SYLLABUS
CHEM-406 Biochemistry II

Dr. Jeff Osborne

COURSE OBJECTIVE

This course aims to familiarize you with the fundamentals of the structure, function, and interaction of nucleic acids; important aspects of molecular physiology; and metabolic pathways in order to prepare you for further professional study.

OFFICE HOURS

My office is room 313 Science Center. Office hours are posted outside my office and I will be regularly available at other times, as well, if I am not busy. My email is jposborne@manchester.edu. I will try to respond to your questions and course related difficulties within 24 hours, either by email or by addressing them in class.

TEACHING METHODS

Class sessions will be mostly lecture with some case studies worked on in small groups. Also, an out of class project will involve a metabolic pathway. I believe that a variety of teaching methods that encourage you to learn actively, cooperate with peers, and think independently will best achieve the objectives described above.

EXPECTATIONS OF STUDENTS

The content of the course will be presented during the lecture time and you will be responsible for everything that is presented during that time, unless it is explicitly excluded. The textbook is a resource, but does not determine nor contain the full content of the course. Readings are expected to be completed prior to the lecture for which they are assigned. Activities will often require something to be completed and turned in on a 3×5 index card during class. Each class meeting will be important and will build on knowledge learned in previous meetings. You are expected to master specific skills for each exam. Missed quizzes, group presentations, labs, or tests cannot be made up except under very special, documented conditions described below in Course Policies.

WHAT STUDENTS CAN EXPECT FROM THE TEACHER

I will create opportunities for your learning in a number of ways and then provide constructive criticism in a welcoming and respectful environment. I bring enthusiasm and expertise in the subject area, yet require you to understand and wrestle with the ideas presented so that you are able to arrive ultimately at your own conclusions. I welcome ideas and suggestions, with the goal of improving the course. Toward this end, your feedback will be requested a number of times during the course. I strive to practice what I preach as a scientist who is continually learning.

CLASS WEBSITE

The class web site on Canvas will be updated frequently, and will include your daily readings and exercises to be completed outside of class.

REQUIRED MATERIALS

You will need Biochemistry, 8th edition, by Berg, Tymoczko, Gatto, and Stryer (2015). ISBN: 1464126100. Biochemistry is changing much more rapidly than other parts of chemistry, so a current textbook is essential.

3×5 index cards will be required for daily quizzes or short writings. **Bring 3×5 index cards, as answers will only be accepted on 3×5 index cards.** Note that 3×5 index cards are *free* outside Room 209 in the Success Center in the Student Union.

COURSE POLICIES:

Class Participation. All students are expected to participate in class exercises. I can help you learn, but the responsibility is yours.

Makeup Tests. Makeup tests and quizzes will only be given for students who missed them due to verifiable illness, religious holiday, serious family emergency, jury duty or court subpoena. Missing an exam or quiz without an excuse from the college nurse, a doctor, or Student Development is not permitted.

Academic Dishonesty. Cheating and plagiarism in the form of taking credit for someone else's work, thoughts, or conclusions without giving that individual proper credit will not be tolerated. Some other examples of cheating include using notes or looking at a classmate's paper during a quiz or exam, copying portions of someone else's work in your enzyme paper, or using the published ideas of another person without assigning credit to them by using a reference. For more specific information concerning the consequences of cheating and plagiarism, read the college catalog on "Plagiarism" and "Academic Dishonesty." Also, the "Academic Dishonesty and Grievance" document on Canvas has more details.

Diversity. To maintain a welcoming and respectful classroom environment, disrespect of other students, in the form of verbal or written threats, attacks, or insults on the basis of gender, race, physical disability, physical stature, culture, socio-economic class, creed, sexual preference, mental disability or any form of social group membership will not be tolerated.

Student Disability and Reasonable Accommodation Statement. Manchester University, in compliance with federal guidelines, is committed to assuring students with disabilities equal access to programs and activities that are provided to students without disabilities.

Any student who feels she or he may need an accommodation based on the impact of a disability should contact Audrey Hampshire, the Director of Academic Support and Disability Services, to establish eligibility and to coordinate reasonable accommodations. It is the student's responsibility to self-disclose the disability. Students whose accommodation requests are approved will be provided with confidential letters to deliver to their professors which verify the nature of the student's disability and document the need for auxiliary aids and services and/or academic adjustments/accommodations. Students are encouraged to meet with each professor early in the semester to discuss the academic implications of the disability as they relate to the specific course and to request appropriate accommodations. The Disability Support Services Office is located in the Success Center (second floor of the Switzer Center). Students may call (260) 982-5036 or (260) 982-5888 to schedule an appointment.

