A. COURSE DESCRIPTION:
Induction, deduction, hypothesis formation, experimentation and interpretation of data are applied to a variety of biological problems such as the enzyme function, membrane transport, cell structure and function, DNA, animal taxonomy, certain animal phyla and mammalian systems.

TEXTBOOK: The required textbook is: "Problem Solving in Biology" by Kaplan and Billeter, 5th edition for Biology 1020 Lab, Zoology. This is the spiral bound edition with 10 chapters. It is a workbook so you must buy a new book. Used books with answers already written in them are useless to you and are not acceptable.

B. COURSE OBJECTIVES:
Read the "Foreword to the Student" in the Lab Manual and see "About the Course" below.

C. CREDITS:
The lab is a one-credit course. This credit value has been assigned to this lab for record-keeping and other logistic reasons (i.e. for reasons associated with registration, transferability, tuition,
calculating your GPA), so you can withdraw or otherwise change your lab status without affecting your lecture status, etc.

Philosophically, the faculty of the Biology Department considers the lecture and lab to be a single entity, intimately related and inseparable. It is in the lab where you are afforded the opportunity to DO science and, therefore, accomplish one of the major goals associated with the 4-credit lab science requirement of the Liberal Arts (General Studies), or other curricula which require zoology or a comparable lab science. The misconception that the laboratory is “only one credit” and “should not require much work” is an idea that is quite foreign to us. If you have this misconception please discard it before you undertake this course.

D. PREREQUISITES:
BIO 1020 lecture must be taken concurrently or have been completed in a previous semester in order to enroll in the Lab.

E. ABOUT THE COURSE - GOALS, OBJECTIVES, PHILOSOPHY, ETC.:
It is not uncommon that a majority of students in zoology lab are not science majors. For many of you, this is the only lab science you will take in college. In other words, for some of you this is your FIRST lab science course, while for many of you (if not most) this is (also) your LAST college lab science course.

The faculty and academic administration of this college (and almost all other colleges) do not require most students to take zoology, but we do require that you take at least one lab science course (among other requirements) to graduate. You may choose almost any 4-credit natural science course offered at almost any accredited college or university, e.g. chemistry, botany, physics, geology, astronomy, physical geography, etc., or you may take, as you have chosen -- zoology.

As part of an overall college education, it is a role of the lab science course to elucidate the nature of empirical* investigation that characterizes ALL science. Although science is sometimes defined as a body of publicly verifiable fact, a scientist is more apt to emphasize the inquiry by which these facts are discovered. In other words, zoology is not just the facts published in your textbook or other science books, journals, reports etc., it is also the processes used to discover those facts. An understanding of both the FACTS OF SCIENCE and the PROCESS OF SCIENCE is important in this course. It is equally important that we understand HOW things are known in science as it is WHAT things are known in science.

It is an important goal of the introductory lab science, be it biology, chemistry, geology, physics or astronomy, to allow the student to explore, evaluate and consider the epistemology of science. That is, to wrestle with the basis of science’s methods and the grounds of its knowledge, especially with reference to the limits of investigation and the validity of conclusions. By carefully studying a science, any science, the lab science course can make a student a better observer, a more careful and precise thinker, and a more deliberate problem solver. To a large measure, that’s what a college education is all about.
Please be sure to read the "Foreword to the Student" for the lab manual for a further introduction to the nature of this lab course. The Biology Department welcomes you to this lab. We urge you to work hard, grapple with the problems presented in each lab, participate fully in your own education, and earn the highest grade possible consistent with your abilities and the priority you place on your college education.

F. ATTENDANCE:
Because of its nature, attendance in a lab course is mandatory. I value your participation and interaction, and consider your physical presence in the lab to the minimum commitment you can make to this course. I strongly urge you to avoid unnecessary absences.

Each lab you miss and don’t make up WILL LOWER YOUR FINAL GRADE BY FIVE (5) POINTS. IF YOU MISS MORE THAN THREE (3) LABS, YOU WILL BE ASKED TO WITHDRAW AND RETAKE THE COURSE IN A LATER SEMESTER WHEN YOU DO HAVE SUFFICIENT TIME TO PARTICIPATE: IF THE WITHDRAWAL DATE HAS PASSED YOU WILL AUTOMATICALLY RECEIVE A GRADE OF "F". If you must miss a lab due to extraordinary circumstances, you may make up the lab during one of the other regularly scheduled lab sections (see below). You must obtain prior permission from another instructor if you wish to make up a lab in his/her class. It is YOUR responsibility to have your own instructor notified when you make up a lab in a different instructor’s class so you are not considered absent. Make-up notification forms are available in the lab for this purpose.

