



DEPARTMENT OF BIOCHEMISTRY

BCHM 30700 – Biochemistry Syllabus Summer 2017

INSTRUCTOR:

Dr. Orla Hart
office: BCHM 116
e-mail: ohart@purdue.edu

Course TAs:

	Faeze Saatchi	Chris Petell	Kortany Baker
e-mail:	fsaatchi@purdue.edu	cpetell@purdue.edu	baker461@purdue.edu

This is a fully online course, which can be taken remotely, as long as you have the required resources. You should consider if online learning is right for you, and speak with your advisor if necessary, before enrolling in this course. It will require a lot of discipline, organization, time management, and collaboration with people at other remote locations (and time zones!). PLEASE NOTE THAT A WIRED INTERNET CONNECTION WITH HIGH PERFORMANCE UPLOAD AND DOWNLOAD SPEEDS WILL BE MORE RELIABLE THAN WIFI. YOU WILL NOT BE ABLE TO TAKE THIS COURSE USING ONE OF THE CAMPUS-OWNED COMPUTERS (eg, in the library).

COURSE SUMMARY

Students who enroll in BCHM 30700 have wide-ranging interests and aspire to pursue careers in biological or life science, medicine, nursing, veterinary medicine, animal science, dietetics, food science, botany and nutrition. This course will provide students with the basic foundation of biochemistry concepts that will be required for the pursuit of their academic and career objectives. The first third of the course will use a structure-based approach to introduce students to central biomolecules including nucleic acids, proteins, carbohydrates, and lipids. As each biomolecule is described, its relevance and context will be demonstrated using real-world examples drawn from human health and agriculture. This part of the course will cover the molecular basis of protein structure and the catalytic activity of enzymes. During the second third of the course, the essential features of the central dogma will be described with an emphasis on the enzymes and macromolecules that are involved in replication, transcription and translation. The final third of the course will cover metabolic pathways and focus on the interconnection between glycolysis and the citric acid cycle and the production of chemical energy by the formation of proton gradients.

LEARNING OUTCOMES

- Upon completion of BCHM 30700, students with a passing or above grade will be able to:
- Examine the structure/function relationship of biological macromolecules.
 - Outline the central dogma of molecular biology.
 - Describe intermediary carbon metabolism: glycolysis, the citric acid cycle, oxidative phosphorylation and photosynthesis.
 - Critique case studies and articles that discuss the contributions of biochemistry to society, including improvements to medicine agriculture and the economy.

TEXTBOOK

Essential Biochemistry, Third Edition by Pratt and Cornely. Published by John Wiley & Sons, Inc. Access to WileyPLUS online is recommended.

SUGGESTED VERSIONS	ISBN
Hardcover Text with WileyPLUS	9781118567883
Loose-leaf, binder-ready text with WileyPLUS	9781118567715
E-text with WileyPLUS	9781118567586

BLACKBOARD

The syllabus for the course, along with all content and links to additional resources, required software, and assessments, will be available via the Purdue University Blackboard Learn site at <https://mycourses.purdue.edu/>

COMPUTERS

A computer or laptop that is equipped with a webcam is required in order to take this course. A tablet such as an iPad will not be sufficient. If your computer does not have a built-in webcam, you will need to purchase one that can be used with your computer. Usually you cannot install software or hardware on a shared computer (such as in the computer labs on campus, or in a library), so it is assumed that you have your own computer for this course.

If you cannot take assessments by their due dates because of lack of access to a computer, software, internet access, or webcam, you will forfeit the points for that assessment. There are system requirements for running the software that is needed. If your system cannot download, install, or run the Lockdown Browser, you will not be able to take any course assessments. Neither your instructor, nor your TAs, will be able to troubleshoot any computer issues for you. You may contact ITaP, or the Academic Success Center for help.

REQUIRED SOFTWARE

To take quizzes and exams in this course you will be using Respondus LockDown Browser and Respondus Monitor. Instructions for Respondus LockDown Browser, including system requirements, can be found at <http://www.itap.purdue.edu/learning/tools/respondus-browser.html> Respondus Monitor will require you to have a webcam.

INTERNET ACCESS

You will need regular wired access to high-quality internet that will allow you to stream content in both directions. Poor connectivity will not be accepted as an excuse for not reviewing content, or missing assessment deadlines, or browser or system crashes on your end.