Medical Emergency Evacuation Schedule. Students should speak to the instructor immediately if (1) they may require medical attention during class, or (2) they have a disability, chronic condition, or a temporary injury that may limit or affect their ability to evacuate the classroom/building in an emergency. The student and the instructor should discuss the student's specific needs and the types of precautions that should be made in advance of such an event. In the event of a fire or other situation requiring emergency evacuation, students with ambulatory disabilities are to go with or without assistance to the nearest stairwell area. Faculty and staff will assist with evacuation management efforts until such time as the Campus Safety and/or Police and Fire Departments arrive on the scene to assist in student evacuation from the building. Elevators are not to be used for evacuation by any persons.

Students who need special arrangements in the event of an evacuation should also register with Audrey Hampshire as early as possible in the semester to help facilitate the provision of needed emergency assistance.

Diversity. Disrespect of other students in the form of verbal or written threats, attacks, or insults on the basis of gender, race, physical disability, physical stature, culture, socio-economic class, creed, sexual preference, mental disability or any form of social group membership will not be tolerated.

Title IX reporting requirements. While students should feel comfortable approaching the professor with issues they may be struggling with or concerns they may be having, students should be aware

that faculty members have some reporting requirements that are part of their job duties at Manchester University.

For example, if a student informs a faculty member of an issue of sexual harassment, sexual assault, or discrimination, the faculty member will keep the information as private as possible, but the faculty member is required to bring it to the attention of the institution's Title IX Coordinator (x. 5052 ajmachielson@manchester.edu) or the Human Resources office (ext. 5038). Additionally, students can report incidents or complaints to Campus Safety (ext. 5999 or in Fort Wayne: 260-266-1800). Students can also obtain support from the University Counseling Services (260-982-5306).

Finally, students should know that if, for some reason, the interaction between a student and faculty member involves a disruptive behavior or potential violation of policy, the faculty member will inform the appropriate student experience staff, even when the student and faculty member may have reached an informal resolution to the incident. The purpose of this is to keep University leaders apprised of any behaviors and what was done to resolve them.

Campus resources.

Health Services 260-982-5306 http://www.manchester.edu/OSD/Health/Index.htm
Counseling Center 260-982-5306 http://www.manchester.edu/OSD/Counseling/Index.htm
Safety NM: 260-982-5999; FW: 260-266-1800 http://www.manchester.edu/OSD/Security/index.shtml

SENIORITIS

For some of you this will be your last term of study at Manchester. Even though there are important life decisions made during this term, do not lose your focus. Employers and graduate and professional schools may withdraw their offers if your performance slips below their expectations. This semester is not the time to ease up.

Grading Scale

A	**4.0**	**93%**
A-	**3.7**	**90%**
B+	**3.3**	**87%**
B	**3.0**	**83%**
B-	**2.7**	**80%**
C+	**2.3**	**77%**
C	**2.0**	**73%**
C-	**1.7**	**70%**
D+	**1.3**	**67%**
D	**1.0**	**63%**
D-	**0.7**	**60%**

GRADING

Grades are based on results, not effort. My grading philosophy is that using a variety of methods to evaluate your progress is more beneficial than over-reliance on a few large exams. Additionally, spreading out tests and assignments over the semester encourages you to keep up with the course material and provides many opportunities to succeed in this class. To encourage cooperation in learning, grading will not be calculated on a standard curve. Grades will be determined by the percentage of total possible points earned, as shown in the box to the right. Below is an estimate of the final point total. Additional assignments may be given that would alter it, but the percent of total point scale for each letter grade is **absolute.**

Tentative Point Distribution:

Exams 4	4 @ 100 pt each	400
Biodegradation Pathway Project		100
Biodegradation Pathway Project Peer Reviews		10
Problems	140 @ 1 pt each	140
Activities	4 @ 8 pt each	32
ACS Standardized Full Year Exam		100
TOTAL		**772**

HOMEWORK PROBLEMS

Each day's problems will be due at the beginning of the next class period, and each question will be worth one point. Each question must be answered thoroughly and correctly in order to gain the full points. There will be a substantial penalty for late or incomplete problem sets.

