FOUNDATIONS OF BIOCHEMISTRY (BIOL335)
FALL 2025
Section 1:Mon, Wed, Fri from 9.30am-10.20am (Newton 212)
Section 2: Mon, Wed, Fri from 10.30am-11.20am (Newton 212)

Instructor information

Dr. Varuni Jamburuthugoda
Office: ISC 355
Office Hours: Mondays and Wednesdays from 12.30pm-2pm
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Required Textbook

Biochemistry, 10th Edition by Berg, Tymoczko, Gatto and Stryer
ISBN:9781319486785
Achieve (Optional)

Course Description

- The primary goal of this course is to help you understand the core concepts of biological metabolism and apply them to the context of human disease**.** Lectures will generally follow the assigned textbook, and PowerPoint slides will be posted on Brightspace before each class. Please note that these slides serve only as a study guide, you are expected to read and refer to your textbook for a deeper, more complete understanding of each topic.
- To support your learning, I will post guiding questions on Brightspace to accompany the readings. I strongly encourage you to ask questions during lecture and interruptions are welcome if something is unclear. That said, many questions tend to arise upon review of the material. To address this, we will begin each class with a short Q&A session based on your reflections and inquiries.
- During lectures, I will also pose questions to you. Please think actively**,** come prepared to offer answers**.** Active engagement is a key part of learning in this course.

Learning Objectives

By the end of this course, students will be able to:

- Describe the basic facts, concepts, and fundamental principles of **cellular metabolism**.
- Explain **protein structure and function**, and how they relate to cellular metabolic processes.
- Compare the structures of **hemoglobin and myoglobin** and explain how these differences relate to their distinct physiological functions.
- Explain the fundamental concepts of **enzyme kinetics**, including the effects of different types of **enzyme inhibitors**.
- Describe the **catalytic strategies** enzymes use to accelerate reactions, as well as the **regulatory mechanisms** that control enzyme activity.
- Identify the essential components of **signal transduction pathways** and explain their role in regulating metabolism.
- Describe the pathways of **glycolysis**, the **citric acid cycle**, and **oxidative phosphorylation**, including how ATP is generated through these processes.

- Explain the **coordinated regulation** of glycolysis and gluconeogenesis.
- Describe the metabolism of **glycogen** and **fatty acids** and analyze how metabolic pathways are integrated and altered in **human diseases**.

Course Evaluation

Graded Work	Contribution
4 Exams	70%
Assignments Homework Quizzes (15%) Case studies (15%)	30%

Overview of Evaluation

Exams (70%)

- There will be four exams during the semester. Each exam will cover about one-fourth of the course and will include a mix of multiple-choice, true/false, fill-in-the-blank, and short-answer questions. These exams are meant to check not just what you remember, but how well you can connect ideas and apply what you've learned**.**
- Exams are not cumulative. Each exam will focus only on the material covered since the previous exam (as outlined in the syllabus).
- Even though the exams are not comprehensive, keep in mind that the course builds on itself**.** Mastering early topics will make it much easier to succeed with later ones.
- To do your best, use the textbook chapters, class lectures, and slides together as study tools. You won't be tested on textbook material that wasn't covered in class or in the assigned.

Homework Quizzes (15%)

- There will be **8 quizzes** throughout the semester.
- Your **two lowest quiz grades will be dropped**, so only your best 6 scores will count toward your final grade.
- Quizzes are designed to help you stay on track and review material regularly.

Case studies (15%)

- Case studies will be completed in **groups**, and each group will turn in **one copy** of the assignment.
- Case studies include questions that apply course concepts to real-world examples.
- **Peer evaluation counts for 50%** of your case study grade. Each group member will evaluate their peers' contributions, ensuring that everyone is accountable for participation.

Late Work

- Late work will not be accepted. Assignments will not be available after the deadline. If you have an extenuating circumstance, please email me before the assignment is due to make alternate arrangements.

Makeup Exam policy

- Makeup exams will only be granted for valid reasons, such as illness or a family emergency. To ensure fairness and comply with departmental and university policies, appropriate documentation will be required.
- If you miss an exam due to one of these valid reasons, you must contact me as soon as possible to arrange an alternate exam.

Grading Scale

- The following scale will be used to calculate final grades.

A = 100-93%	A^- =92.9-90%	B^+= 89.9-87%	B = 86.9-83%
B -= 82.9-80%	C^+ = 79.9-77%	C = 76.9-73%	C- = 72.9-70%
D = 69.9-60%	F = 59-0%		

How to get the most out of this course:

- **Review regularly** – Go over lecture notes each week instead of cramming right before the test.
- **Use multiple resources** – Combine slides, class notes, and assigned textbook chapters to reinforce concepts.
- **Practice actively** – Test yourself with flashcards, practice problems, or by explaining ideas out loud.
- **Look for connections** – Exams focus on applying concepts, so think about how topics fit together.
- **Study with peers** – Discuss tricky topics in a group to strengthen your understanding.
- **Ask for help early** – Bring questions to class, email me, or stop by office hours—don't wait until the day before the exam.

Accessibility

- SUNY Geneseo is committed to providing an equitable and inclusive educational experience for all students. The Office of Accessibility Services coordinates reasonable accommodations for students with documented physical, emotional, or cognitive disabilities, as well as medical conditions related to pregnancy or parenting.
- For questions related to access and accommodations, please contact the Office of Accessibility Services. **Office of Accessibility Services**, Erwin Hall 22, (585) 245-5112

Safeguarding your mental health

- Mental health challenges—such as stress, mood changes, or sleep/eating issues—can affect academic performance. If you are struggling, please reach out to me or seek support.
- SUNY Geneseo offers free, confidential services through Counseling Services (Lauderdale Center for Student Health & Counseling) to help manage personal or academic challenges.
- If I notice you may need support, I will share resources and express concern. Seeking help is a strong and positive step for yourself and those who care about you.