The consequences of low download speed will be disruptions to streaming the video content, and accessing other materials. The consequences for low upload speed will be inability to take or complete assessments. An unreliable internet upload speed means you risk your browser crashing while you take your assessment. If this happens, you will not have the opportunity to complete the assessment. There are multiple platforms you can use to check your connection

speed. A consistent minimum (not average) speed of 20 Mbps download and 5-10 Mbps upload speed is required. This is assuming your network is unshared, and your router can handle the data. Neither your instructor, nor your TAs, will be able to troubleshoot any internet connectivity issues for you.

TIPS: 1. Run a **speedtest** on your computer: <http://beta.speedtest.net/>
2. **Malware** can build up and bog down internet processing, and even though the connection speed is high quality, the internet may be extremely slow. It is recommended that you use some type of malware checker/remover/cleaner.

LECTURES

Lectures will be delivered online through Blackboard Learn. They are divided into content areas to help you keep the material organized. There is no set time that you are required to be online, however, it is strongly recommended that you create a schedule for watching the lectures. There is no limit to how many times you can view a lecture video or any other content.

ASSESSMENT

Quizzes

There are five quizzes over the course, which you will take using Respondus Lockdown Browser. You will have a 24-hour period within which you must complete the quiz. Once you begin the quiz, you must complete it; you cannot stop and start. These are closed-book, timed quizzes. You must take them in a suitable environment, ie, no-one else in the room, well lit, and do an environment scan with your webcam before starting to demonstrate that you have no materials (including your phone) on your desk.

Examinations

There are three exams that will be given. Each in-semester exam is worth 100 points. The final exam is worth 150 points. Two of the exams will be given during the semester, and the last exam will be given during the final week. The date of the final exam will be announced when scheduled. Exams 1 and 2 are non-cumulative; Exam 3 (the final exam) is cumulative.

The Exams will be administered as “assignments” on Blackboard, and are open-book. You will have a 24-hour window within which they must be completed. **Because they are open book, a higher standard will be expected of you in your answers.** If you have not studied, you will not be able to perform well. All submissions will be checked for plagiarism against the book, online sources, and other students (including previous students of the course). It will take you longer than you think to complete these, so do not procrastinate!

Missing an exam or quiz will result in a grade of zero being recorded unless documented justification for the absence is presented. You will have a minimum of a 24 hour-window to complete all assessments, therefore, no rescheduling of quizzes or exams will be permitted for any reason. **Missing deadlines for assessments will result in a 10% deduction of your grade per hour that the submission is late.** Poor internet connection, falling asleep before the submission deadline, etc., will not be accepted as a reason for late submissions of assessments.

Requests for re-grading of a quiz or exam must be submitted within a week of the assessment grade being made available to you.

Please note that the Final Exam will be scheduled by Purdue to be held on the Wednesday, Thursday or Friday following the last day of classes. There will be no rescheduling of the Final Exam for any reason except an emergency, for which documentation must be provided (ie, rescheduling for a vacation is not permitted). Please plan accordingly.

Clinical Connections

These are team activities. Clinical Connections are articles that detail practical applications of the topics we cover in regular lectures. They are all available for viewing on Blackboard. Each week, questions will be released that your team must answer and submit as an assignment.

In preparing your final submission, it is required that you will all contribute to the activity and answering questions on your team discussion board. **If you do not post your work to the discussion board, it is assumed that you did not participate in the activity and you will likely incur an individual penalty.** Each team will have 4 or 5 members. Each member will take ownership of one question, with the remaining questions rotated between team members. Once your team is happy with the answers, one of the team members will submit a final document. These activities will be due at the end of day Monday each week, except week 1.

If you have questions about your part of the Clinical connection, the first thing you should do is ask your team members for feedback. If you would like to ask your TA additional questions about the activity, this should be done well ahead of the submission deadline to ensure you get adequate feedback. Waiting to request feedback until a day before the submission deadline may not give your TA enough time to respond (the day of submission sometimes results in a very busy email inbox!).

