

**Proposed Syllabus (v.2)****Instructor:**

Dr. Hartmut Doebel

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office: Lisner Hall 341

office hours: Tuesday 11:30 to 1:00  
Wednesday 10:00 to 11:30

bio chats: various days and times (TBA)

**Course Description:**

This 4-credit course contains both, lecture/class and laboratory and is aimed at science majors. During lecture/class we will cover three main units: (1) small organic molecules form macromolecules and cellular structures; (2) cells obtain energy and building materials; (3) genetic information in DNA is used to synthesize macromolecules and cell structures.

**General Learning Goals and Objectives:**

On a more general level, students will be able to

- learn all steps and processes required to reason scientifically to develop analytical approaches.
- distinguish between causation and correlation.
- work with a team to solve problems and analyze concepts.
- communicate their understanding of biological systems in speaking and writing.
- use basic lab techniques to design, execute, and computationally analyze experiments.

With regards to the specific course material, students will be able to

- describe the chemical and physical basis of life.
- know the features of protein structure, molecular recognition, and catalysis.
- apply knowledge of biomolecules and cell organization to bio-energy conversions.
- understand the structure and replication of DNA molecules
- articulate knowledge of RNA transcription and processing
- explain the principles of protein translation
- interrelate cellular organization and processes of metabolism, gene regulation, and cell signaling.
- analyze the molecular basis for genetic inheritance.

## Course Structure and Assessment

Time and resources allowing, I will make every effort to make use of modern education research on how people learn best, allowing for several studio-style problem-solving activities and creating a dialogue between instructor and students by reducing lecturing during those activities. To make this an efficient and exciting experience, I may be assisted by several trained learning assistants, advanced undergraduate students who have enrolled in a graduate level pedagogy course. Together we will work on questions, problems, data interpretation and be practicing the articulation of our answers and solutions. Details will be forthcoming during our first class meetings. Reading assignments, frequent in-class quizzes, and Mastering Biology tutorials will enhance the activities planned for lecture/class and allow for frequent feedback.

### Pre-Class Preparation:

- guiding questions to help with study material (here, I will start you off, and then expect you to take over more and more)
- assigned readings (text and other)
- MyLab/Mastering Biology assignments (will talk about this in class)

### Interactive Lectures:

- lecture slides with specific learning outcomes
- questions for short, focused discussions
- journaling/writing exercises
- clicker questions (correct answers will receive points)
- end-of-class worksheets (usually once a week); worksheets will be started in class and turned and finished outside of class
- end-of-class quizzes (usually once a week) with an individual as well as a team component (quizzes will be graded)
- all electronics must be shut off; use of laptops/tablets/smart phones is not allowed

### Post-Class Work:

- answers to worksheets and quizzes will be discussed during biochats (and in class – if time allows).
- interactive biochat sessions will review covered material (voluntary for students, but highly recommended)
- office hours

### Required Textbooks and Materials:

1. The required lecture text is Campbell Biology, 9th edition, by Reece et al., 2014, Pearson/Benjamin Cummings **with My Lab/Mastering - New Design (an on-line tutorial), 10th edition**. My Lab/Mastering - New Design and the e-text are included with the book sold in the GW Bookstore; it can also be purchased separately from the book, with or without the e-text, from the GW Bookstore or from BlackBoard ("Pearson MyLab/Mastering" icon under "Tools"). You must have My Lab/Mastering "New Design" (or MasteringBiology "New Design") and **not MasteringBiology**.
2. Also required for the course is the **i>clicker student response system. A more recent model, i>clicker+, can also be used, and one or both of these models** are available for purchase at the GW Bookstore. Other i>clicker models do work, but are more expensive. However, you may need the i>clicker2 for another class (it will work for my class) – so, inquire before you make your purchase. If you have a used i>clicker, be sure to replace all **3** batteries.
3. Last but not least, you need to bring a **quad-ruled composition book** to each lecture/class. This is in addition to the composition book required for lab.

**You must register your i>clicker and My Lab/Mastering no later than Sept. 3 by selecting this course in BlackBoard (blackboard.gwu.edu).** Select "**Tools**". To register your i>clicker, select the icon "**Register your i>clicker remote ID**", and for My Lab/Mastering select the icon "**Pearson's My Lab/Mastering**", and follow the instructions. After you have registered for My Lab/Mastering, you can obtain all of your Mastering assignments by selecting the "**Pearson's MyLab/Mastering**" icon under "**Tools**" and then select "**Mastering Assignments**".

To receive any credit, you must register your i>clicker and My Lab/Mastering through BlackBoard and **not** through the i>clicker and Pearson web sites. If you have registered through either of these web sites, be sure to re-register through BlackBoard.