G. LAB SCHEDULE FOR SUMMER 2010

<table>
<thead>
<tr>
<th>A) TWTh 7:10p-9:00p (Prof Billeter) Sect. 80911</th>
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H. RESPONSIBILITIES OF THE STUDENT:
1. Read the "Foreword" in the lab manual.
2. Study each lab BEFORE coming to class by reading the "Preliminary" and/or "Introductory Information." (up to the pen icon ). Be familiar with the problem to be solved in each exercise. You must come to lab prepared! There will be a short quiz at the beginning of each lab based on the preliminary/introductory information).
3. Turn in each lab assignment as directed by your instructor. LATE ASSIGNMENTS WILL NOT BE ACCEPTED.
4. In some cases, you will find it helpful (if not necessary) to devote some extra time outside of class to the study of the problems presented during the lab period. The schedule of classes for Room ST-225 will be posted near the door. You are encouraged to come to the lab for individual or group study during your free time. (This is particularly important for Labs 2 and 3.)
5. YOU are responsible for the proper care of microscopes, keeping the lab clean, and returning materials to their proper places. Your cooperation in this matter will be helpful to me, the lab assistants, and other students who use the lab.
6. If your lab does not meet due to a holiday, an unscheduled college closing, or if you must miss a lab for a legitimate reason, YOU are responsible to make up the lab during one of the other six periods unless otherwise informed by your instructor.
7. NO CHILDREN OR OTHER UNAUTHORIZED GUESTS ARE ALLOWED IN CLASSROOMS OR LABS. YOU MUST BE ENROLLED IN BIO 1020L TO ATTEND THE LAB. NO EXCEPTIONS.

I. TESTS & GRADING:
Your final grade in zoology lab will be based on:
1. Two written exams scheduled for dates shown on the course outline.
2. The average of your graded lab exercises and quizzes.
3. The two Hour Exams AND the lab exercise/quiz average are each worth 33.3% (1/3) of your final grade.
4. Your lab book will be collected and evaluated on the two exam days. The instructor's evaluation of your lab book will add or subtract -5 to +5 points to your lab exam grade.
5. Completion of the EXTRA CREDIT LAB CAN EARN 0-10 POINTS. These points will be added directly to your final average.

MAKE-UP EXAMS:
1. For valid reasons (i.e., hospital stay, emergencies, etc.), a student MAY be excused from taking an exam at the scheduled time. In order to do this, the student MUST discuss with the instructor the reason for being excused, obtain permission, and make arrangements to take the exam either before or after the scheduled time.
2. If a student fails to take an exam at the scheduled time without permission of the instructor, s/he MUST present a written excuse (i.e., doctor's note, etc.). In this case, the student MUST make arrangements to take the exam WITHIN ONE WEEK of the originally scheduled time. IF THE STUDENT FAILS TO FOLLOW THIS PROCEDURE, S/HE WILL RECEIVE A GRADE OF ZERO (0) FOR THAT EXAM.

GRADING SCALE:  90-100% = A  80-89% = B  70-79% = C  60-69% = D  <60% = F
A = "Excellent",  B = Good,  C = average,  D = Poor,  F = Fail

BORDER LINE GRADING POLICY:
A student with a borderline numerical course average will be given the higher or lower grade at the discretion of the instructor. The different instructor's may have slightly different policies on borderline grades. The policy of the instructor of this class is:

J. OUT OF CLASS ASSISTANCE:
Feel free to seek additional assistance from your instructor, if necessary. Contact your instructor either in person or through the Biology Department secretary (301.934.7843) if assistance is needed.
K. DISABLED STUDENTS POLICY:
If you have learning or other disability (e.g. hearing problems, vision problems, etc.) please inform your instructor and contact Dr. Glennis Bacchus, the college’s learning specialist. Her office is in the SSC (Student Success Center) and her phone number is 301-934-7614. She will verify your status and provide appropriate accommodations.

L. CHANGE OF STATUS:
THE LAST DAY TO WITHDRAW WITHOUT A GRADE OR TO CHANGE BETWEEN CREDIT & AUDIT IS June 16th.

M. STUDENT HONESTY:
All forms of dishonesty, including cheating and plagiarism, will not be tolerated. A GRADE OF ZERO (0) will be given for any exam, quiz, exercise, project, etc., on which the student cheated or used plagiarized material. In addition, the student shall be subject to disciplinary action, as set forth under “Judicial Procedures” in the CSM Student Handbook. This may result in dismissal from the college. Honor in academia is a cornerstone of higher education and we consider breaches of this trust to be serious and respond accordingly.

N. EXTRA CREDIT:
This is the same extra credit option offered in (Billeter’s) lecture. If you are just taking the lab and not the lecture, read this info carefully to see how it differs for you.

