

BIOCHEMISTRY 443 Information sheet

Biochemistry 443: *Metabolism and basic nucleic acid chemistry*

This course is a follow-up of BCEM 393 and provides students taking both courses with a complete overview of introductory concepts across all subject fields of biochemistry (amino acid/protein, carbohydrate, lipid and DNA). With connections made to relevant medical, biotechnological or real-life situations, we try our best to help you think critically about the world at large. Relevant research articles and information on different jobs that require a strong biochemistry background will also be made available.

Course Instructors:

Dr. Lohmeier-Vogel is the course coordinator and laboratory coordinator. Dr. Lohmeier-Vogel will be teaching the first 24 lectures of the course.

- Office: Biological Sciences building BI 442 (follow the pink arrows off the elevators or stairs on the 4th floor of the building).
- Phone number (with answering machine): 220-8281.
- Office hours: Mon, Wed Fri 3-4, Tues/Thurs 9:30-10:30
- E-mail policy: I prefer face-to face during office hours, but am willing to answer e-mails if this is not possible

Dr. Zarembeg will teach the remainder of the course which deals with lipid metabolism and signal transduction.

- Office: Biological Sciences building BI 461 (far SW corner of the building, near the stairwell).
- Phone number (with answering machine): 220-4298.
- Office hours and E-mail policy: to be communicated later:

We instructors are **passionate** about the subject of biochemistry and both do active research specifically in the area of metabolism. We hope that we can pass along our enthusiasm for the material to you, the students, and are happy to integrate questions you might have into our lecture material where possible. Are you curious about something in the news that relates to the course material? Ask us! As well, we will ask you to search for background information on specific internet sites in some pre-lab assignments in order to give you a better understanding of how the lecture material integrates with the laboratory exercises you are about to do.

Time permitting, we will also bring in outside speakers to talk to you about their experience in medical or biotechnological research.

Biochemistry background material:

It is expected that students entering BCEM 443 have a solid grasp of the following topics covered in BCEM 393:

- Coenzyme structure and function (especially NADH, NADPH and ATP)
- Enzyme concepts (kinetics, K_m , V_{max}), and allosteric regulation of enzymes
- Free energy concepts
- Classes of enzymes (how to recognize which reaction corresponds to one of six enzyme classes)*

- The pathways (structures included) of glycolytic and TCA cycle metabolites*
- Oxidative phosphorylation and energetics*

***This material will be reviewed the first two days of class, to bring transfer students from other institutions up to speed and to refresh the memory of students who have not taken BCEM 393 in the previous semester.**

Lecture component:

For carbohydrate, nitrogen, nucleotide and lipid metabolism, students are responsible for memorizing the full chemical structures, enzyme names and cofactor requirements of the metabolic pathways. Memory work will be spread evenly through the course to reduce the load. Students are advised to keep up with memory work well in advance of the exams. Two memory quizzes worth 1% of the final course grade (given at the beginning of labs 1 and 2) should prove motivational. As well, the utilization of a large poster board (already introduced in BCEM 393) will help keep track of the metabolic pathways that branch off of glycolysis or the TCA cycle and how these are regulated. In this way the integration of metabolic pathways is best visualized.

Study suggestions for the memory content of the course:

- Read assigned textbook passages and review lecture material within 24 hours. Research has shown that after 24 hours, short-term content is 'dumped'.
- Once a week go through the week's lectures, making summary notes of key concepts. These will form the basis for exam study notes. Repetition is important for enhancing long-term memory.
- Do the assigned problems.
- If you have questions about the material, ask your instructors for clarification right away.

Dr. Lohmeier-Vogel is happy to set up study groups should anyone be interested. Often doing problems in a group setting sets up a very positive learning environment for individuals who like to work with others.

Students transferring from other universities or institutions may not be aware of the Disability Resource Center, MacEwan Student Center 293, where text anxiety, concentration problems or other problems may be assessed and learning strategies offered. Aside from the suggestions above, we instructors are not experts in this field).

Laboratory component:

Only **one excused laboratory absence** is allowed in this course. Please see Dr. Lohmeier-Vogel with the necessary documentation (medical certificate, student counselor's note, obituary notice etc....) to support your absence. Download the **medical/counselors form** before seeing your doctor! It must be filled out. Missing a lab for non-documented reasons results in a zero grade for that lab and heightens the risk of not making the passing grade for the lab section. A minimal passing grade is **66%** in the laboratory section and passing the lab component is required to pass the course.

