



Organismal Biology

HLSC 207

Dr. Bretton W. Kent

Fall 2020

MWF 9:00-9:50; Online

HLSC 207 explores the narrative of how life arose and diversified in Earth. The course looks at the physical and chemical parameters that made life possible, while constraining organisms to a core set of processes that both unify all lifeforms and provide the basis for the evolution of incredible biodiversity. This course integrates concepts from multiple disciplines to provide a conceptual framework for understanding the evolution of living systems.

Students successfully completing HLSC 207 will be able to view organisms as integrated systems that have used ancient metabolic pathways in novel ways to meet the often conflicting demands of different life styles. They can also apply these underlying principles and concepts to unfamiliar situations.

Staff

Instructor

Dr. Bretton W. Kent

Office: 3142 Plant Sciences

Office Hours: I will have virtual office hours (via Zoom) every Monday during the semester from 9:00-9:50 AM for HLSC 207 students. Appointments to meet at other times are scheduled [online](#).

Contact Information: Please contact me via the **Discussions** area (for course related questions) or via the **Inbox** link (for personal communications).

Teaching Assistants (Study Group Cohort)

Beza Ketema (Study Groups 1-4)

Jacqueline Liu (Study Groups 5-8)

Daniel Oh (Study Groups 9-12)

Clarissa Xia (Study Groups 13-16)

Alvin Ya (Study Groups 17-20)

Contact Information: Please contact the TAs through the **Inbox** link on the course website. TAs will also be setting up office hours.

Textbook

There is no required textbook in HLSC 207. If you have an introductory biology textbook you've found useful in the past you can certainly use it for reference for any topics that are unclear from lecture. We do have supplemental readings available online for topics that are poorly covered in introductory textbooks. Links to these readings can be found in Lecture schedule. These readings should be used in two ways:

- First, only use the material in the readings that covers the same concepts we cover in lecture. The readings are used by multiple instructors and so cover a broader range of topics than we'll be using in class. In other words, don't use the readings for new material, but only to help you understand and see the material covered in lecture in different ways. (Of course, if a subject interests you, we would encourage you to explore other related topics in the text, but we will not test you on this material unless we make a specific announcement in class).
- Second, study the figures in the readings carefully, since these are frequently different than those used in lecture. As with the text portion of the readings this will provide you with a different perspective on the topic and a wealth of useful information that you need to understand lecture material.

Course Website

We will be using this Canvas for the course. Information on using Canvas can be found on the **How to use UMD Canvas** link on the right-hand side of the course homepage.

Using Canvas you will be able to access lecture notes (and add your private annotations to help you learn), figures from the text, discuss material in the course with your professors and other students, other web pages, etc.

Canvas will also enable you to access your grades and keep track of your scores. They will be available to you (*and only you*) each time you access the web, from anywhere in the world.

- *Keep in mind that only you can see your grades or your annotations to documents.* Your use is password-protected and you should NOT give out your password to anyone.
- Use of Canvas is **mandatory** for students in our course. We will provide material on our course site that may not show up in lectures, and announcements about changes to the schedule, review sessions, etc.

Examinations

There will be three term exams (100 points each) and one comprehensive final exam (200 points). All exams are given online within the course website.

- The term exams each consist of 10 short essay questions that must be completed within 50 minutes. You will have a 4-hour window of availability for each exam and you can take the exam at any time during that window. But once you start the exam you must complete it: if you leave the exam you will not be able to access it again.
- The final exam consists of 20 short essay questions to be completed within 2 hours. The University requires that the exam be given during the posted final exam period (Saturday, 19 Dec, 8-10 am). Students that cannot take a Saturday exam should contact Dr. Kent to make arrangements for an alternative day and time.
- *The final exam is optional and if you are satisfied with your grade going into finals you do not need to take the final exam.* But if you choose to take the final exam, that grade must be including in calculating your final grade for the course.

Make-up Examinations: It is in your interest to take all three of the lecture term exams in order to give yourself the best chance of a high grade. Make-up exams will be given for University-recognized excused absences. However, because of the extremely fast pace material is covered in 207, students that take a make-up exam typically do poorly on both on the make-up exam and on the subsequent term exam. Make-up exams will be in the same format as the term exams.

Re-grade Requests: For lecture exams, re-grades will be considered only if the original was written in pen. If you feel you were graded incorrectly on an exam, you should pursue the following procedure to obtain a re-grade:

1. Refer to the answer key (which will be posted the day of the graded exams are returned in class) to make sure you know the correct answer.
2. Contact the course instructor through **Inbox** with a written explanation of why you feel you should have received more points on the exam, and including reference to the posted answer key.

Important Note: The firm deadline for re-grade requests is ONE WEEK after the graded exam was made available.

Exploration Questions & Quizzes

Students in HLSC 207 can become overwhelmed by the volume and pace of the material covered in lecture. To help you gauge your progress in the course there are five 10-point Exploration questions and five 10-point online quizzes given during the semester.

- Explorations are group assignments and will become available one week prior to the due date. Exploration questions will examine aspects of biology that integrates information from multiple sources. The questions will require you to search for information from outside sources and

formulate answers based on your readings. Your group answers will be posted online within the course website.

