

BIO111: General Biology

Spring 2008 Syllabus

Lecture

Instructor: Chrystal Ho Pao, Ph.D.

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Lecture: McLennan 211
MWF 10:00 – 10:50 am

Office Hours: Tue 1:30 pm -4:20 pm
and by appointment

Laboratory:

Lab 1 1:15 - 4:05 pm Mon **MCI 113**

Lab 2 1:15 - 4:05 pm Fri **MCI 113**

Course Description: “A concentrated study of the principles and fundamentals of biology. Basic biochemistry, cellular structure and function, energetics, concepts of basic molecular biology, and genetics are included. Laboratory is included. This course is open to majors in the School of Science and Technology only or by consent of the instructor. Prerequisite or corequisite: CH 103 or CH 111 or consent of department.” (TIU catalog)

Course Objectives: Upon successful completion of this course the student should:

1. be familiar with the philosophical basis for and the use of scientific method
2. be able to analyze major theories of origins from a Christian worldview perspective
3. be able to identify the major categories of biological molecules by their structures and describe their functions
4. know the major differences between prokaryotic and eukaryotic cells
5. be able to identify the major cellular organelles in plant and animal cells and describe their functions
6. be able to describe the structure and functions of cell membranes, inter-connections, and explain cell surface transport phenomena
7. demonstrate understanding of the basic principles of cellular respiration and energetics
8. know and be able to describe the major metabolic pathways of glycolysis, Krebs cycle, lactate and alcohol fermentation and oxidative phosphorylation, as well as photosynthesis in plant cells
9. be able to explain chemiosmotic phosphorylation
10. know the process of meiosis, mitosis, and cytokinesis and the significance of each, and be able to explain differences and similarities in these processes in plant and animal cells
11. be able to trace patterns of Mendelian inheritance of genes, predict the phenotypic and genotypic outcomes of matings using a Punnett square, apply chi square analysis to genetic data, and apply principles of Mendelian genetics to human inheritance
12. understand and have committed to memory the syntheses of DNA and RNA, transcription and translation

Course Materials (All Required):

Textbook: *Biology*, P.H. Raven and G.B. Johnson et al., 8th ed., McGraw-Hill 2008.

Lab Manual: *Biological Observations*, Shelton and Rentas, 4th ed. 2004.

Lab Notebook: Composition manual [a bound (not spiral) black and white laboratory notebook with graphed ruled pages].

Course Policies:

Groupwise E-mail Account: Please use your Groupwise e-mail for all communications regarding this class. The instructor routinely communicates with the class by sending e-mails to the class list prepared with these e-mail addresses. Even if you do not regularly use it, you should at least check it often as you will be responsible for any assignments or class updates sent to the class by this method.

Online homework: Please go to the website for ravenbiology.com to register for the use of the supporting website for the textbook. You will be required to complete some online study quizzes as homework. You will need this student section code (case sensitive): 677-F6-48A

The website also contains other helpful information like chapter notes, quizzes and answers to the end-of-chapter questions in your text.

Cell phones and other electronic devices not used for note taking, which are a distraction to the entire class, **must be turned off in class**. Violations will result in the student being asked to leave the class and receive an unexcused absence.

Readings: You are expected to have read the chapter and other assigned reading before class to facilitate your understanding of the lecture material. After each lecture, you are also expected to revisit the relevant chapter(s) of the textbook to ensure understanding of the material and the memorization of general principles. I will call on students in class, frequently and at random, to answer questions. There will also be **in-class quizzes**. You should work on the self-quizzes at the end of the chapter to assess the effectiveness of your own study.

Lecture Exams: There will be three (3) in-class examinations and a final examination during Final Exam week. Make-up exams are not allowed except under *extraordinary* circumstances (verifiable emergencies) and the instructor notified as early as possible. An unexcused absence from an exam will result in a zero for that exam. For planned excused absences, exams must be made up within one week and must be scheduled in advance with the instructor. For the examinations, you are responsible for all the material assigned, whether it is covered in class or not.

In-class quizzes: There will be unannounced quizzes given throughout the course. These cannot be made up, however, the lowest quiz grade will be dropped.

EXCUSED ABSENCES for lecture, laboratory, and exams MUST be granted by the instructor IN PERSON and IN ADVANCE. Blanket notices of extracurricular events such as sports and field trips are not considered adequate reasons for excused absences.

