

SYLLABUS: COURSE # 11:115:301

INTRODUCTORY BIOCHEMISTRY

SPRING 2017 in-person class

Course Overview

Course Description

This is a one semester survey course of biochemistry and will focus on an introduction to proteins, nucleic acids, carbohydrates and the lipid family of biological molecules. In addition, we will discuss how a cell performs signaling and hence the regulation of metabolism of biomolecules in the body. In order to appreciate these, students will be taught the basic structure of these molecules and the biochemical reactions that allow them to form more advanced macromolecules in the organism. The overall goal is for students to understand that many of these reactions or metabolic pathways relate to each other in the organism.

Instructor

Instructor: Kyle Murphy, Ph.D.

Email address: Use the Sakai Forums tool for class related questions

Office hours: directly after each class in the hallway of Beck Hall and in Lipman Hall on (the room to be announced). Space is limited in Lipman Hall meetings, so please use the Sign-up tool on Sakai.

Course Delivery

This course uses Sakai as the learning management system to deliver most course content. To access the course, please visit sakai.rutgers.edu. For more information about course access, support or technological assistance with the Sakai site contact the Sakai Help Desk via email at sakai@rutgers.edu or call 848-445-8721 immediately upon having an issue. Do not contact your professor about technical issues about Sakai. You will also be using Modified Mastering Chemistry found at <https://www.pearsonmylabandmastering.com/northamerica/>

Prerequisites

- 01:160:209 or
- 01:160:307 or
- 01:160:315 or

- 21:160:335

Important Dates (see schedule below assignment deadlines)

The course begins on 01/17/2017 and ends on 05/01/2017. The last day to withdraw from the course without a W is 01/24/2017. The last day to add the course is 01/25/2017 and the last day to drop the course with a "W" grade is 03/20/2017. Please check the Rutgers registrar's office for details and official dates and times at (<http://nbregistrar.rutgers.edu/undergrad/s17ugcal.htm>) All class meeting are required and in class activities may be given at any time with no make-ups given for missed assignments or exams except by approval sent directly to me from a Dean of Students. The first assignment due date will be...02/03/2016. All graded events will have due dates and it is the responsibility of the student to ensure they are completed by the due date. You will be able to see the self-guided module quizzes and end of module quizzes in your test and quizzes. If something personal happens to you (a life altering event), please contact the Dean of Students immediately. This is your point of contact for life altering events (sickness, death(s), or other trauma inducing things). <http://deanofstudents.rutgers.edu/> They usually require documentation of these events, so please be prepared to provide it to them (doctor's note, police report, etc.)

Course Learning Objectives

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

- explain and apply core concepts of matter and energy transformation, including thermodynamic calculations, enzyme catalysis and the coupling of exergonic and endergonic reactions in biochemical systems.
- explain and examine core concepts of homeostasis, the organization of chemical processes, and the regulation of biological molecules in the cell.
- describe and analyze macromolecular structure and function, including the nature of biological macromolecules, their interaction with water, the relationship between structure and function, and mechanisms for regulating their function.
- explain and apply core concepts of biological information focusing on the manner in which information is encoded, transcribed and translated, and the mechanisms by which information is transmitted and maintained across generations.
- analyze and evaluate peer-reviewed literature in order to formulate hypotheses that will further biochemical research required for post-graduate exams and studies.

Course Materials

Required Subscription(s)

- A subscription to Modified Mastering Chemistry/Biochemistry from Pearson or Rutgers bookstore is required (other codes from sources other than this will not work with the class). Please see Rutgers bookstore or Pearson's online store directly for optional

purchase bundles. A subscription to Modified Mastering Chemistry. The textbook is on reserve at many of the Rutgers Libraries as well.

Highly Suggested Text(s)

- Biochemistry: Concepts and Connections Dean R. Appling, Spencer J. Anthony-Cahill and Christopher K. Mathews, offered in hardcover, 3 ring hole-punched or e-text text and can be purchased with or without Modified Mastering Chemistry. Please see the Rutgers bookstore or Pearson's store for a bundle package that includes the textbook material and a subscription to Mastering Chemistry/Biochemistry and then you don't need to buy the hard cover text on its own. Reading assignments will be provided out of this textbook. I also have one copy of this text on reserve at Alexander, Chang, Livingston and LSM libraries. If you have a problem with the code, please contact Pearson directly. There is nothing I can do about the code not working. Please log on under this website for our class. I will send out a join code shortly.
<https://www.pearsonmylabandmastering.com/northamerica/>
- Other potential useful references Biochemistry: The Molecular Basis of Life McKee and McKee **updated fifth edition**. I have this book on reserve at a couple of the Rutgers libraries if you would like to read a topic from another author's perspective.