- Quizzes are timed, individual assignments and each consists of two short essays that must be completed within 10 minutes. You will have a 3-hour window on the day of a quiz and you can take the quiz at any time during that period. But once you start the quiz you must complete it.

Math Bench Modules

Mathematics is an important component for understanding the material in HLSC 207. The Math Bench modules on the course website are useful tools for being successful in this course. We **STRONGLY** urge you to complete these. There are five content modules, each associated with a specific lecture. Based on previous offerings of this course there is a strong correlation between successful completion of the Math Bench modules and success in HLSC 207.

Grading Scale

The 600 maximum possible point total for this course derives from three term exams (100 points each = 300 points), 50 points from quizzes (five quizzes at 10 points each), 50 points from Exploration questions (five questions at 10 points each), and a 200 point comprehensive final exam. In order to be guaranteed a particular grade, you need to get the following percentage of points, and +/- grades will be assigned within the letter grade range. The grade breaks may be moved down for the entire class (i.e. in students' favor) at the discretion of the lecturer.

90 - 100 % = A 80 - 89% = B 70 - 79 % = C 60 - 69% = D

Course Organization

HLSC 207 will be entirely online this semester. Although days and times are listed for the course (Monday, Wednesday and Friday; 9:00-9:50 AM), the course will be taught almost entirely asynchronously. We'll use the listed times, as needed, for office hours, review sessions, etc.

At the beginning of each week a message will be posted to Announcements providing an overview of topics and concepts to be discussed that week. This will allow you to plan your coursework for the week and focus on the most critical aspects.

Lectures are provided as PDF files of annotated PowerPoint slides. My students in other online classes have found this the most useful way to access the lecture material because it allowed them to more rapidly search through the lectures to find specific information while studying for exams and other assignments. We may also supplement the lecture notes with short (10-15 minute) videos to help with particularly difficult concepts.

Learning Outcomes

After successfully completing this course you should be able to:

- Apply an understanding of fundamental constraints imposed by the laws of physics and chemistry to explaining the structure & function of both unicellular and multicellular organisms.

- Apply quantitative thinking and analysis to interpret, explain, and derive graphs and mathematical relationships based on algebraic equations relating biological and physical characteristics and phenomena.
- Explain key aspects of major life processes such as gas exchange, osmoregulation, signal transmission, and movement in both unicellular and multicellular organisms.
- Understand the evolutionary roles of phylogenetic history (ancestry), physical laws, and environmental context in shaping the structure and function of organisms.

Academic Success in an Online World

The online learning environment may be a relatively new experience for most of you. In many cases your previous experience will have been in courses that were hastily moved online due to the covid-19 pandemic. This is far from ideal, since successful online courses are organized rather differently than resident courses. In particular, many of the most successful online courses use a largely asynchronous format and encourage group work.

The advantages of an asynchronous format seems fairly obvious: each individual is free to work on the course material when it's most comfortable for them. But more importantly, an asynchronous format helps students hone their organizational and time-management skills. And these are two of the three transferable skills strongly associated with success in professional and graduate schools, as well as, with potential employers.

Group work is easily facilitated in the online environment because each group can be assigned their own workspace with a complete set of interactive tools within the course website. Working in a small group also helps develop closer friendships, which could otherwise be difficult in an online setting. Finally, the ability to work in small groups is the third of the three transferable skills that is so desirable in the post-undergraduate world.

Some additional suggestions to be successful in HLSC 207 and other online courses:

- Review lecture notes in a timely manner. Although the lecture material is presented asynchronously, there are weekly or biweekly assessments of your progress.
- Write out the major concepts and ideas from each the lecture *within 24 hours* of reading the annotated notes. Rewrite them in your own words and phrasing, not simply recopying them. This helps to greatly reinforce your learning (by moving information from short term to long term memory) and will make a *giant* difference for comprehension and preparation for exams. As you copy the material, you should *think about* the lecture and make sure you understood the material. If you did not understand the material then you should ask your group members for help or post your questions to Discussions in the course website.
- Even though you will be allowed to use your notes during the the exams, part of your re-writing should have the notes closed to see what you remember and what you only read. Open-note exams are constructed so that you will be under time-pressure. Once you have recopied the most recent lecture, write a detailed summary of the lectures from 1-2 weeks prior: refresh your memory, make new connections, and figure out what you need to clarify with your group or TA.

- Keep up with all course work, reading assignments, and updating your notes. Falling behind in your work in 207 is courting disaster since it becomes more and more difficult to follow lectures if you are not thoroughly familiar with work that precedes each lecture. Moreover, it is almost impossible to understand the material for exams if you have not kept up.
- When questions are asked in the lecture notes make sure to discuss them within your group. The questions asked the lectures are examples of what you should know and the thought processes you are trying to develop.
- One of the most effective ways to insure that you understand material is to use your group to ask and answer questions. By talking to the other students in your group on a regular basis, and explaining material to each other, you will do an immense amount of real learning. In a study group you will find that each person may have been the best one at grasping particular aspects of the material. By sharing what you know, everyone learns.
- There is no substitute for effort. You should be spending **an average of eight to 12 hours per week outside of class** working on 207 material and assignments.
- Keep in mind that you cannot study for a 207 exam the night before the exam. There is *far* too much material for a single night.
- Finally, do not hesitate to ask for assistance. We are here to help you.

