Examination** Request form to the Registrar's Office by the deadline date, please consult the List of Important Dates. Requests will be considered for the following reasons only: 1) the scheduled final examination slot conflicts with another exam; 2) three final exams within three consecutive exam time blocks; 3) the scheduled final exam slot conflicts with an exam at another institution; 4) extenuating circumstances. Travel is not considered a valid excuse for re-scheduling or missing a final exam.

Electronic Etiquette

Students are expected to treat their instructor, guest speakers, and fellow students with respect. It is disruptive to the learning goals of a course or seminar and disrespectful to fellow students and the instructor to engage in electronically-enabled activities unrelated to the class during a class session. Please turn off all cell phones and other electronic devices during class. Laptops should be used for class-related purposes only. Please do not use iPods, MP3 players, or headphones. Do not text, read, or send personal emails, go on Facebook or other social networks, search the internet, or play computer games during class. The professor has the right to disallow the student to use a laptop in future lectures and/or to ask a student to withdraw from the session if s/he does not comply with this policy. Repeat offenders will be directed to the Dean. If you are expecting communication due to an emergency, please speak with the professor before the class begins.

Academic Policies

It is the responsibility of all students to become familiar with and adhere to academic policies as stated in the Academic Calendar. Personal information, that is information about an individual that may be used to identify that individual, may be collected as a requirement as part of taking this class. Any information collected will only be used and disclosed for the purpose for which the collection was intended. For further information contact the Privacy Compliance Officer at privacy@ambrose.edu.

Extensions

Although extensions to coursework in the semester are at the discretion of the instructor, students may not turn in coursework for evaluation after the last day of the scheduled final examination period unless they have received permission for a "**Course Extension**" from the Registrar's Office. Requests for course extensions or alternative examination time must be submitted to the Registrar's Office by the deadline date, please consult the List of Important Dates. Course extensions are only granted for serious issues that arise "due to circumstances beyond the student's control".

Appeal of Grade

An appeal for change of grade on any course work must be made to the course instructor within one week of receiving notification of the grade. An appeal for change of final grade must be submitted to the Office of the Registrar in writing within 30 days of receiving notification of the final grade, providing the basis for appeal. A review fee of \$50.00 must accompany the appeal to review final grades. If the appeal is sustained, the fee will be refunded.

Academic Integrity

We are committed to fostering personal integrity and will not overlook breaches of integrity such as plagiarism and cheating. Academic dishonesty is taken seriously at Ambrose University as it undermines our academic standards and affects the integrity of each member of our learning community. Any attempt to obtain credit for academic work through fraudulent, deceptive, or dishonest means is academic dishonesty. Plagiarism involves presenting someone else's ideas, words, or work as one's own. Plagiarism is fraud and theft, but plagiarism can also occur by accident when a student fails or forgets to give credit to another person's ideas or words. Plagiarism and cheating can result in a failing grade for an assignment, for the course, or immediate dismissal from the university. Students are expected to be familiar with the policies in the current Academic Calendar that deal with plagiarism, cheating, and the penalties and procedures for dealing with these matters. All cases of academic dishonesty are reported to the Academic Dean and become part of the student's permanent record.

Students are strongly advised to retain this syllabus for their records.

Other

Any added features in the syllabus are optional. You may or may not wish to include elements such as a bibliography, reading list, schedule of lectures/topics, or reporting form.