Required Videos and/or Website Materials

- Sakai (<https://sakai.rutgers.edu/portal>)

Technology Requirements

Baseline technical skills necessary for this course

- Basic computer and web-browsing skills.
- Navigating Sakai.
- Using Pearson Mastering Chemistry/Biochemistry interface.
- Use of all the tools associated in our Sakai site for the course.
- Using the test and quizzes tool in Sakai.

Required Equipment

- Access to a computer: current Mac (OS X) or PC (Windows 7+) with high-speed internet connection that is reliable as internet connection issues are not excusable for missed assignments in the course.

Required Software

- None

Assessments and Scheduling

Course Schedule and Deadlines

Lesson	Chapter	Dates	Module 0 & 1: Introduction and Overview Topics, Readings, Assignments, and Deadlines
1	1	Jan 17	<ul style="list-style-type: none"> Introduction to Biochemistry
2	2	Jan 20	<ul style="list-style-type: none"> Water and weak interactions
3	3	Jan 24	<ul style="list-style-type: none"> Energy
			<ul style="list-style-type: none"> All Module 0 & 1 Assignments Due by Feb 3rd at 10AM (Only delayed due date)

Lesson	Chapter	Dates	Module 2: Proteins and Enzymes Topics, Readings, Assignments, and Deadlines
4	5	Jan 27	<ul style="list-style-type: none"> Primary level of protein structure
5	6	Jan 31	<ul style="list-style-type: none"> 3-D Structure of Proteins Read Chapter 6.6 (Prediction of Protein Secondary and Tertiary Structure)
6	8	Feb 03	<ul style="list-style-type: none"> Enzymes
**	<i>Assignment</i>	<i>Feb 07</i>	<ul style="list-style-type: none"> <i>Enzymology Peer-Reviewed Articles Assigned to Groups and Students Should Start Reading the Article (Nothing due on this date)</i>
7	8	Feb 07	<ul style="list-style-type: none"> Enzymes
			<ul style="list-style-type: none"> All Module 2 Assignments Due Feb 14th by 10AM

Lesson	Chapter	Dates	Module 3: Carbohydrates and Carbohydrate Metabolism Topics, Readings, Assignments, and Deadlines
8	9	Feb 10	<ul style="list-style-type: none"> Carbohydrates
**	<i>Assignment</i>	<i>Feb 07- Feb 14</i>	<ul style="list-style-type: none"> <i>Keep reading your enzymology paper and preparing your initial post.</i>
9	11	Feb 14	<ul style="list-style-type: none"> Metabolism & Carbohydrate Metabolism Oxidate It or Love It Extra Credit Video Offer
**	<i>Assignment</i>	<i>Feb 14</i>	<ul style="list-style-type: none"> <i>Opening Day for Initial Forum Posts of Peer-Reviewed Research Article Feb 14th. Initial submission due by 10AM on Feb 17th.</i>
10	12	Feb 17	<ul style="list-style-type: none"> Carbohydrate Metabolism
**	<i>Assignment</i>	<i>Feb 17</i>	<ul style="list-style-type: none"> <i>Deadline for Initial Forum Posts about Peer-Reviewed Research Article. Due by 10AM on Feb 17th</i>
**	<i>Assignment</i>	<i>Feb 21</i>	<ul style="list-style-type: none"> <i>Reply to someone's initial forum post due by 10AM on Feb 21st</i>
11	12	Feb 21	<ul style="list-style-type: none"> Carbohydrate Metabolism Read section 12.3 (Metabolic Fates of Pyruvate)
12	13	Feb 24	<ul style="list-style-type: none"> Citric Acid Cycle
13	14	Feb 28	<ul style="list-style-type: none"> Electron Transport and Oxidative Phosphorylation
			<ul style="list-style-type: none"> All Module 3 Assignments Due Mar 07th by 10AM

Mar 07

Exam 1 (Material from Modules 1, 2 & 3)

Lesson	Chapter	Dates	Module 4: Lipid and Nitrogen Metabolism Topics, Readings, Assignments, and Deadlines
15	10	Mar 03	<ul style="list-style-type: none"> Lipids and Membranes
16	16	Mar 10	<ul style="list-style-type: none"> Lipid Metabolism
17	18	Mar 21	<ul style="list-style-type: none"> Amino Acid and Nitrogen Metabolism Read Chapter 18.6 (Pathways of Amino Acid Degradation)
18	19	Mar 24	<ul style="list-style-type: none"> Nucleotide Metabolism
			<ul style="list-style-type: none"> All Module 4 Assignments Due Mar 31st by 10AM