### Announcements:

Important announcements will be made during lecture/class and/or on BB, including the timing of exams and homework. You are responsible for finding out about assignments, dates and deadlines. Do not necessarily expect and definitely, do not rely on getting e-mails about announcements or on me responding to such e-mails. Thus, make sure you do not miss any announcements.

### Security and Emergency Procedure:

In case of an emergency the class should shelter in place until further instructions. If the building for the lecture hall is affected, follow the evacuation procedures for the building and seek shelter at a predetermined rendezvous location.

**Attendance Policy:**

**Active presence at all lectures is required.** You have to come prepared to each lecture:

- study the reading assignments in your text book
- be prepared to answer clicker questions by having your i-Clicker registered and by bringing it to each lecture (often points will be awarded)
- be prepared to participate in group activities during lectures (points may be awarded)
- be prepared to take a short quiz; these quizzes will be announced (points may be awarded)

**Absences:**

I understand that it will happen that you may have to miss a lecture or lab for a variety of reasons. If you miss a lecture or two, I am not so worried about it, as you should be able to catch up quickly. It may be helpful for you to look over my grading policy at the end of this syllabus.

If you have to suffer through an extended absence have your advisor/your college send me a written excuse, and I will deal with these extreme situations on an individual basis to find a fair solution. The note has to state that this was an emergency and that you were incapable of attending classes for a while. In case of illness, the note must state that rest is required (warning: a mere doctor's visit is not a reason for excuse). If an emergency family affair prevented you from attending a lecture, your school (e.g. CCAS) needs to send me a written note confirming that you had to deal with an emergency family affair.

If you plan to be absent to observe religious holidays, you must submit a written request within the first two weeks of classes.

Please, consider the following before you decide to miss an exam: the granting and timing for makeup exams are solely at my discretion and will require flexibility on your part.

## Course Support, Expectations and Hints for Success:

You are encouraged to make use of my office hours. I am here to help and to assist. As a matter of fact I discourage you from e-mailing me with a "quick question" about the course material; I prefer to speak to you in person. E-mails about administrative procedures and anything you can find in this syllabus will not be answered.

On occasion, some of my former GTAs are willing to offer their tutoring services to you. Upon request, I will post their names and contact info on BB as they become available. Occasionally, a free tutoring service is available through the GW housing program. Inquire by e-mailing a note to [gwtutoring@gmail.com](mailto:gwtutoring@gmail.com).

1. **Presence** at all lectures **is required**.
2. Have a reliable **note-taking buddy**, if you absolutely must miss a lecture.
3. Come **prepared** to all lectures, having read the corresponding assignments.
4. **Review AND rewrite** your notes after each lecture ("looking over" your notes will not accomplish much, unless you are the rare exception who can learn by osmosis).
5. The excitement of studying biology is often short-lived, if you do not keep up with the vocabulary, i.e. the many new words you will have to learn. Although it may seem, at times, that I will bombard you with endless streams of new terms, there is no alternative to learning the "language of biology". Once you know the words, you will be able to apply them, by thinking through biological processes more swiftly, by asking better questions, etc. So, please, **do not be afraid of the terminology**.
6. After each lecture, imagine being the professor yourself and **write down possible exam questions** from a professor's point of view; think of some easy and some more-difficult-to-answer questions. Study those questions and know the answers. You will be surprised about the relative ease you will feel when going into your exams, IF you know already many of the questions. As a matter of fact, none of the exam questions will be a surprise to you. I am not here to trick you. I want to make you think, and I will try to help you as much as I can.
7. **Ask questions!** Your teaching assistants as well as I will be available for help.
8. Make use of my **office hours**.
9. **Respect** yourself and others.
10. Do **not cheat, plagiarize, or otherwise mislead** your professor and teaching assistants about the work you do, including exams and quizzes as well as use of i-Clickers. Unless explicitly stated, all work has to be done solely on your own merits and without any outside help. Severe sanctions may be taken against any misconduct, which includes students allowing others to cheat. Please, carefully read the 'Code of Academic Integrity' ([www.gwu.edu/~ntegrity/code.html](http://www.gwu.edu/~ntegrity/code.html)).
11. Any student who feels s/he may need an accommodation based on the impact of a disability should contact us privately to discuss specific needs. Please contact the **Disability Support Services** office at 202.994.8250 in the Academic Center, to establish eligibility and to coordinate reasonable accommodations. For additional information please refer to <http://gwired.gwu.edu/dss/>.