GRADING POLICIES:

Your final grade will be determined by the total accumulated points using the following formula:

Exams	100 X 4	400
Questionnaire	10	10
In class assignment/quiz	70	70
Online Homework	10 X 17	170
<u>Lab Subtotal</u>		<u>350</u>
	Course Total	1000 pts.

ATTENDANCE

Lecture Attendance: Attendance at lecture is expected in order to facilitate your understanding of the assigned readings. However, students are allowed up to three (3) absences if necessary. For each absence of the three not used, 1% point will be added to the composite score, for each absence beyond the three, 1% point will be deducted from the composite score. If a student enters the room after attendance has been taken she/he will be counted absent. **Classes missed for sports, field trips etc., even if cleared in advance with the instructor, count toward the three allowed.** (Note, however, that if you were to have 4 or more excused absences you would not be penalized, but would also not receive the attendance bonus.) Missed in-class assignments/quizzes cannot be made up.

COURSE POLICY ON PLAGIARISM AND CHEATING

PLAGIARISM, which is defined as utilizing another person’s ideas, works, or words as if they were one’s own, without identifying the source, will not be tolerated in any form, including written papers, exams, notebooks, or oral presentations. If you have questions regarding what is or is not considered plagiarism, please clarify with the instructor before handing in the assignment.

CHEATING, which is defined as any form of fraud or deception that results in a better grade or even a better impression of the student’s performance than she/he actually earns or deserves, will not be tolerated.

INCIDENTS OF PLAGIARISM OR CHEATING will be dealt with severely by the instructor. The penalty will include, at least, a zero for the assignment(s) involved, but could include failure of the course. Incidents of plagiarism and cheating will be reported to the Academic Dean, who has the authority to undertake further disciplinary measures in accordance with TIU policy on community standards violations.

Grading Scale*

A	94-100%	C+	77-79.9%
A-	90-93.9%	C	73-76.9%
B+	87-89.9%	C-	70-72.9%
B	83-86.9%	D+	67-69.9%
B-	80-82.9%	D	63-66.9%
		D-	60-62.9%
		F	0-59.9%

Lecture Schedule*

<u>Date</u>	<u>Assigned reading</u>	<u>Topic</u>
Jan 9	1	Syllabus, Questionnaire, Introduction to the course
Jan 11	1	Science of Biology
Jan 14	2	Nature of Molecules
Jan 16	2	
Jan 18	3	Chemical Building Blocks of Life
Jan 23	3	
Jan 25	4	Cell Structure
Jan 28	4	
Jan 30	5	Membranes
Feb 1	5	
Feb 4	6	Energy and Metabolism
Feb 6	<u>Exam I</u>	(Chapter 1 – 5)
Feb 8	6	
Feb 11	7	How Cells Harvest Energy
Feb 13	7	
Feb 15	8	Photosynthesis

Feb 18	8	
Feb 20	9	Cell Communication
Feb 22	9	
Feb 25	10	How Cells Divide
Feb 27	10	
Mar 10	11	Meiosis
Mar 12	<u>Exam II</u>	(Chapter 6 – 10)
Mar 14	11	
Mar 17	12	Patterns of Inheritance
Mar 19	12	
Mar 26	13	Chromosomes
Mar 28	13	
Mar 31	14	DNA
Apr 4	14	
Apr 7	14	
Apr 9	15	Genes
Apr 11	<u>Exam III</u>	(Chapter 11 – 14)
Apr 14	15	
Apr 16	16	Control of Gene Expression
Apr 18	16	
Apr 21	17	Biotechnology
Apr 23	17	
Apr 25	18	Genomics
Apr 28	18	
Apr 30	19	Mechanisms of Development
May 2	19	
May 7 (10:30 am) Wed	<u>Final Exam</u>	(Chapter 15 – 19)

*Subject to change based on time constraints, flow of the course and the necessities of pedagogy.

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Laboratory, Spring 2008

Laboratory Objectives:

The hands-on laboratory exercises are designed to assist students in comprehending basic biological principles by reinforcing and/or complementing concepts presented in lecture. Laboratory exercises allow students the opportunity to learn fundamental laboratory techniques. Diligent participation in laboratory exercises will enable students to develop the abilities to think critically and be detail-oriented.

Laboratory Policies:

Besides the following, all the mentioned lecture policies apply.