Lesson	Chapter	Dates	Module 5: Integration of Metabolism and the Central Dogma Topics, Readings, Assignments, and Deadlines
19	17 & 20	Mar 28	<ul style="list-style-type: none"> Integration of Metabolism and Signal Transduction
20	4 & 22	Mar 31	<ul style="list-style-type: none"> DNA and DNA Replication
21	24	Apr 04	<ul style="list-style-type: none"> Transcription and Post-transcriptional Processing
**	<i>Assignment</i>	<i>Apr 07</i>	<ul style="list-style-type: none"> <i>Extra Credit Artistic Video Due Turned in to Allison Pohorence, Lipman Hall room 223B as an mp4 by 3PM (not by email).</i>
22	24	Apr 07	<ul style="list-style-type: none"> Transcription and Post-transcriptional Processing
		Apr 11	<ul style="list-style-type: none"> Translation and Post-Translational Protein Processing

23	25	Apr 14	<ul style="list-style-type: none"> • Translation and Post-Translational Protein Processing
24	26	Apr 18	<ul style="list-style-type: none"> • Regulation of Gene Expression
25		Apr 21	<ul style="list-style-type: none"> • Techniques and interpreting data
26		Apr 25	<ul style="list-style-type: none"> • Techniques and interpreting data
			<ul style="list-style-type: none"> • All Module 5 Assignments and module 4 & 5 extra credit by April 28th 10AM.

	Apr 28	<u>Exam 2</u> (Material from Module 4 & 5)
--	--------	---

Assignment Summary

Below are the required components of this course and the percentage of each component out of 100. Please refer to the course schedule (below) for specific due dates and in the assignment overview section for details regarding each assignment or extra credit option. There is no curve in the class, just extra credit offers.

Graded Assignments	Point
Exam 1	20
Exam 2	20
Initial Forum Posts of Peer-Reviewed Research Article	05
Reply to Someone's Initial Forum Post	05
End of Module Quizzes in Sakai (2pts per quiz)	20
Self-guided Learning Module Quizzes in Sakai (3pts per quiz)	10
Assignments in Mastering Chemistry	20
Total	100

Extra Credit Options	Value
Artistic Video Extra Credit	Max 5pts to Exam 1
Extra Credit Module 4 & 5 Mastering Chemistry Assignments	Max 5pts to Exam 2

Scores That Will Be Dropped
<ul style="list-style-type: none">• The Lowest Assignment in Mastering Chemistry Will Be Dropped
<ul style="list-style-type: none">• The Lowest Self-Guided Learning Module Quiz in Sakai Will Be Dropped
<ul style="list-style-type: none">• The Lowest End of Module Quiz Will Be Dropped

Assignment Overviews

Exam 1 (20pts)

- This exam will contain a total of 43 multiple-choice questions. The exam will be broken into two parts, each having multiple-choice answers. **Part 1** will consist of 35 questions worth 2 points each and should not require much work (math, graphing, extrapolation, etc.) to get the answer. **Part 2** will have 8 questions worth 3.75 points each and will involve you performing tasks. Both parts will have multiple choice answer selections. You will be given 1 hour and 20 minutes to complete the exam.

Exam 2 (20pts)

- This exam will contain a total of 43 multiple-choice questions. The exam will be broken into two parts, each having multiple-choice answers. **Part 1** will consist of 35 questions worth 2 points each and should not require much work (math, graphing, extrapolations, etc.) to get the answer. **Part 2** will have 8 questions worth 3.75 points each and will involve you performing tasks. Both parts will have multiple-choice answer selections. You will be given 1 hour and 20 minutes to complete the exam.

Forum Posts about Peer-Reviewed Research Article (10pts total (5 points each))

- Students will be broken down into groups and asked to read a peer-reviewed research article assigned to your specific group by the due date on the course schedule. After reading the paper, each student will start their own new discussion under the Forum tool on the left-hand tool bar of Sakai and make one original comment either agreeing or disagreeing with one of the figures in the paper. The student must back up their statement with a reference from their text or another peer-reviewed article. There will be a deadline for your original posts and then we will begin replying to original posts within the group. After the closing date of the original posts, each student is to choose one original post from their group that doesn't have a reply and post a reply to it. The reply is also in the form of either agreeing or disagreeing with the student's opinion in their original post. The same rule for citing your source applies to replies to other student's contributions. The citation should be entered as the last paragraph of the forum post it is contained within (both original post and reply to someone else's original post). Failure to do so will result in a loss of points. There will be an opening and closing date for each the original post and the reply. Because of the nature of this assignment extensions will not be given.

