LB 273, Fall 2011: Physics of the Life Sciences, I
Course Syllabus

Instructor Information

This course will be taught by Professor Brian O'Shea, Professor Walter Benenson, and Mr. Steven Wolf. Professor O'Shea is in charge of all aspects of the lecture component of the course, including exams, the LON-CAPA site, and the help room. Professor Benenson is responsible for the hands-on component of the course. Mr. Wolf is responsible for many of the logistical aspects of the course, including the grading of hands-on session material, and he will also be lecturing periodically throughout the semester. Our contact information is:

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Contacting course staff: All course staff can be reached at the telephone or e-mail addresses found above. Please be sure to put "LB 273" and the nature of your query in the subject heading of the email (for example: "LB 273: missed exam due to illness, need to schedule retake"). We will respond within 48 hours. The course staff does not check their LON-CAPA email on a regular basis.

Course Description

LB 273 is the first semester of the Lyman Briggs College calculus-based introductory physics sequence. This course focuses on classical mechanics, waves, thermodynamics, and fluid mechanics, with an emphasis on examples pertaining to the life sciences. Throughout this course sequence, we will try to understand the scope and behavior of biological systems using the laws of physics.

The primary goals of this course are 1) to provide you with an overarching conceptual understanding of physics and the interconnectedness of physical phenomena, and how the laws of physics affect living organisms, 2) to provide a mathematical toolkit for expressing and manipulating the laws of physics, and 3) to increase your problem-solving skills and provide you with problem-solving strategies that are broadly useful. Regarding this last point, problem-solving is a skill that is broadly useful. A few years after this course is over, it is likely that you will have forgotten the formula for the kinetic energy of an object that rolls without slipping - but you hopefully will have retained the strategies to find out things like that, the physical intuition regarding how the world works, and the problem-solving abilities gained in this course, and will hopefully be able to use these same strategies in problems quite outside of physics.

We will work toward the goals expressed above throughout the course, using research-tested active learning strategies. In lecture, most of our time will be used for activities, demonstrations, and discussions. Very little time will be used for classical lecturing.

Class Hours

The classroom component of this course meets three times a week, on Monday, Wednesday, and Friday in C-106 Holmes Hall. There are two class sections: from 10:20-11:10 a.m. and from 11:30 a.m. to 12:20 p.m. **You can attend either lecture, regardless of what section you are registered in.** Please bring paper, pencil, a calculator, and your iClicker to class every day.

The hands-on sessions meet Monday-Thursday in the Lyman Briggs Physics Lab, which is E-26 Holmes Hall (in the basement of the East wing). You are expected to attend the section that you are enrolled in, though if you need to change sections for a week you should just go to whichever hands-on session fits into your schedule (and make sure to let the LA know that you aren't usually in their section).

Office Hours

Professor O'Shea's office hours for Fall 2011 will be Mondays from 2-3:30 p.m. in his Holmes Hall office (193-A East Holmes), and by appointment. You are also welcome to stop by his Holmes Hall office whenever the door is open. Professor Benenson schedules office hours by appointment only, and Mr. Wolf's office hours are from 10 a.m. to noon on Tuesdays in his Holmes Hall office (187-A East Holmes). Please note that there will be no office hours during the first partial week of class, the weeks of Thanksgiving and of final exams, or on days that are University holidays.

For questions regarding particular online problems, the help room is the preferred venue (see the "Help Room" section for more information). For other issues (emergencies, grade questions, etc.) please contact **Professor O'Shea** by email at oshea@msu.edu.

Help Room

The help room is a place to get assistance with homework and exam preparation. It is located in W-40 Holmes Hall and is staffed by undergraduate learning assistants and the graduate teaching assistant. Help room hours will be announced during the first week of class in lecture and via email. **Help room hours start the week of September 5th**. The help room hours may change, depending on attendance patterns and TA/LA availability. These changes will be announced in lecture and via email. Please note that there are no help room hours on days that coincide with University holidays, or during the week of final exams.

