

**Syllabus Spring 2014**  
**BIOL 100: Organismal Biology**

Tues & Thur 9:30-10:50 am, Science Center N292 (Craig Lecture Hall)

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**Keith Tarvin, Instructor for the Lecture**

Department of Biology

Science Center A130

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**Office Hours:**

Mon 2:30-4:30; Wed 9:00-11:00; Thur 2:00-4:00;  
or at other times by appointment (contact me via  
email or phone to set up a time).

*If my office door is closed, just knock!*

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**Lab Instructors:**

**Jane Bennett**

Science Center A137; 440-775-8325

email: jrbennett@oberlin.edu

Office hrs by appointment and T - F 11-12

**Lila Leatherman**

Science Center K107; 440-775-6277

email: LLeather@oberlin.edu

office hours: M 11-12, Th 1:30-2:30 and by  
appointment

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**Course Description:**

BIOL 100 - Organismal Biology

*Full Course; Credits: 4 hours; Attributes: 4NS, QFR*

This course provides prospective biology majors and others with an integrated introduction to the biology of organisms, from the subcellular level, through the cellular, tissue, organ, and whole organismal level.

Students must register for both lecture and laboratory. *Enrollment Limit: 40*

Organisms are biological entities, but they must abide by physical and chemical processes that often act to disrupt biological systems. This course focuses on the physiological mechanisms organisms have evolved to use and manage physical processes like entropy, diffusion, and osmosis to obtain, store, and use energy and materials, protect themselves, and reproduce. Multicellular organisms must resolve additional problems, such as the need to transport materials and waste products to appropriate locations inside or outside of their bodies, coordination of the activity of different tissues and systems within their bodies, and development of multiple cell and tissue types, often from a single cell.

**Learning objectives for this course:**

In this course, we aim to help you:

1. Apply physical and chemical principles to explain physiological processes
2. Appreciate the ways in which the structure of molecules, cells, and organs defines their function
3. Understand the basic ways that organisms obtain, store, and use energy and materials
4. Understand the major problems that organisms face and some of the primary solutions that have evolved to address those problems
5. Use quantitative and formal reasoning to understand biological phenomena
6. Develop an understanding of the nature of science and of the process of scientific inquiry

**Primary Texts:**

Brooker, R.J., Widmaier, E.P., Graham, L.E., and Stiling, P.D. 2014. *Biology*. 3<sup>rd</sup> Edition. McGraw-Hill, New York.

*We strongly encourage you to obtain this book from the Oberlin College Bookstore. They have made arrangements with the publisher to offer the book for sale or rent, either in hard copy or electronic format. The prices for some of these options are very reasonable. The readings listed on the course calendar are for the 3<sup>rd</sup> edition of this text. They may not correspond to earlier editions, and earlier editions may not cover exactly the same material.*

## Format of the Course

**Lectures:** During lectures I will present material introducing each of the major topics of the course. I will lead us through material based on the readings and other material, but I expect you to bring up issues that you find interesting or confusing. Feel free to ask questions during the lectures. During some class periods we will engage in learning activities other than lecture.

**Labs:** Organismal Biology Lab meets once per week. You must attend the lab section for which you are registered. Because of seating limitations and other factors, you *cannot* attend a lab in which you are not registered unless you first get permission from the instructors for your lab section and the one you want to attend. Because of the complexities of preparing the materials for laboratory exercises, you can only make up a lab within the same week as the lab you miss, and this can only be done with prior approval by your lab instructor. Lab assignments will be turned into your lab instructor, and will count for 25% of your overall grade for the course.

**Assessment and grades:** I will assess your performance in the course and your mastery of the material via take-home problem sets, in-class quizzes, and a comprehensive final exam.

Problem sets are open-book, but you are not allowed to work on them or discuss them with classmates until after you have turned them in. However, I encourage you to meet with me or the CLEAR Center (see below) if you are having trouble with a problem set. In most cases, problem sets are due on the class day before an in-class quiz (in one case, they are due on the same day as the in-class quiz). In all cases, **Problem sets are due at the beginning of class.** Problem sets are designed to help you work through material that is related to that which will be covered by quizzes, though the questions won't duplicate one another. Some questions on problem sets will be recursive in that they will address issues from earlier in the course and ask you to make connections between different parts of the course. Many of the questions in problem sets will engage you in quantitative and formal reasoning. There will be five problem sets at 25 points each.

In-class quizzes will occur at the beginning of selected class days, and will last 25-30 minutes. We will resume lectures immediately following the quizzes. There will be five in-class quizzes at 25 points each (the fifth in-class quiz will be taken during the final exam period and will cover material from the final three weeks of the course).

