

## SPRING 2024 COURSE SYLLABUS

### **BCH 4024/ GMS 5905: INTRODUCTION TO BIOCHEMISTRY & MOLECULAR BIOLOGY** **DISTANCE LEARNING**

**COURSE COORDINATOR: Dr. Deborah Smith**

**1. Course Description:** *Four (4) credits.* BCH4024 (undergraduate/postbac student section) & GMS5905 (graduate student section) surveys the structure, function, and metabolism of amino acids, proteins, carbohydrates, lipids, and nucleic acids. It introduces concepts in cell structure, replication and growth, and metabolic regulation.

**2. Prerequisites:** Organic Chemistry (CHM 2210 and 2211, CHM 2215 and 2216, or their equivalents at other universities) or consent of course coordinator. CHM 2200 is not an acceptable prerequisite for BCH4024/GMS5905. The lecturers of the course assume a working knowledge of the concepts and vocabulary of organic chemistry.

**3. Necessary Time Commitment and Management:** BCH4024/GMS5905 is a very demanding course and will require a substantial time commitment to do well. BCH4024/GMS5905 is a 4 lecture per week course. **Previous successful students report spending at least 10 hours studying per week outside of lecture hours.** You may require more hours if you need to review organic chemistry. *Studying tips from previous students are available in the course information module.* A recommended lecture schedule is on the Canvas “Syllabus” page.

#### **4. Course Objectives:**

- Explain the fundamental principles of biochemistry and molecular biology.
- Describe the purpose and interpret the results of common biochemical and molecular techniques.
- Apply the foundational concepts to the analysis and interpretation of biochemical observations.
- Recognize the connection between the basic processes of cells and their impact on overall human health.
- Critically analyze and evaluate primary research articles related to course content.

**5. Recommended Text:** *Lehninger Principles of Biochemistry, 8th edition*, by David L. Nelson and Michael M. Cox. New York: Macmillan Learning, 2021.

- There are no assigned readings in this course. Exam questions are *not* drawn exclusively from the textbook, but the text can provide a useful alternate view of material covered in lectures.
- If you purchase the digital copy of the book through UF All Access, you will also get access to Achieve, Macmillan’s online learning platform. The only thing I have set up in Achieve are the optional readings and the adaptive learning quizzes. Previous students have indicated that the quizzes are helpful in solidifying the basic material from the readings and lectures. The cost is \$88.
- Used copies of the 6th and 7th editions are widely available and can provide the alternate view of the lecture materials.

**6. Web Page:** Course material is available on the Canvas E-Learning site: <https://elearning.ufl.edu/>. Access lecture videos and slides by clicking the respective exam module button on the course homepage. Lectures videos are the property of UF and cannot be downloaded. Weekly announcements can be found

by clicking “Announcements.” **Students are expected to keep up-to-date with all information communicated through the announcements.**

**7. DRC Accommodations:** Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the Disability Resource Center by visiting <https://disability.ufl.edu/students/get-started/> . It is important for students to share their accommodation letter with Dr. Smith ASAP via UFL email ([dsmith43@ufl.edu](mailto:dsmith43@ufl.edu)).

**8. Tests and Grading:** Students' final letter-grades will be determined based on performance on four (4) examinations and the syllabus quiz. Each exam is worth 100 points with 50 questions on each exam (2pts/question). The grading scale for this course is based on the performance of the entire class on all 4 exams. Updated grading scales will be provided after each exam. For more detailed information on grading see the Testing and Grading Policies on the Canvas “Syllabus” page. Information on the UF grading policy is available at: <https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies/>

**Multiple choice exams:** There will be a total of four (4) exams, each 90 minutes long with 50 questions. The first two exams will be available from 7:00 AM (EST) to 11:59 PM (EST). You must begin your exam NO LATER than 9:59 PM (EDT) to finish your exam by deadline. Exams 3 & 4 will be available 7:00AM (EDT) to 11:59PM (EDT) You must begin your exam NO LATER than 9:59 PM (EST) to finish your exam by deadline. Exams will cover the material discussed in the specified lecture videos and notes. Students cannot *retake* exams.