Students wishing to learn more and/or earn extra credit may do so by 1) completing extra CyberEd Modules AND/OR 2) reading extra chapters in Evolution for Everyone. (Students enrolled in Lab but not Lecture can only do option 1, CyberEd Modules). Do the extra-credit modules or the extra credit chapter summaries the same way you do the required ones EXCEPT you must score at least a 95% on the CyberEd Post-Test to get extra credit.

EXTRA CREDIT ACTIVITIES ARE OPTIONAL AND YOUR FINAL GRADE WILL NOT BE AFFECTED IF YOU DO NOT DO THEM. However, if you do complete the extra credit modules/chapters, you may ADD as much as TEN POINTS TO YOUR FINAL AVERAGE(S).

Each CyberEd Module or Evolution for Everyone Chapter is worth ONE-POINT of extra credit. You may earn up to 10 points of extra credit in the lab. Check with your lecture instructor regarding extra credit in the lecture.

EXTRA CREDIT POINTS MAY BE ADDED TO YOUR LECTURE OR LAB GRADE OR PARTITIONED BETWEEN BOTH. FOR EXAMPLE, IF YOU EARN 9 POINTS, YOU MAY ADD ALL 9 TO LECTURE, ALL 9 TO LAB OR SPLIT THEM UP TO YOUR BEST ADVANTAGE. If you intend to earn extra credit you should get started in the first week of class. Don’t procrastinate.

ALL EXTRA CREDIT IS DUE TUESDAY JUNE 22nd. YOU MAY NOT CRAM EXTRA CREDIT INTO THE LAST WEEK OF CLASS TO GET YOURSELF OUT OF A JAM YOU GOT INTO BY GOOFING OFF. THAT’S NOT WHAT EXTRA CREDIT IS FOR! DON’T ASK FOR AN EXTENSION FOR EXTRA CREDIT. YOUR FINAL EXAM(S) ARE IN THE LAST WEEK OF CLASS.
# Optional Extra Credit Cyber-Ed Modules*

<table>
<thead>
<tr>
<th>GROUP 1 (Must be dated in May)</th>
<th>GROUP 2 (Must be dated before 6/13)</th>
<th>GROUP 3 (Must be dated before 6/22)</th>
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<tbody>
<tr>
<td>Exploring Biology</td>
<td>Protista</td>
<td>Investigating Heredity</td>
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<tr>
<td>Mitosis</td>
<td>Sponges</td>
<td>Mendel’s Heredity Principles</td>
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<tr>
<td>Meiosis</td>
<td>Cnidarians</td>
<td>Blood and Immunity</td>
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<tr>
<td>Enzymes</td>
<td>Annelids</td>
<td>Genetic Engineering</td>
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<tr>
<td>Membranes/Transport</td>
<td>Arthropods</td>
<td>Viruses and Bacteria</td>
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<tr>
<td>Cellular Respiration</td>
<td>Mollusks</td>
<td>(CyEd Chemistry) Atomic Structure</td>
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<td></td>
<td>Birds</td>
<td>(CyEd Chemistry) Acids, Bases, &amp; Salts</td>
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These Modules are optional for extra credit. SEE INSTRUCTIONS BELOW.

1. "Evolution for Everyone" Extra Credit, see lecture syllabus for details.

2. CyberEd Extra Credit

Some sort of 3-ring binder is probably best for doing this. **BUT PLEASE TURN IT IN IN A PAPER FOLDER-TYPE BINDER TO TURN IT IN.**

For each module do the following:

a) Take the Pre-test and print it out. SEE INSTRUCTIONS FOR PRINTING TEST RESULTS. THERE’S A TRICK.

b) Watch the Presentation take and take notes as you would in an on-campus class.

c) Work through the Interactive Lesson.

d) Take the Post-test and print it out. You must get at least an 85% on the Post-test. You may take it as many times as you want. SEE INSTRUCTIONS FOR PRINTING TEST RESULTS. THERE’S A TRICK. See below.

**HOW TO USE CyberEd**

*1. FIND IT

a. Go to any CSM computer in the Library and look for the CyberEd icon.

b. All the computers in LaPlata, Leonard, Waldorf and Pr. Fred. Libraries should have this program.

c. It should also be accessible at your home via the Internet. [www.cybered.csmd.edu](http://www.cybered.csmd.edu) It will not work with everyone’s particular computer, and you’ll have to download Authorware software to use it at home. See the website for instructions. If it doesn’t work at home, you will have to work on-campus.

2. ASK FOR HELP IF YOU NEED IT

a. The best person to ask for help is Ronda Jacobs, Rm LR-202 at LaPlata. or, ask at the main desk.

3. BRING EARPHONES

a. If you are concerned about catching ear cooties from CSM earphones, bring your own personal earphone from your I-Pod, etc. Or ask at the desk to borrow earphones. (It’s best to use your own.)