Individual Project

This project is called "Biochemistry in the Movies", and will ask you to analyze the presentation of biochemistry in a particular movie, tv show, or even a single tv episode. It is expected that you will not begin this project until halfway through the course. Detailed instructions will be provided on Blackboard, but you should note, your submission will include a short video that you make!

GRADING SCHEME

Exam 1	100 points
Exam 2	100 points
Exam 3 (Final)	150 points
Quizzes (x5)	100 points
Clinical Connections (x 7)	100 points
Individual project	30 points
Scavenger Hunt	20 points
*Knowledge Assessment (x2)	12 points
*Perception Survey (~week 5)	6 points
**Replay activities	6 points
***End of course survey	6 points

Total points 600

* These are Extra Credit tasks and you will be awarded points based on completing the assessment/survey.

**Replay is a way for you to practice your mastery of the content and earn XPs for doing so. You earn XPs based on mastery, but also time-on-task. Students within the top 50% of XPs will be awarded the extra credit. More information on this will be provided in an announcement on Blackboard Learn.

*** End of course survey extra points will be awarded to the entire class if at least 80% of the class completes the survey. If less than 80% of the class completes the survey, these extra points will not be awarded.

The cutoff values for letter grades are as follows:

540 points	A
480 points	B
420 points	C
360 points	D
359 points and below	F

OBTAINING EXTRA HELP

Your TAs (Faeze, Chis and Kortany) will communicate with you via the discussion boards, and can be contacted via email if you have additional questions. Additional resources will be offered if needed prior to exams. Dr. Hart will be available to answer questions on the discussion boards or via email. **Please note: any content-related questions should be asked on the discussion boards.**

ACADEMIC MISCONDUCT

There will be a Zero-Tolerance policy for lack of personal integrity in this course. At a minimum, cheating will result in zero points for the assignment or exam in question. It's also possible that a student will fail the class as a result. It is always best to avoid the very appearance of cheating.

Academic misconduct of any kind will not be tolerated in any course offered by the Department of Biochemistry. Information on Purdue's policies with regard to academic misconduct can be found at http://www.purdue.edu/studentregulations/student_conduct/regulations.html

Any incidence of academic misconduct will result in two actions.

- **The incident will be reported to the Office of the Dean of Students. Academic misconduct may result in disciplinary sanctions including expulsion, suspension, probated suspension, disciplinary probation, and/or educational sanctions.**
- **Zero points will be assigned as the grade for the test or quiz for the first incident.**
- **Subsequent incidences will result in an automatic F for the course.**

Please note reported incidences of academic misconduct go on record for reference by other instructors. Further, a record of academic misconduct is likely to influence how current/future situations are handled.

To provide you with an unambiguous definition of academic misconduct, the following text has been excerpted from "Academic Integrity: A Guide for Students", written by Stephen Akers, Ph.D., Executive Associate Dean of Students (1995, Revised 1999, 2003), and published by the Office of the Dean of Students in cooperation with Purdue Student Government, Schleman Hall of Student Services, Room 207, 475 Stadium Mall Drive West Lafayette, IN 47907-2050.

"Purdue prohibits "dishonesty in connection with any University activity. Cheating, plagiarism, or knowingly furnishing false information to the University are examples of dishonesty." [Part 5, Section III-B-2-a, [Student Regulations](#)] Furthermore, the University Senate has stipulated that "the commitment of acts of cheating, lying, and deceit in any of their diverse forms (such as the use of substitutes for taking examinations, the use of illegal cribs, plagiarism, and copying during examinations) is dishonest and must not be tolerated. Moreover, knowingly to aid and abet, directly or indirectly, other parties in committing dishonest acts is in itself dishonest." [University Senate Document 72-18, December 15, 1972]

More specifically, the following are a few examples of academic dishonesty which have been discovered at Purdue University.