- Course Information Quiz: Monday January 9<sup>th</sup> – Friday January 13<sup>th</sup>
- Exam 1: Tuesday, January 30<sup>th</sup>
- Exam 2: Tuesday, February 27<sup>th</sup>
- Exam 3: Tuesday, April 2<sup>nd</sup>
- Exam 4: Tuesday, April 30<sup>th</sup>

By agreement of the faculty, we will **NOT** provide a review of individual student exam results. Be assured that exams undergo a rigorous statistical review of every individual question. The faculty also consider student concerns voiced *immediately* after exams. Adjustments to the answer key may occur and extra points will be awarded based only on the results of the faculty assessment.

**Honorlock:** Exams will be administered using the Honorlock Chrome extension. Honorlock will provide a scientific calculator when an exam requires one. For all exams you must use Chrome web browser, a computer that is connected to the internet, and a webcam which can be turned to give a 360° view of your testing room. You must be the only person in your testing room. Scratch paper is permitted, but you must show the front and back of the paper at the beginning of the exam. Ensure you have a stable internet connection. If your connection is dropped, the exam timer will not stop. *In case of technical issues during an exam, contact Honorlock support IMMEDIATELY! Use the chat feature within Honorlock or go to link below.*

Install Honorlock: <http://www.honorlock.com/extension/install>

Honorlock technical support: <https://honorlock.com/support/>

A practice Honorlock quiz is available all semester within the “Quizzes” section. **Students are responsible for ensuring their internet connection and computer are compatible with Honorlock before beginning each exam.**

**Make-up exams:** Make-up exams will be granted ONLY for emergencies. Students must provide adequate documentation of a need to miss an exam and receive approval by Dr. Smith. Vacations are not a valid reason to miss an exam. Students are only permitted ONE makeup exam in total. The make-up exams are specific to the missed exam, not cumulative. There is no makeup Exam 4 due to the grade submission deadline.

**Note:** GMS5905 graduate students have additional manuscript review assignments to elevate the course to the graduate level. If you hear anything or see any announcement about these assignments, **they do not apply to BCH4024.**

**9. Campuswire:** **\*\*\*This is the ONLY opportunity for extra credit\*\*\*** Campuswire allows students to post questions and answers while staying anonymous to other students. Students are encouraged to work together to answer each other’s questions. The Teaching Assistants (TAs) will monitor the Campuswire page weekly to ensure student’s answers are correct. Campuswire will be inactive during all exams.

- To join the Campuswire page go to: <https://campuswire.com/p/GA36827F5>
  - Register with your UFL email address.
  - Your Campuswire name must match your name listed in Canvas.
  - Use the class code: 3160
  
- Download Campuswire App for Android or iPhone: <https://campuswire.com/download>

Students will be awarded extra credit based on their reputation level and/or reputation points as determined by Campuswire. Campuswire awards reputations points as follows:

- 2pt for each question asked
- 2pt for each like you receive on a question you asked
- 5pt for each question you answer
- 10pt for each upvote you receive on an answer you provided

Campuswire has tiers of reputation levels as follows:

- Level 1: Starter (yellow bird). To level up to Starter:
  - Answer 1 question on the Class Feed AND Receive 1 upvote from a classmate
- Level 2: Intermediate (red bird). To level up to Intermediate:
  - Answer 5 questions on the Class Feed AND Receive 10 upvotes from classmates
- Level 3: Advanced (eagle). To level up to Advanced:
  - Answer 20 questions the Class Feed AND Receive 50 upvotes from classmates

**Campuswire Grading:** Participation on Campuswire can earn you up to 12 extra credit points. I will download Campuswire's reputation report on May 1<sup>st</sup> at 7 AM (EDT). No posts after that point will count towards your grade. I will award points as follows:

- Students who remain at noob level will get 0 points.
- Students who achieve starter level will get 2 extra credit points.
- Students who achieve starter level AND earn 50 reputation points will get 3 extra credit points.
- Students who achieve intermediate level (red bird) AND earn 100 reputation points will get 6 extra credit points.
- Students who achieve advanced level (Eagle) will get 12 extra credit points.