In addition to the help room, each homework problem in LON-CAPA also provides an attached discussion board. We encourage you to make extensive use of this discussion feature during the readings, for homework, and during test retakes. We request, however, that students do not simply post the answers to specific homework questions – while it is helpful in the short term, it encourages others to take the "easy way out," and is detrimental to overall learning.

Grading Information

The course grade is determined by contributions from several sources: LON-CAPA homework, assignments in the hands-on sessions, in-lecture "clicker questions," and exams. Each of these contributes to the final grade in the following percentages:

45%	Midterm exams (3 exams, 15% each)
15%	Final exam
5%	Clicker questions
15%	LON-CAPA homework and reading questions
20%	Hands-on learning sessions

The course grading scale is as follows:

4.0	$\geq 92\%$
3.5	$\geq 84\%$
3.0	$\geq 76\%$
2.5	$\geq 68\%$
2.0	$\geq 60\%$
1.5	$\geq 52\%$
1.0	$\geq 44\%$
0.0	$< 44\%$

The grading scale for the semester, as well as the grading on assignments and exams, are on an absolute scale. **Grades will not be curved, although we retain the right to adjust scores upward on exams if necessary.**

LON-CAPA Homework

Homework is assigned using course's LON-CAPA website, and is generally due at 11:59 p.m. on the assigned day. This consists of multiple-choice, numerical response, and graph-oriented questions. Each homework assignment focuses on a specific topic. The LON-CAPA homework counts for 15% of the overall course grade, and each homework assignment counts equally toward this percentage, rather than on a per-question basis. Reading-oriented questions are due the night before a topic will be discussed in class, and you will also receive one point per question and one point per free-response box.

Hands-on Learning Session

During the hands-on component of this section, you will work on a variety of assignments: physics tutorials, in-class guided problem solving, laboratory exercises, and occasionally some other activity that has intellectual utility for the course. These assignments are meant to help you with your conceptual understanding of the material and problem-solving skills. These assignments are meant to be worked on in groups of between two and four, depending on the project, and all individuals in a group will receive the same grade for a given assignment. Collaborative learning is highly encouraged in these sessions.

The hands-on component of the course is worth 20% of the overall course grade. Each week's hands-on session is worth a total of 20 points, which will generally be allocated as follows: 10 points will be awarded for active participation in your session. A group assignment will be graded for a maximum of 5 points, and an individual problem will be graded for a maximum of five points. All graded assignments must be turned in at the end of the session, and will be returned at the beginning of the next session.

Clickers

This course uses the iClicker system for answering questions posed in lecture. You will get 60% credit for an incorrect answer, and 140% for a correct answer (with a maximum of 100% total points possible over the course of the semester). Clicker questions count 5% toward your overall course grade.

The majority of lectures will have clicker questions. All lectures that have clicker questions will receive equal weight, regardless of the number of clicker questions assigned in that particular lecture. As a result, you don't have to worry that you might miss a lecture that has a very large number of questions.

If you forgot to bring your clicker or failed to register it in LON-CAPA, you cannot receive credit for clicker questions that day. You cannot share the same clicker device with another student, since the serial number for a given clicker is assigned to a single student.

Exam Information

Midterm and final examinations will be a combination of free-response and multiple choice questions, and will take place in C-106 Holmes Hall. For each exam, you should bring pencils, a good eraser, a pocket calculator, and a 3"x5" index card with hand-written notes. We will provide a formula sheet. Exam questions will be taken from the reading materials, topics discussed during the lectures, the LON-CAPA homework, and from the work that you do during your hands-on sessions and related assignments. You are responsible for ALL material in the course, not just what is directly discussed in lecture!

Midterm Exams

Each of the three midterm exams is worth 15% of your total grade for the semester, and will cover the chapters listed in the course calendar (approximately four weeks of material per exam).

We will make a copy of the midterm exam available shortly after its conclusion. You will have the opportunity to correct ONE question on the exam, by first providing a completely correct solution to the problem, and also explaining why your answer was incorrect. This should be turned in at the beginning of class on the Wednesday after the exam (two days later). If you provide an incorrect or incomplete "correction problem," you will NEVER lose points.

