Biology/Chemistry 275: Medicinal Biochemistry, Spring 2019

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Office hours are by appointment, **Lecture: M/W 11:30am – 12:45pm in SC108W**

Course Description

Medicinal Biochemistry, BIO/CHE 275, is a foundational course that introduces students to the fundamentals of biochemistry topics with clinical significance including structure and function of biomolecules, enzyme kinetics, bioenergetics, catabolic and anabolic pathways and regulation of biochemical processes. Does not include a lab component. Prerequisite – Chemistry 240 and Biology 111.

General Course Learning Goals and Objectives

- Develop critical thinking skills and hypothesis-driven scientific inquiry through the analysis of complex data, calculation of predicted results, and connection of observations to scientific theory.
- Gain a foundational understanding of the structure, function, and clinical significance of the common classes of biomolecules.
- Ability to explain the chemical and clinical significance of metabolic pathways including glycolysis, Kreb's Cycle, and metabolism.

Course Text and Materials

- *Essential Biochemistry* by C.W. Pratt and K. Cornely
- Three-ring binder to organize handouts, notes, and homework problem sets

Assignments & Grading

Course Material: All assignments, syllabus, announcements, presentations from class, links to relevant internet resources, and required course materials will be posted on *Moodle*. Course information will be continually updated on *Moodle*.

Readings: Readings from the textbook will be assigned to assist in understanding the lecture. Additional materials may also be distributed and discussed during lecture. A list of required reading will be maintained on the course *Moodle* site.

Quizzes: There will be 20 quizzes. Quizzes may come in many forms. For example: questions on Moodle, homework assignments, case studies, etc. Quizzes must be completed by the beginning of the subsequent class period. There will be no opportunity to make-up a missed quiz, however, five quiz grades will be dropped. The adjusted quiz average will account for 15% of the final grade.

Case Studies: Case studies will be assigned periodically. Students will be asked to read a case study prior to our class discussion. Students should come to class prepared with questions or comments about the assigned case study. Case study material may appear on online quizzes after class discussions.

Exams: There will be three non-cumulative exams, each will count 20% toward the final grade. Students will be given the entire class period to complete the exam. Absences must be excused prior to the exam, otherwise, there will not be an opportunity to take a make-up exam. If an exam is cancelled due to weather conditions, the instructor will inform the class via email of the make-up time.

Final Exam: The final exam will be cumulative and will count 20% toward the final lecture grade.

Grading Policy: Your grade in this course will be calculated as follows:

Case studies / Participation	5%
Quizzes (best 16 out of 20)	15%
Three exams (@ 20% each)	60%
Comprehensive final exam	20%

Grades are tentatively assigned according to the following scale: 92-100 A; 90-91 A-, 88-89 B+; 82-87 B; 80-81 B-; 78-79 C+; 72-77 C, 70-71 C-; 68-69 D+; 62-67 D; 60-61 D-; < 60 F.

The instructor reserves the right to alter the course requirements and/or assignments based on new materials, class discussions, or other legitimate pedagogical objectives.

Course Evaluation: The completion of course evaluations is an expectation of students in this class. Near the end of the semester you will be notified by email and provided with a link to follow to complete the evaluations online outside of class.

Academic Assistance

Chemistry Learning Support Center: Refer to schedule at http://rcms.agnesscott.edu/ The tutors are excellent, and it would be a wise decision for students in this course to get to know the tutors and utilize their talents. Students are also encouraged to seek assistance from their fellow classmates, the tutors and/or Dr. Bourassa before falling behind.

Office Hours: You are encouraged to stop by the instructor's office early in the semester, if nothing else, just to say hello, and introduce yourself. If you want to speak privately about performance or issues related to the class, please email Dr. Bourassa to schedule an appointment. Note – I have found that giving set office hours never works for me and my students. I am in my office almost all day, every day. My availability is very flexible so please send me an email or stop by my office when available.

Course Policies

Attendance: Attendance during regular class time is not required. However, it is to the student's advantage to attend all scheduled class meetings. Keeping up with the enormous amount of new material presented in each lecture is the key to success in this course. It is much more difficult to keep up if a classe is missed. Additionally, it is possible material will be discussed in a different fashion than how it is presented in the textbook. Students are responsible for all material discussed in class. *If a class is missed due to illness, it is YOUR responsibility to obtain the notes and handouts that you missed from a classmate and Moodle, please do not ask the instructor.*

Email: Updates, corrections and announcements are communicated by email regularly throughout the semester. Students are expected check their email at least once per day. All emails are sent to official Agnes Scott College email address. Email is also the best way to contact Dr. Bourassa. If you have a specific request that you bring up in the hall or after class I highly recommend that you send me an email with the same information, otherwise there is a high chance I will forget your request.