End of Module Quizzes in Sakai (20pts)

- There will be a quiz at the end of each module and a link to this quiz will be found in the final lesson page of each module. You can locate these lesson by clicking on the Course Content tool in Sakai, then the proper module and finally the lesson you would like to be in. You are responsible for keeping up with the due dates for these quizzes. There will be a due date for these quizzes and extensions will not be given. There will be a time limit put on these quizzes.

Self-guided Learning Module Quizzes in Sakai (10pts)

- There is a Self-Guided Learning Module located in each module of the Course Content tool of Sakai. They are lesson specific and located within the lesson they pertain to. You should watch the self-guided portion first for practice and perform the free practice quiz located within the self-guided learning module before trying the Sakai quiz located after it. Once you have viewed the self-guided learning module you should proceed to take the Sakai quiz by following the link provided right below it on the lesson page. You will have unlimited attempts on these quizzes. Your quiz grade should appear in gradebook upon completion of the quiz. You can review your incorrect answers in office hours only. There will be a due date for these assignments and extensions will not be given.

Assignments in Mastering Chemistry (20pts)

- The Assignment in Mastering Chemistry will be found under the Mastering Chemistry Course Home tool located on the left-hand tool bar of your Sakai page. You are responsible to check this tab for due dates and assignments throughout the term. Late submissions will not be accepted. These grades will only be shown in the Mastering Chemistry gradebook and will be manually input into the Sakai gradebook at the end of the term. You will have to check the Mastering Chemistry gradebook to see how you are doing on this section. There will be a due date for these assignments and extensions will not be given. Although Mastering may give you extra credit over 100%, the maximum grade given will be a 100%.

At Home Reading Assignments from the Textbook (0pts)

- Chapter or section reading assignments will be given during class or listed in the lesson they are intended for on Sakai. Material from these readings may be located on any assessments for the class.

Artistic Video That Teaches a Complete Lesson in Biochemistry (extra credit to Exam 1)

- No more than 5 people per group and 4 must appear in the video. You can do the video alone if you'd like.
- The video must use a form of art to teach biochemistry
- Will be graded on a rubric divided evenly between 3 criteria: lesson clarity, entertainment, and audio/visual quality for a total of 5 points to be added onto your exam 1 grade. The possible points earned are 0-5 pts.

Mastering Chemistry Extra Credit Assignment for Exam 2 (extra credit to Exam 2)

- There will be an extra credit assignment offered consisting of two parts, one for Module 4 and one for Module 5. The completion of scores from both module assignments

combined can give you a grand total of five points of extra credit towards your exam 2 grade. These questions will be graded and if you get them wrong you will not receive maximal points. You will be credited some points for whatever you finish and get correct, it is not an all or nothing grading. If you partially complete this assignment, Mastering Chemistry will still provide me data to give you some points. Possible points earned are 0-5pts.

Grading Scale

(Source: Rutgers standard undergraduate grade scale)

Grade	Range
A	90 – 100
B+	85 – 89
B	80 – 84
C+	75 – 79
C	70 – 74
D	60 – 69
F	Below 60

Student Participation Expectations

There is no grade given for attendance, but attendance and class participation is encouraged. The following is a summary of everyone's expected participation:

- **Logging in to Sakai and/or Mastering Chemistry:**
Be sure you are logging in to the course in Sakai daily, including weeks with holidays or weeks with minimal online course activity. (During most weeks you will probably log in many times.) I will be posting communications via the announcement tool and offering office hours through the Sign-up tool. If nobody signs up by the deadline, there will be no office hours on that day as I will plan to use the time for something else.
- **Time Commitment**
To be successful in this course, you should plan to dedicate approximately 3hrs outside the class per credit of the class (9hrs for this class). This varies on a per student basis and is no guarantee of success. Study as much as you have to until you know your material (without the use of your notes).
- **Office hours**
If you miss a class session you will not be eligible for any extra credit offered during that session. My office hours will be posted on under the Sign-Up tool and you will need to sign up for them in advance. Please do not just show up without scheduling an appointment on the Sign-Up tool. Also be sure to cancel if you are not going to make it by canceling your appointment. Seats will be limited and so will the time frame I'm available for.
- **Participating in discussion forums**
You will need to post your comments and contributions about the peer-reviewed paper to the "Forums" tool during the semester. Please see the instructions in the discussion forums for and the description of the assignment entitled, "Forum Posts about Peer-Reviewed Research Article (10pts)" located above. A rubric will be released when the assignment nears.