4. LAUNCH IT

a. Click on the "CyberEd Biology" or "CyberEd Chemistry" icon to launch the tutorial.

b. Choose the assigned tutorial from the menu and launch it The first one is called "Biology."

4. "TALK TO THE HAND"

a. Click on the Helping Hand Icon and see what’s there for you.
5. TAKE THE PRE-TEST
   a. Take the pre-test and print it out to be handed with your CyberEd project at end of semester.

   IMPORTANT !!!
   
   How To print the Test Results: YOU CAN NOT JUST PRESS "PRINT" !!! You will lose your results and have to start over. Hit the "Print Screen Key" on the keyboard up next to F12. This will Copy the Screen to the computers clipboard. Open Microsoft Word and Paste the Screen into a Word document. The Word Icon should be on the Toolbar at the bottom of your computer (it's a blue W).
   
   TO GET CREDIT: Type these TWO things on your Pre- or PostTest before you actually print it out:
   1) Your Name 2) The meeting time of your lecture class, i.e. MW 10:00. Now print out the Word document. After you do the tutorial you will take the Post-Test and print that out too.

6. WORK THROUGH THE PRESENTATION
   a. From the Main Menu, click on "Presentation."
   b. In the "Presentation Mode" Window, choose "Manual" and "Start at Beginning"
   c. Make sure the sound is turned on; adjust the volume on the computer if necessary. (see #2)
   d. Take notes while working through the PRESENTATION. Figure out how to use the "JUMP" tool and the "GLOSSARY" tool.

7. WORK THROUGH THE INTERACTIVE LESSON
   a. Return to "Main Menu" and click on "Interactive Lesson." Choose "Start at Beginning"
   b. Follow the instructions and do the Interactive Lesson. Take notes here too. This material will be on the exams.

8. TAKE THE POST-TEST
   a. You may take the Post-Test as many times as you want until you get at least an 85%!
   b. Print out the Post-Test (see printing instructions above) and turn it in with the project at end of semester.
O. LAB SCHEDULE

We 5/19: LAB 1: THE NATURE OF SCIENCE (Suggested CyberEd Modules B-1 & 15)
Th 5/20: LAB 1: (finish), and turn in Lab 1 Worksheet
Homework: Read pp. 7-17. Answer questions 1-10 pp. 18-21 (on white sheet
generated by Billeter) and turn in next Tuesday.

LAB 2: INDUCTIVE & DEDUCTIVE REASONING: Bio-Classification
Homework #1 & #2 pg 29

Tu 5/25: LAB 2: (finish) LAB 3: DEDUCTION: (start) Form and Structure of Animals
Homework: #1 pg 40
(Suggested CyberEd Modules B18-23)

We 5/26: LAB 3: DEDUCTION: (continue),
Homework: #1 & #2 pg 41 Type it on a separate piece of paper
Th 5/27: LAB 3: DEDUCTION: (finish), Turn in Lab 3 Worksheet
Homework: #3 pg 41

Tu 6/1: LAB 4: CONSTRUCTION OF AN EXPERIMENT: Enzyme Function
(Suggested CyberEd Module B-8)

We 6/2: CASE STUDY #1: The Philosophy of Science: Pre-paradigm Research. Puerperal Fever.

Th 6/3: LAB 4: CONSTRUCTION OF AN EXPERIMENT: Enzymes (finish)
Homework: Lab 4 Worksheet

LAB 5: THE MODEL IN SCIENCE: Osmosis.
(Suggested CyberEd Module B-6)

Homework p.70, #4
(Suggested CyberEd Module B-6)

We 6/16: CASE STUDY #3: Adaptation to a Marine Environment

Th 6/17: LAB 5: THE MODEL IN SCIENCE: (finish) "Be sure to Solve the Problem" p.69 and to do Review Questions pp70-74
Lab 5 Worksheet Be sure to do all Review Questions in book.

Homework: Cut out DNA models & bring to class. Read pp137-151

Tu 6/22: LAB 10: AN ANALYSIS OF A FAMOUS INVESTIGATION: DNA (start)
(Suggested CyberEd Module B-9)

Wed 6/23: LAB 10: AN ANALYSIS OF A FAMOUS INVESTIGATION: DNA (continue)
(Suggested CyberEd Module B-11)

Thu 6/24: LAB 10: AN ANALYSIS OF A FAMOUS INVESTIGATION: DNA (finish)
(Suggested CyberEd Module B-11)

Homework: Answer all questions in Lab book.

Tu 6/29: FINAL EXAM: Labs 5,6,10 and Case Studies 2&3

______________________________________________________________________

Wednesday June 16th is the last day to withdraw or change between audit and credit.
Tuesday June 22th is the DEADLINE for extra credit.

THESE DATES ARE DEADLINES, THERE ARE NO EXCEPTIONS! DON'T ASK.