BIODEGRADATION PATHWAY PROJECT

Interspecies transfer of DNA segments and DNA point mutations are the primary means by which degradation pathways are formed in nature. The biodegradation pathway project will involve finding in the literature and then presenting a pathway through which a compound can enter intermediary metabolism. Depending on the quality of the work, this pathway will be published on the EAWAG Biocatalysis/Biodegradation Database (**EAWAG-BBD; http://eawag-bbd.ethz.ch/**). The EAWAG-BBD contains information on microbial biocatalytic reactions and biodegradation pathways for primarily xenobiotic, chemical compounds. This database is a valuable, publicly-available resource provided to the scientific community and you would be adding to its worth.

READINGS

The textbook is a resource, but does not determine nor contain the full content of the course. Readings are expected to be completed prior to the lecture for which they are assigned. In addition, various, essays, stories and poems will be assigned throughout the semester. The purpose of the assignments is to stimulate your thinking about biochemistry from points of view that you perhaps do not normally assume. They are intended to work towards the goal of being a "Well-Read Biochemist."

Class	Date	Topic	Reading	Other
1	1 Feb	Genetics	Voet and Voet (part 4 Genetics, stopping before part D Bacterial Genetics) reading on Canvas	
2	3 Feb	DNA Packing	32.1	
3	6 Feb	Nanotechnology	none	
4	8 Feb	DNA Sequencing	1.4, 5.1, 5.3	
5	10 Feb	Genomics	5.2-5.3	
6	13 Feb	DNA Mutations	28.4	
7	15 Feb	DNA Rearrangement	28.5	
8	17 Feb	DNA Rearrangement		
9	20 Feb			**Exam 1**
	22 Feb	*Discussion Day* (no class)		
10	24 Feb	Prokaryotic Gene Expression	Chapter 31	
11	27 Feb	Eukaryotic Gene Expression	Chapter 32	
12	1 Mar	Protein Targeting	30.6	*Biodegradation Project 1 Due*
13	3 Mar	DNA Manipulation 1	5.1-5.2	
14	6 Mar	DNA Manipulation 2	5.4	
15	8 Mar	Fatty Acid Biosynthesis	22.4-22.6	
16	10 Mar	Steroids	Chapter 26	
17	13 Mar	Molecular Motors	9.4, 35	
18	15 Mar	Glycogen and Carbohydrate Metabolism	11.2-11.3, 21.1-21.5	
19	17 Mar			**Exam 2**
	20 Mar	*Spring Break*		
	22 Mar	*Spring Break*		
	24 Mar	*Spring Break*		
20	27 Mar	Glycogen and Carbohydrate Metabolism		
21	29 Mar	Pentose Phosphate Pathway	20.3-20.5	*Biodegrad.Project 2abcdefg Due*
22	31 Mar	Photosynthesis Light Reaction	19.1-19.6	
23	3 Apr	Photosynthesis Light Reaction		

24	5 Apr	Photosynthesis Dark Reaction	20.1-20.2	
25	7 Apr	Photosynthesis Dark Reaction		
26	10 Apr	Photosynthesis Dark Reaction		
27	12 Apr			**Exam 3**
	14 Apr	*Good Friday* (no class)		
28	17 Apr	Nitrogen Uptake and Amino Acid Biosynthesis	Chapter 24	
29	19 Apr	Nitrogen Uptake and Amino Acid Biosynthesis		
30	21 Apr	Nucleotide Biosynthesis	Chapter 25	
31	23 Apr	Nucleotide Biosynthesis		
32	26 Apr	Amino Acid Catabolism	Chapter 23	
33	28 Apr	Nucleotide Catabolism	25.5	*Biodegradation Project 2hi Due*
34	1 May	Immunoglobulin Structure	Chapter 34 Intro- 34.3	
35	3 May	Immunoglobulin Structure and Diversity	3.2, 34 Intro-34.3	*Biodegradation Peer Reviews Due*
36	5 May	Major Histocompatibility Complex and Immune System	34.4-34.5	
37	8 May	Case Study		
38	10 May	Case Study		
39	12 May			**Exam 4**
40	15 May	*Reading Day* (no class)		*Final Biodegrad. Project Due*
	16-19 May			**Final Exams**