- substituting on an exam for another student
- substituting in a course for another student
- paying someone else to write a paper and submitting it as one's own work
- giving or receiving answers by use of signals during an exam
- copying with or without the other person's knowledge during an exam
- doing class assignments for someone else
- plagiarizing published material, class assignments, or lab reports
- turning in a paper that has been purchased from a commercial research firm or obtained from the internet
- padding items of a bibliography
- obtaining an unauthorized copy of a test in advance of its scheduled administration
- using unauthorized notes during an exam
- collaborating with other students on assignments when it is not allowed
- obtaining a test from the exam site, completing and submitting it later
- altering answers on a scored test and submitting it for a regrade
- accessing and altering grade records
- stealing class assignments from other students and submitting them as one's own
- fabricating data
- destroying or stealing the work of other students

Plagiarism is a special kind of academic dishonesty in which one person steals another person's ideas or words and falsely presents them as the plagiarist's own product. This is most likely to occur in the following ways:

- using the exact language of someone else without the use of quotation marks and without giving proper credit to the author
- presenting the sequence of ideas or arranging the material of someone else even though such is expressed in one's own words, without giving appropriate acknowledgment
- submitting a document written by someone else but representing it as one's own”

CLASS ATTENDANCE

In accordance with University policy, you are expected to attend every scheduled class. In an online class, this means you are responsible for ensuring you schedule adequate time for viewing and studying the course materials. For the official university policy, see:

www.purdue.edu/odos/services/classabsence.php and
http://www.purdue.edu/studentregulations/regulations_procedures/classes.html

EMERGENCY PREPAREDNESS

In the event of a major campus emergency, course requirements, deadlines and grading percentages are subject to changes that may be necessitated by a revised semester calendar or other circumstances. To get information about changes in this course consult the class Blackboard site or e-mail or phone the instructor.

ON-LINE COURSE EVALUATIONS

During the last week of the semester, you will be provided an opportunity to evaluate this course and your instructor(s). To this end, Purdue has transitioned to online course evaluations. On Monday of the eighth week of classes, you will receive an official email from evaluation administrators with a link to the online evaluation site. You will have one week to complete this evaluation. Your participation in this evaluation is an integral part of this course. Your feedback is vital to improving education at Purdue University. I strongly urge you to participate in the evaluation system.

NON-DISCRIMINATION POLICY STATEMENT

Purdue University's non-discrimination policy will be upheld in this classroom. Purdue University is committed to maintaining a community which recognizes and values the inherent worth and dignity of every person; fosters tolerance, sensitivity, understanding, and mutual respect among its members; and encourages each individual to strive to reach his or her own potential. In pursuit of its goal of academic excellence, the University seeks to develop and nurture diversity. The University believes that diversity among its many members strengthens the institution, stimulates creativity, promotes the exchange of ideas, and enriches campus life.

Purdue University views, evaluates, and treats all persons in any University related activity or circumstance in which they may be involved, solely as individuals on the basis of their own personal abilities, qualifications, and other relevant characteristics.

RECOMMENDED LECTURE SCHEDULE*

Week	Topic	Chapter	Notes
1	Introduction to Biochemistry	1	
	Aqueous Chemistry	2	
	From Genes to Proteins	3	Clinical Connection: Acid-Base Balance in Humans
2	Quiz 1 // Protein structure	4	Quiz 1
	Protein function	5	
	How Enzymes Work	6, 7	Clinical Connection: Protein Misfolding and Disease.
3	Enzyme kinetics and Inhibition// Carbohydrates	7 // 11	
	Quiz 2 // Lipids and membranes	8	Quiz 2
			Clinical Connection: The Lipid Vitamins A, D, E and K
4	Exam 1 // DNA Replication & Repair	20	Exam 1
	DNA Replication & Repair	20	
	Transcription & RNA	21	Clinical Connection: Discovery of the Cystic Fibrosis Gene
5	RNA and transcription // Protein Synthesis	21 //22	
	Quiz 3 // Protein Synthesis	22	Quiz 3
			Clinical Connection: Cancer is a Genetic Disease.
6	Exam 2 // Metabolism & Bioenergetics	12	Exam 2
	Bioenergetics	12	
	Glucose Metabolism	13	Clinical Connection: Alcohol Metabolism OR Glycogen Storage Diseases.
7	The Citric Acid Cycle	14	
	Quiz 4 // Oxidative Phosphorylation	15	Quiz 4
	Photosynthesis	16	
			Clinical Connection: Mutations in Citric Acid Cycle Enzymes.
8	Quiz 5 // Exam review, prep for final exam		Quiz 5
	FINAL EXAM		FINAL EXAM: Date to be confirmed. Will be scheduled for August 2 nd , 3 rd , or 4 th .

*Schedule is subject to change.