Laboratory assistants will communicate their expectations regarding lab report drop-off locations and office hours during the first lab. It is mandatory that students purchase (and wear) lab coats and safety glasses, closed shoes and pants during lab time. Laboratory **safety** is stressed highly in our Department. Students will also be expected

to wipe down lab benches and rinse their glassware before putting it in the wash-up carts (for protection of the wash-up technicians from corrosive material). TA's have the right to dock marks for non-compliance.

Students are advised to write their lab reports separately from their lab partners. Collaboration in the writing of lab reports is considered to be a form of plagiarism. Raw data will be initialed by the TA and will be attached to the final lab report, **written in pen**. This is what is currently being stressed in the biotechnology industry (for intellectual property purposes).

Material covered in the exams:

Lectures 1-12 will be examined on the first midterm. This material reviews glycolysis and the TCA cycle in terms of hormonal regulation (in liver) versus allosteric regulation (muscle), introduces glycogen metabolism, the pentose phosphate pathway, the Urea cycle and some amino acid metabolism.

The material covered in lectures 13-24 will be examined on the second midterm. This material continues on with amino acid metabolism, nucleic acid metabolism, nucleic acid chemistry, exo- and endo-nucleases, as well as bacterial replication, transcription and translation.

Lectures 24-36 on lipid metabolism and signal transduction will be the main focus of the final exam, however metabolism concepts and material from the carbohydrate metabolism section (as it integrates with lipid metabolism) will also be on the final exam, which runs 3 hours.

Time conflicts for mid-term exams:

One weeks notice **in writing** is required if BCEM 443 midterm exam times conflict with any of your other courses. Attach a copy of your lecture schedule to your letter and put it under the door of Dr. L-V's office along with your e-mail address and phone number. After considering the schedules of all students who cannot write in the evening, she will book a room **earlier in the day** where the exam can administered instead.

Examination protocol:

Students writing their exams must bring only their ID's and a pen to the desk. No pencil cases, cell phones, calculators or other electronic devices are permitted. Leave coats, hats and backpacks at the front of the class.

Students who miss an exam will be allowed to write a deferred exam once Dr. Lohmeier-Vogel is provided with documentation (medical certificate, student counselor's note, obituary notice etc....) for the official records and a time can be set to accommodate these students.

Model answers will be posted in the glass cases on the first floor of the Biological Sciences Department near the main office the day the exams are handed back. Students who wish to have their **midterm exams re-graded** or have discovered an addition error must write their concerns on a page stapled to the front of the exam and

placed under Dr. Lohmeier-Vogel's office door. Exams will be entirely re-graded according to the marking guide so please make sure that a loss of marks on one question is not balanced out by a gain in another. Students officially have 15 days to submit exams for re-grading, after which time exam material will no longer be addressed. Student exams with addition errors only do not go through the re-grading process.

Grades:

For 2008 BCEM 443 grade cuts are maximally (may be lower):

A = 86% and up	B- = 70-74%
A- = 82-86%	C+ = 66-70%
B+ = 78-82%	C = 62-66%
B = 74-78%	C- = 58-62%

How to calculate where you stand

Example: A student gets 70% on the first midterm and 85% on the second midterm. He/she has an 83% lab average and got 1.5/2 marks on their memory quizzes. What is their mark going into the final exam?

$[0.24 \times \text{midterm 1 grade}] + [0.24 \times \text{midterm 2 grade}] + [0.15 \times \text{lab average to date}] + [\text{quiz marks}]$ divided by 65 marks total to date (without final exam marks added in) = $[0.24 \times 70] = [0.24 \times 85] + [0.15 \times 83] + 1.5 = 51.5$ divided by 65 = 78.7%

According to the scaling system above, this translates to a B+ grade going into the final.

This exercise can be done at any point in the course, as long as the mark to date is adjusted accordingly.

Questions or concerns:

Please do not hesitate to ask! If concepts or expectations are not clear, it is better we know about things ahead of time so we can address issues in a timely fashion.