Academic Honesty and Plagiarism

- Cheating, plagiarism, or any form of academic dishonesty will not be tolerated.
- Follow the University's policies on academic integrity (see the student handbook). If you are struggling, ask for help rather than risk dishonesty.
- Violations may result in a zero on the assignment or exam and a record in the Dean of Students Office.
- If you are unsure about proper citation, collaboration, or academic expectations, please ask me for guidance.

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- All course materials are © Dr. Jamburuthugoda or the textbook publisher. You may use them for your **own studying only**. **Do not share, post, or upload** these materials online (e.g., StudyBlue, Course Hero, Chegg, Quizlet) or with anyone outside the class, even small groups. Sharing or selling these materials can lead to **legal consequences**.

Tentative Schedule

Week 1

Date	Lecture	Topic	Chapter
8/25	**1**	Introduction	**1**
8/27	**2**	Protein Composition & Structure: Amino Acids	**2**
8/29	**3**	Protein Composition & Structure: Peptide Bonds	**2**

Week 2

Date	Lecture	Topic	Chapter
9/1	**Labor Day**		
9/3	**4**	Protein Folding, Misfolding and diseases	**2**
9/5	**5**	Protein Purification **Quiz 1**	**4**

Week 3

Date	Lecture	Topic	Chapter
9/8	**6**	Exploring Proteins & Proteomics- II	**4**
9/10	**7**	Exploring Proteins & Proteomics- III	**4**
9/12	**8**	Hemoglobin and Myoglobin-Oxygen Binding Curves **Case Study 1 Answers Due (group work)**	**4**

Week 4

Date	Lecture	Topic	Chapter
9/15	**9**	Hemoglobin: Bohr Effects & Mutations	**3**
9/17	**9**	Hemoglobin Continue **Quiz 2**	**3**
9/19	**Exam 1 (Lectures 1-9)**		

Week 5

Date	Lecture	Topic	Chapter
9/22	**10**	Enzymes: Protein Catalysts & Thermodynamics	**5**
9/24	**11**	Enzyme kinetics	**5**
9/26	**12**	Enzyme Inhibition **Quiz 3**	**5**

Week 6

Date	Lecture	Topic	Chapter
9/29	**13**	Catalytic Strategies -Proteases	**6**
10/1	**14**	Catalytic Strategies-Carbonic Anhydrases & Restriction Enzymes	**6**
10/3	**15**	Catalytic Strategies: Myosins Regulatory Strategies: Allosteric & Isozymes	**6** **7**

Week 7

Date	Lecture	Topic	Chapter
10/6	**16**	Regulatory Strategies: Covalent Modification & Proteolytic Cleavage **Quiz 4**	**7**
10/8	**17**	Carbohydrates	
10/10	**Exam 2 (Lectures 10-16)**		

Week 8

Date	Lecture	Topic	Chapter
10/13	**Fall Break**		
10/15	**18**	Signal Transduction	**14**
10/17	**19**	Insulin Signaling Pathway	**14**

Week 9

Date	Lecture	Topic	Chapter
10/20	**20**	Metabolism: ATP and Oxidation of Carbon Fuels **Case Study 2 Answers Due (group work)**	**15**
10/22	**21**	Metabolism-Common Motifs	**15**
10/24	**22**	Glycolysis **Quiz 5**	**16**

Week 10

Date	Lecture	Topic	Chapter
10/27	**23**	Alcoholic Fermentation	**16**
10/29	**24**	Regulation of Glycolysis	**16**
10/31	**25**	Gluconeogenesis	**16**

Week 11

Date	Lecture	Topic	Chapter
11/3	**26**	Citric Acid Cycle-part 1	**17**
11/5	**27**	Citric Acid Cycle-part 2 **Quiz 6**	**17**
11/7	**Exam 3 (Lectures 17-25)**		

Week 12

Date	Lecture	Topic	Chapter
11/10	**28**	Oxidative Phosphorylation part 1: Redox Potential & Electron Transport Chain	**18**
11/12	**29**	Oxidative Phosphorylation-part 2	**18**
11/14	**30**	Oxidative Phosphorylation-ATP Synthesis	**18**

Week 13

Date	Lecture	Topic	Chapter
11/17	**31**	Pentose Phosphate Pathway	**20**
11/19	**32**	Glycogen Metabolism-Glycogen Synthesis & Regulation **Quiz 7**	**21**
11/21	**33**	Fatty Acids	**22**

Week 14

Date	Lecture	Topic	Chapter
11/24	**34**	Fatty Acid Metabolism-Beta Oxidation and Ketone Bodies	**22**
11/26 **11/28**	***Thanksgiving Break***		

Week 15

Date	Lecture	Topic	Chapter
12/1	**35**	Fatty Acid Metabolism-Fatty Acid synthesis	**22**
12/3	**36**	Integration of Metabolism-Caloric Homeostasis, Diabetes	**27**
12/5	**37**	Integration of Metabolism-Caloric Homeostasis, Diabetes **Quiz 8**	**27**

Week 16

Date	Lecture	Topic	Chapter
12/8	Final Exam review **Case Study 3 Answers Due (group work)**		
12/10 **12/16**	***Final Exam 8 -10.30am (Section 2)*** ***Final Exam 8 – 10.30am (section 1)***		