Discussion and Communication Guidelines

The following are my expectations for how we should communicate as a class. Above all, please remember to be respectful and thoughtful.

- **Writing style:** While there is no need to participate in class discussions as if you were writing a research paper, you should remember to write using good grammar, spelling, and punctuation. Informality (including an occasional emoticon) is fine for non-academic topics. Please also refrain from using all CAPITAL LETTERS, as this is often interpreted as shouting.
- **Tone and civility:** Let's maintain a supportive learning community where everyone feels safe and where people can disagree amicably. Remember that sarcasm doesn't always come across online. Treat your instructor and fellow students with respect at all times, and in all communications.
- **Citing your sources:** When we have academic discussions, please cite your sources to back up what you say. (For the textbook or other course materials, list at least the title and page numbers. For online sources, include a link.)
- **Backing up your work:** I would like each student to compose their academic posts in a word processor, where you can save your work, and then copying into the Sakai discussion. Please keep a copy of this for your records in case it is required later.

Support and Policies

Late Work and Make-up Exams

Any excuse for missed work, must be documented and presented to a Rutgers Dean of Students for approval and the Dean of Students must contact me via email (kamurphy@rci.rutgers.edu) prior to the possibility of an extension. You do not have to contact me regarding personal matters. <http://deanofstudents.rutgers.edu/>

Faculty Feedback and Response Time

Please email sakai@rutgers.edu or call the help desk at 848-445-8721 if you have a technical problem with Sakai. If there is a technical problem with Mastering Chemistry, please consult the help feature. If you have a technical problem with Top Hat, please consult their website for customer service help.

Grading and Feedback

You can generally expect feedback within **7 days** after an assignment is collected. **Although the discussion forums will take longer to grade.**

E-mail

I prefer to use the Forums tool in Sakai as I find email unreliable and cumbersome. Please refrain from using email as a way to reach me. I would advise seeing me after class in the hallway should you have a question and we will try to efficiently deal with easy to answer questions after each class. In addition to meeting the class twice a week after class, I will also hold a weekly office hour at which I will entertain questions that require problem solving (see above for times). The learning assistants for the class will also be holding weekly study groups to help students who can't make it after class or during my scheduled office hours. As a last and not as good of an option, you can post your question under the appropriate Forum (module 1, module 2, etc.) and I will respond the best I can within that week. You may want to see if someone else has already asked the same question before you post so that you can get your answer as quick as possible. If the answer involves a lot of explanation, I would ask that you come to my office hours or see me after class.

Academic Integrity

The consequences of scholastic dishonesty are very serious. Please review the [Rutgers' academic integrity policy](#).

Academic integrity means, among other things:

- Develop and write all of your own assignments.
- Show in detail where the materials you use in your papers come from. Create citations whether you are paraphrasing authors or quoting them directly. Be sure always to show source and page number within the assignment and include a bibliography in the back.
- Do not fabricate information or citations in your work.
- Do not facilitate academic dishonesty for another student by allowing your own work to be submitted by others.



If you are in doubt about any issue related to plagiarism or scholastic dishonesty, please discuss it with your instructor.

Other sources of information to which you can refer include:


- [Rutgers' Academic Integrity website](#)
- [Code of Student Conduct](#)
- [Eight Cardinal Rules of Academic Integrity](#)

Academic Support Services

- Rutgers has a variety of resources for academic support. For more information, check the [Academic Support website](#).
- Rutgers has Learning Centers on each campus where any student can obtain tutoring and other help. For information, check the [Learning Center website](#).

- Rutgers also has a Writing Center where students can obtain help with writing skills and assignments. Learn more at the [Writing Center website](#) .
- Many library resources are available online. Assistance is available through phone, email, and chat. For information, check the [Rutgers Libraries website](#) .


Rutgers Health Services

- Rutgers Health Services is dedicated to health for the whole student body, mind and spirit. It accomplishes this through a staff of qualified clinicians and support staff, and delivers services at a number of locations throughout the New Brunswick-Piscataway area. For more information, check the [Rutgers Health Services website](#) .

Accommodations for Accessibility

Requesting accommodations

If you would like to request academic accommodations based on the impact of a disability qualified under the Americans with Disabilities Act and Section 504 of the Rehabilitation Act of 1973, contact your instructor privately as soon as possible to discuss your specific needs. Discussions are confidential.

In addition to contacting the instructor, please contact the [Office for Disability Services](#)  to register for services and/or to coordinate any accommodations you might need in your courses at Rutgers.

Go to the [Student section of the Office of Disability Services](#)  website for more information.