The exams (including the correction problems) will generally be scored by the following Monday, and you will see the results posted online as soon as the grading is completed. We will return the exams to you in your hands-on section after they are graded, and solutions will be available online.

As mentioned previously, we do not curve exams. However, if we deem that an exam question is unfair, we reserve the right to throw out that question, with point totals being adjusted accordingly.

Final Exam

Approximately 50% of the final exam will be on the last four weeks of material (that material which was not covered by the midterm exams), and the rest will be a cumulative exam covering the entire course. The material covered is NOT constrained to material that has previously appeared on midterms. As with the midterms, a formula sheet will be provided and uou are allowed to bring one 3"x5" index card with hand-written notes. The final exam is worth 15% of the overall course grade.

There are three sessions offered for the final exam:
1. Session A: Thursday Dec. 15, 10:00 a.m. - 12:00 noon.
2. Session B: Friday Dec. 16, 10:00 a.m. - 12:00 noon.
3. Session C: TBD (this will be announced in November)

You can come to any of the three sessions. As finals week approaches, a survey will open up on LON-CAPA that will allow you to reserve your seat in one of the exam sessions. Given this flexibility, you are expected to resolve any scheduling conflicts by discussion with the professors leading your other classes. Further information about the finals (including the time/date of Session C) will be made available near the end of the semester.

Readings

Course reading materials are available in the course pack. The material is organized by topics over the course of the semester. For each topic, there are three stages:

1) Read the material before the first day that it will be discussed in class and respond to a few short questions online by the evening prior to the first lecture where it will be discussed.
2) Material will be worked on in lectures and hands-on sessions
3) LON-CAPA homework is due after the material has been discussed in class

The written course material establishes the expected learning outcomes for this course, and students are expected to read ALL of the material on a given subject before coming to class. Class time is meant to be used for clarification and elaboration of the material, and does not provide comprehensive coverage.

Required Course materials

There is a required course pack, which is the textbook for the course. A paper version of the course pack is available **ONLY** at the MSU bookstore, though we will also have PDF versions available online if you don't want to purchase a paper copy. In addition, you are required to purchase an iClicker (http://www.iclicker.com). The course pack can only be found at the MSU bookstore at the International Center. The iClickers are available at the campus bookstore, among other places.

Honors Project Information

If you are interested in doing an Honors project, please contact Professor O'Shea some time within the first two weeks of class. We have a wide range of equipment available for an honors project, including video cameras, an infrared camera, and various Pasco sensors that are identical to the ones used in lab. We encourage people to do interesting projects, particularly in groups, and in collaboration with the graduate teaching assistant. Please talk to Dr. O'Shea or Steven Wolf if you have any questions!

Contesting grades

Everybody makes mistakes, including the professors and the TAs and LAs grading your assignments. If you feel that you have received an incorrect grade on a LON-CAPA assignment or exam, you can contest it by appealing directly to Professor O'Shea via email. Disputes regarding hands-on session grades should go to the graduate TA - please put the assignment in their mailbox (in the Lyman Briggs mail room) with a written note explaining exactly what you feel is wrong and why. Requests for re-grading of assignments are due within one week of the assignment being returned to you, with the last opportunity to contest grades being 5:00 p.m. on the last day of classes for the semester. We reserve the right to re-grade the entire assignment.

Academic Honesty

The Lyman Briggs College Honor Code states "I will neither give nor receive any unauthorized assistance in completing my work, which includes, but is not limited to: papers, reports, exams, group work, and classroom conduct." In the context of this course, that includes getting answers from other students on quizzes relating to online reading, copying homework or extra credit assignments, cheating on exams, using another student's iClicker, or having your iClicker used by another student. Students caught cheating or plagiarizing will suffer severe consequences, ranging from failing the assignment in question to failing the entire course, with possible additional penalties. In addition, University policy requires that any cheating offense, regardless of the magnitude of the infraction or punishment decided upon by the professor, be reported immediately to the dean of the student's college.

Email policy

At times, we will send out important course information via email. This email is sent to your MSU email address (the one that ends in "@msu.edu"). You are responsible for all information sent out to your University email account, and for checking this account on a regular basis.