## Grading Policy:

### Lecture Part:

Exam I:	70 course pts.
Exam II:	70 course pts.
Exam III:	90 course pts.
Activity Points (mostly quizzes, but may include other assignments, like journals, worksheets, etc.)	<u>70 course pts.</u>
Lecture Total Points:	300 course pts.
Bonus Points:	TBA

Surveys, evaluations, and similar: 2 course points each (upon successful completion)

### Lab Part:

For details, see your lab syllabus 200 course pts.

### Lecture and Lab:

500 course pts.

### Grading Scale:

A:	> 93%	C	73.0-76.9%
A-:	90.0-93.0%	C-:	70.0-72.9%
B+:	87.0-89.9%	D+:	67.0-69.9%
B:	83.0-86.9%	D:	63.0-66.9%
B-:	80.0-82.9%	D-:	60.0-62.9%
C+:	77.0-79.9%	F:	< 60%

### Notes:

- Blackboard scores are not legally binding scores because they are prone to errors. Please, keep track of your own totals. Any errors you discover, you must report to me within 7 days after the initial posting of a score. So, **check your gradebook on blackboard frequently.**
- I do not grade on a curve.

**LECTURE SCHEDULE.**

WE WILL COVER 3 UNITS, THE FIRST ONE OF WHICH I HAVE INCLUDED IN THIS SYLLABUS. I WILL MAKE THE OTHER 2 UNITS AVAILABLE IN DUE TIME.

**UNIT 1: Small organic molecules form biomolecules and cellular structure**

Wk	Lect #	Date	Lecture/Class Topic	Campbell Chapter Readings	Lab Topic
1	1	Aug 26	Introduction: all you possibly would want to know about water.	3.1-2	Introduction (Pipetting)
	2	28	Elements of life: from atoms to molecules	2.1-3	
2		Sept 2	To dissolve or not to dissolve. Biomolecules: sugars and lipids	3.2-3; 4.2 5.2-3	no lab meetings, but: museum assignment
	3	4	Biomolecules: proteins	5.4	
3	4	9	Biomolecules: proteins cont.; form and function	5.4; 2.3; 5.4	Analysis of Proteins
	5	11	Biomolecules: form and function cont.	2.3; 5.4	
4	6	16	From chemistry to life.	4.1 6.2-4	ELISA
	7	18	Life of a cell.	6.4-5	
5	8	23	Energy Considerations	8.1-2; 8.4	Biological Transport
	9	25	Energy Considerations cont.		
6	10	30	EXAM 1		
	11	Oct 2	Unit 2 starts		

**LECTURE SCHEDULE.**

**UNIT 2: Genes, Genetics, and Gene Regulation**

Wk	Lect #	Date	Lecture/Class Topic	Campbell Chapter Readings	Lab Topic
6	11		Exam 1 (finishing unit 1)		Enzyme Kinetics
	12	<b>Oct 2</b>	Exam 1 Review	n/a	
7	13	7	DNA and cell cycle	5.5; 12.1-2; 16.1-2	Midterm and Mitosis Lab
	14	9	It's all about sex	13.1-4	
8	15	14	Visit in a monastery	14.1-4	Drosophila Genetics
	16	16	Chromosomes and genes	15.1-5	
9	17	21	Gene Regulation	18.1-2	Bacterial Transformation
	18	23	Central Dogma (part I)	17.1-3	
10	19	28	Central Dogma (part II)	17.4-5	Enzyme Kinetics II
	20	30	Energetics (building on energetics in unit 1) and intro to cellular respiration	8.1-5; 9.1; pp. 175-6; 9.5	
11	21	<b>Nov 4</b>  6	<b>EXAM 2</b>		PCR

**LECTURE SCHEDULE.**

**UNIT 3: Biotechnology, Cancer, Bioinformatics**

Wk	Lect #	Date	Lecture/Class Topic	Campbell Chapter Readings	Lab Topic
11	21	<b>Nov 4</b>	Exam 2	n/a	DNA extraction and PCR
	22	6	Exam 2 Review – How people learn best	n/a	
12	23	11	Biotechnology and the Future of “Life”	20.1-4	Electrophoresis
	24	13	Biotechnology II	20.1-4	
13	25	18	Cancer I & semester review	12.3; 11.5	<b>Lab FINAL</b>
	26	20	Cancer II & semester review	18.5; pp. 421-2, 428-30, 441-2	
14	27	25	tba...	tba...	n/a
		27	Thanksgiving – No Classes	n/a	
15	28	<b>Dec 2</b>	Bioinformatics I & semester review	21.1-3	n/a
	29	4	Bioinformatics II & semester review	21.4-6	
		11	<b>FINAL Exam for section 10</b>	cumulative	n/a
		16	<b>FINAL Exam for section 11</b>	cumulative	