Academic Policies

The University of Maryland, College Park has a nationally recognized Code of Academic Integrity, administered by the Student Honor Council. This Code sets standards for academic integrity at Maryland for all undergraduate and graduate students. As a student you are responsible for upholding these standards for this course.

Academic dishonesty will not be tolerated. Definitions of academic dishonesty follow:

- **CHEATING:** intentionally using or attempting to use unauthorized materials, information or study aids in any academic exercise.
- **FABRICATION:** intentional and unauthorized falsification or invention of any information or citation in an academic exercise.
- **FACILITATION:** intentionally or knowingly helping or attempting to help another to violate any provision of the Code of Academic Integrity.
- **PLAGIARISM:** intentionally or knowingly representing the words or ideas of another as one's own in any academic exercise.

You will be asked to read and sign the University Honor Pledge on all examinations. The pledge reads as follows: "I pledge on my honor that I have not given or received any unauthorized assistance on this assignment/examination." If you have further questions, please see the link below on Undergraduate Course Related Policies.

Religious Observances: In accordance with University Policy, no examination will be held on a major religious holiday; see the [list of these holidays](#). We realize that not all holidays are listed here. If you need to be absent for a religious observance on a day when an exam is being held you must inform us in advance and we will work with you to resolve the problem as best we can.

Accommodating Students with Disabilities: The Accessibility & Disability Service assists faculty in determining and implementing appropriate academic recommendations. ADS will work closely with both faculty and students. You may contact the office at 314-7682. A booklet, *Reasonable Accommodations*, is also available to assist you in understanding this issue. Students registered with ADS will be given every accommodation they deserve (as documented via ADS). ADS exams will be administered online through the course website. Examinations will not be administered at the ADS.

If you need help: We have experienced, dedicated, and knowledgeable teaching assistants in the course. If you have questions, please see the TAs first. If you need additional help, Dr. Kent are ready to assist you in any way possible. All you have to do is ask! You may meet with us by the mechanisms listed above in this syllabus. We are always happy to chat with students immediately after lecture.

The University has a larger set of policies covering undergraduate courses that are too extensive to be covered here. But the following links are useful if you have questions:

[Undergraduate Course Related Policies](#)

[Conduct of Undergraduate Courses and Student Grievances](#)

Lecture Schedule

Week	Dates	Lecture Topics	Readings & Assignments
1	8/31 - 9/4	Life – An Introduction Basics of Thermodynamics Diffusion and Gradients	Chapter 1 Diffusion Module Chapter 7
2	9/7 - 9/11	LABOR DAY (9/7) Information and Living Systems Feedback and Homeostasis	Exploration 1 (9/11)
3	9/14 - 9/18	Scaling of Function The Tree of Life Emergence of Life on Earth	Chapter 6 Scaling Module Chapter 2 Chapter 3

			Quiz 1 (9/18)
4	9/21 - 9/25	Basics of Bioenergetics Advanced Aspects of Bioenergetics -----	Chapter 4 Exam 1 (9/25)
5	9/28 - 10/2	The Yin & Yang of Being Small Prokaryotic Diversity Problems of Cellular Size & Complexity	Exploration 2 (9/30) Chapter 5
6	10/5 - 10/9	Eukaryotes Diversify Evolution of Multicellularity The Green Revolution	Quiz 2 (10/7)
7	10/12 - 10/16	The Strange World of Fungi Animals & The Quest for Speed Parallel Worlds	Exploration 3 (10/16)
8	10/19 - 10/23	Building Bodies ----- Homeotic Genes & Metazoan Evolution	Exam 2 (10/21)
9	10/26 - 10/30	Basic Principles of Gas Exchange Gas Exchange for the Big & Fast Nutrient Assimilation	Quiz 3 (10/30)
10	11/2 - 11/6	You Are What You Eat Problems with Water & Solutes Regulating the Internal Environment	Exploration 4 (11/2) Diffusion Through a Membrane Module Osmosis Module
11	11/9 - 11/13	Basic Transport Mechanisms High Speed Transport -----	Chapter 8 Exam 3 (11/13)

12	11/16 - 11/20	Membrane-Based Sensory Mechanisms Intra- & Intercellular Communication Nervous Systems & Information Integration	Nernst Potential Module
13	11/23 - 11/27	Complex Neuroendocrine Systems THANKSGIVING BREAK (11/25) THANKSGIVING BREAK (11/27)	Exploration 5 (11/23)
14	11/30 - 12/4	Skeletons & The Mechanics of Support Molecular Motility Mechanisms Animals, Muscles & Machines	Quiz 4 (12/4)
15	12/7 - 12/11	Animals in Motion Case Study: The Biology of Giant Sharks Recapitulation	Quiz 5 (12/11)
16	12/14	Open Review with TAs (no notes)	-----

FINAL EXAM – Saturday, 19 December (8-10 am EST)