Academic Honesty: The Agnes Scott College honor code embodies an ideal of character, conduct, and citizenship, and is an important part of the College's mission and core identity. This applies especially to academic honesty and integrity. Passing off someone else's work as your own represents intellectual fraud and theft, and violates the core values of our academic community. To be honorable, you should understand not only what counts as academic dishonesty, but also how to avoid engaging in these practices. Students are expected to conduct themselves in a way that is consistent with College policies and in a manner appropriate with the College's mission as an educational institution. In academic matters, mutual responsibility between instructors and students requires cooperation and trust in maintaining the details and spirit of an honor system. This insures that a high level of integrity and honesty will be maintained within the academic programs.

The following are the major violations of the Honor Code and will not be tolerated in this course:

- Cheating: Copying others' works, collaborating with others without authorization, using notes or other unauthorized source materials during exams, accessing and using others' computer files without authorization, and violating other specific regulations of the instructor. Specifically, discussing questions, providing answers to other students or any collaboration on online quizzes with classmates is considered cheating.
- Plagiarism: Intentionally or unintentionally using someone else's words, works, thoughts, or expression of ideas without giving proper credit. When a source is not cited, it is assumed that the words, works, thoughts, or ideas are the sole product of the author, i.e., the student. Plagiarism includes handing in as one's own work a paper on which a student has received extensive aid in substance and/or structure without acknowledging that help.

Students of Agnes Scott College are expected uphold the Honor Code by presenting work only of their own creation. In addition, students are responsible for upholding the ethical professional standings of their programs. Students must try to ensure that others in the community also act honorably. Students are encourage to:

- review each course syllabus for the professor's expectations regarding course work and class attendance.
- attribute all ideas taken from other sources; this shows respect for other scholars. Plagiarism can include portraying another's work or ideas as your own, buying a paper online and turning it in as if it were your own work, or not citing or improperly citing references on a reference page or within the text of a paper.
- not falsify or create data and resources or alter a graded work without the prior consent of your professor. This includes making up a reference for a works cited page or making up statistics or facts for academic work.
- not allow another party to do your work/exam, or submit the same or similar work in more than one course without permission from the course instructors. Cheating also includes taking an exam for another person, looking on another person's exam for answers, using exams from previous classes without permission, or bringing and using unauthorized notes or resources (i.e., electronic, written, or otherwise) during an exam.
- not facilitate cheating, which can happen when you help another student complete a take home exam, give answers to an exam, talk about an exam with a student who has not taken it, or collaborate with others on work that is supposed to be completed independently.
- be truthful about the submission of work, which includes the time of submission and the place of submission (e.g., e-mail, online, in a mailbox, to an office, etc.).

You should understand that penalties result from dishonest conduct, ranging from failure of the assignment to expulsion from the college. You should speak with your professors if you need clarification about any of these policies.

Title IX: For the safety of the entire community, any incidence of or information about sexual misconduct must be reported immediately to Title IX Coordinator Marti Fessenden, Hopkins Hall 207, 404-471-6547.

This course adheres to the principles of diversity and inclusion integral to the Agnes Scott community. We respect people from all backgrounds and affirm people's decisions about gender expression and identity. Please feel free to correct me if your preferred name or gender pronoun are different from that listed on the class roster.

Accessible Education: Agnes Scott College seeks to provide equal access, support and services for students with disabilities. Agnes Scott complies with section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act Amendments Act (ADAA) of 2008. Reasonable accommodations will be provided for students with documented physical, sensory, systemic, cognitive, learning, and psychiatric disabilities. To be eligible for services, students need to contact the Office of Accessible Education. Once registered, please contact Dr. Bourassa to discuss the specific accomdations required to fufill individual needs for this course.

Religious Observance and Athletics: Accommodations for religious observance and athletic competitions will be given, provided at least a one-week advance notice is given to the instructor. If a one-week advance notice is not given, the student is responsible for all graded materials, including exams, quizzes, homework assignments and laboratories.

General Advice:

1. **For every hour you spend in class, you should spend at least 2-3 hours outside of class reading to understand and memorize the material.** This includes time spent before and after each topic is covered. Make it a habbit to prepare yourself before each lecture. Before coming to class you should read the relavent chapter and review the online lecture(s) posted on Moodle. After class you should review your notes, complete the problem sets, and seek help from peers, tutors, or the instructor if needed.

2. **Study according to our optimal studying environment**. Log-off, turn-off, tune-out – NO TV watching, phone answering, texting, emailing, DMing, Snap-Chatting, Instagramming, Tweeting, Facebooking, Pandoraing, YouTubing, posting, chatting, talking, eating, munching, snacking, daydreaming, sleeping, cooking, drinking, shopping, surfing, distracting or social planning, for 1, optimally 2 hour blocks at a time, in the same location, NOT in your bed, not wearing headphones and not within 45 mins of finishing a meal.