\* Unprofessional and/or plagiarized posts will be removed & will not count towards reputation points. \*

**\*There is a STRONG correlation between activity on Campuswire and overall grades. Those who are active on Campuswire throughout the semester tend to do significantly better in the course than those who are not active on Campuswire.\***

**10. Supplemental Instruction (SI):** Optional FREE group tutoring sessions will be offered via Zoom by the SI program. The SIs are previous BCH 4024 students who have been selected for the SI teaching program and are in their 2<sup>nd</sup> or 3<sup>rd</sup> semester as a tutor. The SI program is very popular and highly effective. We strongly encourage all students to participate (including graduate students). **Attendance is required to remain in the SI program.** Students are permitted 3 absences for the entire semester. Signup information will be announced during the 1<sup>st</sup> week of class. Participation is not a requirement of the course but is highly encouraged.

**SI Leaders volunteer their time and do not get paid for their work. If you have questions outside of your session time, post your questions on Campuswire. SI Leaders are students as well. Please respect their time.**

For those who cannot attend SI tutoring sessions, practice questions constructed by the SI program will be made available. *The lecturing professors do NOT participate in making the practice questions*; thus the practice questions may not reflect the type of questions seen in the exams. The practice questions should be used to gauge your knowledge. The TAs will also provide review videos that can be viewed on your own time.

**11. Course Communications:** Students are responsible for regularly checking announcements for important updates. Questions about course organization & operation, including grades, should be directed to Dr. Smith using the Canvas email system.

How to send a message on Canvas: <https://community.canvaslms.com/t5/Student-Guide/How-do-I-send-a-message-to-a-user-in-a-course-in-the-Inbox-as-a/ta-p/502>

Each lecturer is responsible for his/her own material. Individual faculty members determine their method for answering course material questions and policies governing those interactions.

All emails must be sent from a UF email address.

Dr. Deborah Smith – Course Coordinator (**Use Canvas email**) [dsmith43@ufl.edu](mailto:dsmith43@ufl.edu)

*\*Please email Dr. Smith for questions regarding course administration, management, and grades.*

Dr. Daniel L. Purich (“DLP”) [dlpurich@ufl.edu](mailto:dlpurich@ufl.edu)

Dr. William L. Zeile (“WLZ”) [wzeile@ufl.edu](mailto:wzeile@ufl.edu)

**\*Note:** Dr. Zeile retired this fall, but we are still using his recording this semester. Dr. Mireille Almen is taking his place. She will have office hours and answer questions regarding the material in this section.

Dr. Lauren Douma (“LGD”) [ldouma@ufl.edu](mailto:ldouma@ufl.edu)

**12. Privacy:** Students who participate in live online office hours or review sessions with their camera engaged or utilize a profile image are agreeing to have their video or image recorded. If you are unwilling to consent to have your profile or video image recorded, be sure to keep your camera off and do not use a profile image. Likewise, students who un-mute during class and participate orally are agreeing to have their voices recorded. If you are not willing to consent to have your voice recorded during class, you will need to keep your mute button activated and communicate exclusively using the "chat" feature, which allows students to type questions and comments live. The chat will not be recorded or shared. As in all courses, unauthorized recording and unauthorized sharing of recorded materials is prohibited.

**13. Course Evaluations:** Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at [gatorevals.aa.ufl.edu/students/](http://gatorevals.aa.ufl.edu/students/). Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via [ufl.bluera.com/ufl/](http://ufl.bluera.com/ufl/). Summaries of course evaluation results are available to students at [gatorevals.aa.ufl.edu/public-results/](http://gatorevals.aa.ufl.edu/public-results/)

**COURSE OUTLINE FOR  
BCH 4024/ GMS 5905: INTRODUCTION TO BIOCHEMISTRY & MOLECULAR BIOLOGY**

**COURSE INFORMATION QUIZ OPENS at 7:00 AM (EST) on Jan 8<sup>th</sup> &  
CLOSES at 11:59 PM (EST) on Jan 16<sup>th</sup>**

A recommended lecture viewing schedule is available on the “Syllabus” page of the Canvas site.