Safety: Biological and chemical reagents and lab equipment used in the lab can pose health and safety hazards. Therefore, each student is expected to know and obey all safety and conduct rules as outlined on p. iii of the lab manual. Each student should be aware of the various safety hazards associated with each lab exercise and take appropriate precautions to avoid accidents. Biological reagents and wastes for each lab must be properly handled and disposed of according to the instructor's guidelines. All students are expected to be responsible and professional in the use of laboratory materials (i.e. equipment, reagents, specimens, etc.)

Pre-lab Quizzes:

Quizzes (5 pts. each) pertaining to the assigned lab exercise(s) will be administered immediately at the beginning of each lab period. Therefore, it is essential that students read and prepare for the lab exercise(s) in advance and arrive on time. Students arriving late to the lab may be refused the opportunity to take the quiz resulting in the loss of 5 - 10 points.

Lab Reports:

Students are required to write lab reports (10 pts. each) in a non-spiral bound, black and white laboratory notebook using only black ink. Merely one single line should be drawn through mistakes. Students are expected to purchase an additional laboratory notebook if they fill the first one before all lab exercises for the semester have been completed. All guidelines for maintaining a laboratory notebook as described on p. iv of the lab manual must be followed. Left hand (facing pages) are to be left blank except as noted on p. iv of the lab manual.

Pre-lab preparation is expected. Students must have read the assigned lab exercise(s) before class and completed the first two sections (Purpose, Materials and Methods) before coming to lab. **50% will be deducted for late pre-lab work.** Using the textbook to complement each lab by reading related material while the lab exercise is still fresh in one's mind is highly recommended. It will also be useful to bring your textbook to lab.

Complete lab reports are due at the end of the lab period. All data and observations, results, and conclusions must be recorded in the lab notebook by the end of

the lab period. When students are done with the assigned exercise(s) for a particular lab period, their lab notebooks will be checked for completeness and signed by the instructor. Students are not to leave without obtaining the signature of the instructor. Late submissions of lab reports will NOT be accepted.

Laboratory Attendance: Prompt attendance to lab is **mandatory** due to the hands on nature of the laboratory exercises. Since the lab exercises often require partners and specific amounts of materials prepared in advance, students must attend only the lab section in which they are enrolled to avoid unnecessary disruption. Exceptions to this policy are extremely limited, and students are required to contact the instructor at least seven (7) days in advance regarding extraordinary situations that interfere with attendance to one's enrolled lab section. **One (1) unexcused absence will result in the loss of 15- 30 points (5-10 pre-lab quiz and 10-20 lab report). Two (2) unexcused absences will lower your course grade one full letter. Three (3) unexcused absences will result in a final course grade of "F" regardless of performance in other areas of the course.**

Lab Practicum:

A lab practicum will be given during the last week of regular classes during the last laboratory. The exam will be a timed exam and will represent material from all of the labs undertaken (i.e. cumulative).

Grading:

Laboratory notebooks (10 points x 17 exercises)	170
Prelab questions (5 x16)	80
<u>Laboratory practical exam</u>	<u>100</u>
Total	350

Tentative Lab Schedule:

Date Sec 1	Date Sec 2	Study Focus	Lab Exercise #
1/9	1/11	Introduction to lab; Check-in Metric Measurement, Scientific Notation	p. iii, iv. Ex. 1 Ex. 2
1/14	1/18	Scientific Method, Data Collection & Sampling	Ex. 3 Ex. 4
1/28	1/25	Biological Compounds	Ex. 8
2/4	2/1	Microscope, Cell Structures	Ex. 6 Ex. 7
2/11	2/8	Cell Membranes : Diffusion	Ex. 9
2/18	2/15	Cell Membranes : Active Transport	Ex. 10
2/25	2/22	Enzymes	Ex. 11
3/10	3/14	Photosynthesis	Ex. 13 A & B
3/31	3/28	Mitosis & Meiosis, Population Genetics	Ex. 14 Ex. 16
4/7	4/4	Transformation of <i>E. coli</i>	Ex. 26
4/14	4/18	Frequencies of Mendelian Traits Blood Typing	Ex. 17 Ex. 21
4/21	4/25	Lab Checkout & Study Session	
4/28	5/2	Lab Practicum	

Note: There is no lab on 3/17 for section 1, no lab on 4/11 for section 2.