3. **Keep up with your work from day to day—never let yourself get behind**. One key to success in college chemistry courses is to keep up with the fast pace of the class; cramming right before exams will not work! You will be presented with a lot of new material in each lecture. Procrastination is the biggest source of failure. Succeeding in this course takes a lot of dedication and commitment, but it will be well worth the effort. *If you are one lecture behind with the reading and homework assignment double the time you dedicate to each the past and current lecture – 3 hours each = 6 hours. If you are two lectures behind triple the time – 3 hours each = 9 hours total. If you are three lectures behind you should schedule a meeting with Dr. Bourassa.

4. **Study material in small units and be sure that you understand each new section before going to the next.** Do not just attempt, but actually understand each topic to such a level that you can explain the material to your peers. A "B" in this class is earned for above average work. An "A" is earned for far superior performance. "A" does not stand for average.

5. **Write when you study**. You cannot learn by "looking" at the material. You must write and re-write notes. Simply looking at your notes is often a complete waste of time.

6. **Learn by teaching and explaining**. Disciplined studying with other students in the course is effective for some but not all. Dedicate a time to meet with classmates a couple of times each week if possible only after you yourself have studied the material on your own. Try to meet the same time and place each week, and be dedicated to studying chemistry. The more people involved the more difficult it will be to maintain focus. Quietly working as a small group and occasionally seeking help from peers is reported to be highly effective for many. White boards are very helpful for studying biochemistry as a group.

7. **Attend all classes and stay awake.** Each minute of class is cost roughly $2.45. Missing an entire lecture of class is like wasting $183.75! Even running 15 minutes late is wasting $36.78!

    - Agnes Scott Tuition = $39,720 per year
    - The average student will take 8 courses per year = $4,965 per course
    - This course has 27 lecture periods (including exams) that are 75 minutes each = 2,025 minutes
    - $4,965 / 2,025 minutes = **$2.45 per minute of class**

Foundational Concepts

1. Biomolecules have unique properties that determine how they contribute to the structure and function of cells and how they participate in the process necessary to maintain life.

2. Highly organized assemblies of molecules, cells and organs interact to carry out the function of living organism and maintain a stable environment within an everchanging external environment.

Tentative Schedule

DATE	Lecture Topic	Chapter
Wednesday, Jan 9	Introduction to course / review of biology basics*	1
Monday, Jan 14	Amino acids*	4
Wednesday, Jan 16	Amino acids*	4
Monday, Jan 21	**MLK Day – Campus Closed**	
Wednesday, Jan 23	Protein structure & function*	4/5
Monday, Jan 28	Protein structure & function*	4/5
Wednesday, Jan 30	Protein detection / DNA structure & properties	4 /3
Monday, Feb 4	**EXAM I**	
Wednesday, Feb 6	DNA replication, repair and mutagenesis*	3 & 20
Monday, Feb 11	DNA replication, repair and mutagenesis*	3 & 20
Wednesday, Feb 13	Carbohydrate Structure & Metabolism*	11 & 12
Monday, Feb 18	Carbohydrate Structure & Metabolism*	11 & 12
Wednesday, Feb 20	Glycolysis & Kreb's Cycle*	13 & 14
Monday, Feb 25	Glycolysis & Kreb's Cycle	13 & 14
Wednesday, Feb 27	**EXAM II**	
Monday, Mar 4	**PEAK WEEK**	
Wednesday, Mar 6	**PEAK WEEK**	
Monday, Mar 11	**SPRING BREAK**	
Wednesday, Mar 13	**SPRING BREAK**	
Monday, Mar 18	Enzyme kinetics / thermodynamics*	5 & 6
Wednesday, Mar 20	Electron Transport Chain (ETC)*	15
Monday, Mar 25	Oxidative Phosphorylation*	15
Wednesday, Mar 27	Gluconeogenesis & Alternative pathways*	13
Monday, April 1	Application of metabolism pathways*	19
Wednesday, April 3	Lipids, introduction*	8
Monday, April 8	Lipids, cont…	8
Wednesday, April 10	**EXAM III**	
Monday, April 15	Membranes & Introduction to Immunology*	9
Wednesday, April 17	Membranes & Introduction to Immunology*	9
Monday, April 22	RNA & Water / Buffers*	2
Wednesday, April 24	Detection methods & Water / Buffers*	2
Monday, April 29	Detection methods & Water / Buffers*	2
Wednesday, May 1	Review	

** indicates that an online quiz following that lecture*

Note: This schedule is provided as a guide, however, it is likely that some subjects will require more or less time than anticipated. The material covered during a particular lecture may not coincide with this schedule, however, the dates of the exams will not change.

You should be reading the chapters before the class date and the case studies after the class date. We will discuss the case studies in the before the following lecture.