<b><u>Lecture</u></b>	<b><u>Lecturer</u></b>	<b><u>Lecture Topic</u></b>
1	DLP	Water structure, Ionization, pH and Buffers
2	DLP	Amino Acids as Protein Building Blocks
3	DLP	Peptides - Bonding, Ionization, and Sequencing
4	DLP	Interactions among Amino Acid Side Chains
5	DLP	Understanding Protein Structure
6	DLP	Protein Folding, Unfolding, and Misfolding
7	DLP	Protein Binding Interactions (Hemoglobin)
8&9	DLP	How Enzymes Work
10&11	DLP	Enzyme Kinetics
12	DLP	Carbohydrates - Structure & Function
<b>EXAM 1 Tuesday Jan 30<sup>st</sup> [L1-12] OPENS at 7:00 AM &amp; CLOSES at 11:59 PM (EST)</b>		
13	DLP	Introduction to Metabolism Part 1 - Basics of Pathway Organization, Regulation and Bioenergetics
14	DLP	Digestion and Amino Acid Absorption
15	DLP	Mobilization of Amino Acids
16	DLP	Ammonia Assimilation
17	DLP	Urea Cycle: Averting Ammonia Toxicity
18	DLP	Biosynthesis of Nonessential & Specialized Amino Acids

19	DLP	<b>Pyrimidine Nucleotide Biosynthesis</b>
20	DLP	<b>Purine Nucleotide Biosynthesis Salvage &amp; Degradation Transporters</b>
21	WLZ	<b>Lipids</b>
22	WLZ	<b>Biological Membranes</b>
23	WLZ	<b>Membrane Proteins</b>
24	WLZ	<b>Membrane Protein Transporters</b>
25	WLZ	<b>Membrane Protein Signaling 1</b>
26	WLZ	<b>Membrane Protein Signaling 2</b>

**EXAM 2 Tuesday February 27<sup>th</sup> [L 13-26] OPENS at 7:00 AM & CLOSSES at 11:59 PM (EST)**

27	WLZ	<b>Introduction to Metabolism Part 2</b>
28	WLZ	<b>Glycolysis</b>
29	WLZ	<b>Gluconeogenesis</b>
30	WLZ	<b>Glycogen Metabolism</b>
31	WLZ	<b>Regulation of Carbohydrate Metabolism</b>
32	WLZ	<b>Cellular Respiration</b>
33	WLZ	<b>The Citric Acid Cycle</b>
34	WLZ	<b>Electron Transport</b>
35	WLZ	<b>Oxidative Phosphorylation</b>
36	WLZ	<b>Introduction to Lipid Metabolism</b>
37	WLZ	<b>Ketones and Fatty Acid Synthesis</b>
38	WLZ	<b>Regulation of Fatty Acid Metabolism</b>
39	WLZ	<b>Cholesterol Synthesis</b>
40	WLZ	<b>Plasma Lipoproteins</b>

**EXAM 3 Tuesday April 2<sup>nd</sup> [L 27-40] OPENS at 7:00 AM & CLOSSES at 11:59 PM (EDT)**

41	LGD	<b>DNA Structure and Genome Organization</b>
42	LGD	<b>DNA Replication</b>
43	LGD	<b>Prokaryotic Transcription and Gene Regulation</b>
44	LGD	<b>Eukaryotic Transcription and Gene Regulation I</b>
45	LGD	<b>Eukaryotic Transcription and Gene Regulation II</b>
46	LGD	<b>Post-Transcriptional RNA Processing</b>
47	LGD	<b>Translation I</b>
48	LGD	<b>Translation II and Post-Translational Modifications</b>
49	LGD	<b>DNA Damage and Repair</b>
50	LGD	<b>Signal Transduction and Cell Cycle Control</b>
51	LGD	<b>Cancer Biology I</b>
52	LGD	<b>Cancer Biology II</b>

**EXAM 4 Tuesday, April 30<sup>th</sup> [L41-52] OPENS at 7:00 AM & CLOSSES at 11:59 PM (EDT)**