A comprehensive final exam will cover major themes from the entire course to assess your ability to synthesize the course material. It will be worth 50 points.

### Contribution of assignments to the final grade

<b>Assignment</b>	<b>Points</b>	<b>% of total grade</b>
Take-home problem sets (5 at 25 points each)	125	31.25%
In-class quizzes (5, one during the final exam period; 25 points each)	125	31.25%
Comprehensive portion of the final exam	50	12.5%
Laboratory assignments (to be turned in to your lab instructor)	100	25%
Totals:	400	100%

**Communication:** The best way to get in touch with me outside of class is via email, though you are welcome to call me on my office phone (440-775-8306). I will occasionally use email to contact you as well, such as when I make announcements about course issues outside of class time, etc.

## **Additional Resources To Help You Do Well In This Course**

Materials on Blackboard: I will post Powerpoint slides from my lectures following each class period. Because my slides typically consist of images, questions, and outline material, it's unlikely you will get much from the slides if you do not also attend the lecture. I also will post the syllabus, problem sets, and other course materials on Blackboard.

Office Hours: My drop-in office hours are listed at the top of the first page of this syllabus. You are welcome to meet with me during office hours without an appointment. If you are unable to make any of my office hours, I am happy to meet at another time by appointment. Email me to set up a meeting outside of office hours. I encourage you to visit my office hours any time, regardless of whether your questions are big or small. In my other courses, students tend to get a lot out of meeting with me during office hours. My objective is to help you learn how to learn the material for this course, and I enjoy meeting with students in office hours. Please come by!

OWLS Peer Mentoring: The Oberlin Workshop and Learning Sessions (OWLS) program is sponsoring OWLS Peer Mentors for our section of the course. Julia Adelman and Delia Scoville both have taken the course in the past, and will attend our lectures and hold workshop sessions on Sunday and Tuesday evenings from 7:00-8:30 pm in Science Center A155. These workshop sessions are designed both to help you with the course content and to help you learn how to learn the material in our course. Data from a previous semester shows a clear relationship between attendance at OWLS sessions and performance in the course. I strongly encourage you to attend these sessions whenever you can. You can read more about the OWLS program at <http://new.oberlin.edu/office/clear/student-resources/owls/index.dot>

CLEAR Center for drop-in tutoring for help with quantitative aspects of the course: The Center for Learning, Education and Research in the Sciences (CLEAR) is an interdepartmental resource dedicated to helping students with quantitative material in their courses. Much of our course material, including problem sets and quiz material, will require quantitative and formal reasoning. The Quantitative Skills Drop-In Tutoring Center offers evening drop-in evening hours where peer tutors can help you with quantitative aspects of the course. They are located in the Science Library, room N176. You are welcome to seek help from them as you work through problem sets for this course. They will not give you answers, but they will help you figure out how to come up with the answers on your own. They can help you with graphs, spreadsheets, equations, and components of the course that have a quantitative aspect. Please make use of this wonderful resource! You can find them in Science Center A263; phone: 440-775-6216; <http://new.oberlin.edu/office/clear/index.dot>

Tutors: The College can provide you with a tutor for this course. Please contact the Student Academic Services office (Peters 118, 440-775-6724) for more details.

### **Other aspects of the course:**

**Class starts promptly at 9:30 am. Please be on time. Late arrivals are very disruptive.**

**Attendance Policy:** You will not do well in this class if you do not come to the lectures. We often will discuss material that is not explicit in my Powerpoint slides or in the readings. Likewise, my verbal explanations of difficult material may not show up in Powerpoint slides. Therefore, I expect you to attend all the lectures. Please contact me ahead of time if you have to miss a class.

**Honor Code:** As members of the Oberlin College Community, each of us is expected to adhere to the Honor Code. Please familiarize yourself with this code. You can view it online in your Blackboard site: Log on to Blackboard, scroll to the bottom of the page and click on “Honor System”.

The following text was taken from The Honor Code and The Honor System Charter:

At the end of each academic exercise students shall write in full and sign the **Honor Pledge**:  
"I affirm that I have adhered to the Honor Code in this assignment."

If a student does not follow the appropriate procedure, faculty members have the option of withholding the grade until the student writes the Honor Pledge correctly, although they may not penalize students for an oversight.

*You will need to pledge the honor code on every assignment that you turn in.*

**Special Needs.** Please contact me early in the semester if you have special needs so we can make any necessary accommodations. Alternatively, you may contact Jane Boomer, Coordinator for Students with Disabilities, Room G27, Peters Hall (440-775-5588; [jane.boomer@oberlin.edu](mailto:jane.boomer@oberlin.edu)). All discussions between you and Ms. Boomer remain confidential, and I will only receive information that describes the type of accommodation needed.

## Course Calendar, Bio 100, TR 9:30-11:50, Spring 2014

Wk	Dates	Days	Topic	Readings from Brooker 3 <sup>rd</sup> ed. (Chapter sections are indicated)	Assignments	Labs
1	Feb 4-6	T	<b>Introduction and theme of the course - Major problems organisms face.</b> Overview of major problems; evolutionary contingency, constraints, and diversity. <b>Part I: Physical processes by which life must abide.</b> 1 <sup>st</sup> and 2 <sup>nd</sup> laws of thermodynamics	1.1; 6.1		Pre-course Assessment (roughly 25 minutes)
		R	Gradients, diffusion, osmosis; the importance of surfaces; surface area to volume ratio	40.2; pg 73	<i>Problem set 1 assigned</i>	
2	Feb 11-13	T	<b>Part II: Biological solutions for controlling physical processes.</b> Enzymes; Membranes and compartmentalization;	6.2; 3.5; 5.1, 5.2; pp 819-821		Chemical Digestion I
		R	Selective and active transport; How basic control is directed – Central dogma, cell structure	5.4, 5.5; 12.2, 12.4; 21.3; pp 238-239	<i>PROBLEM SET 1 DUE</i>	
3	Feb 18-20	T	<u>QUIZ 1:</u> <b>Part III: Major problems that organisms face.</b> <u>Nutrition and energy management:</u> Cellular respiration and energy storage	6.3; 7.1		Chemical Digestion II
		R	Chemical digestion	45		
4	Feb 25-27	T	Photosynthesis	8	<i>Problem set 2 assigned</i>	Vital Signs
		R	Photosynthesis; Plant nutrition	37		
5	Mar 4-6	T	<u>Transport of materials:</u> Water potential and plant vascular system	38		Animal Anatomy I
		R	Water flow in plants	38; pp 729-732	<i>PROBLEM SET 2 DUE</i>	
6	Mar 11-13	T	<u>QUIZ 2:</u> Nutrient transport in plants	38		Animal Anatomy II
		R	Animal cardiovascular systems	47		
7	Mar 18-20	T	Animal cardiovascular and respiratory systems	48	<i>Problem set 3 assigned</i>	Animal Anatomy Quiz
		R	<u>Internal Coordination:</u> How plants sense and respond to stimuli	36.1, 36.3; 12.1, 12.2, 12.4, 12.6		
8	Mar 25-27	-- --				
9	Apr 1-3	T	Plant hormones and secondary growth	36.2; 35.2		Water potential
		R	How animals sense and respond to stimuli: Photoreception	43.1, 43.5	<i>PROBLEM SET 3 DUE</i>	
10	Apr 8-10	T	<u>QUIZ 3:</u> How neurons work	41.1, 41.2, 41.3		Mutant Hunt I
		R	<u>Body architecture and development:</u> Animal muscular-skeletal systems	44.1, 44.2, 44.3	<i>Problem set 4 assigned</i>	
11	Apr 15-17	T	Plant body plans; How plants build flowers	35; 39.2		Mutant Hunt II
		R	<u>Reproduction:</u> Mitosis, Meiosis; Plant life cycles	15.1, 15.2, 15.3; 39.1; Fig 29.7, Fig 29.12, Fig 30.14		
12	Apr 22-24	T	<u>QUIZ 4:</u> Angiosperm reproduction	39.3, 39.4, 39.5	<i>PROBLEM SET 4 DUE</i>	<i>Self-directed lab: Work on projects; look at ferns</i>
		R	Animal reproduction; Mendelian inheritance	51.1, 51.2; 16		
13	Apr 29-May 1	T	<u>Homeostasis, osmoregulation and excretion:</u> internal regulation	40.3; 49.1, 49.2	<i>Problem set 5 assigned</i>	Mutant Hunt III
		R	Animal nephridia and kidneys	49.3, 49.4		
14	May 6-8	T	<u>Protection:</u> Plant and animal defense mechanisms	pp 751-754; 53.1, 53.2		Plant Reproduction
		R	Animal immunity; COURSE EVALUATIONS	53.3	<i>PROBLEM SET 5 DUE</i>	
	May 15	R	<u>QUIZ 5 AND COMPREHENSIVE FINAL EXAM, 2:00-4:00 pm; Room TBA</u>			