

Biology 107: Introductory Biology: Cell Biology and Genetics

Spring 2008

Lecture: T/TH 10:35-11:50 a.m.**Labs:** All labs will be held in **ELS 109**

		Office/Office Hours	Phone	e-mail
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TA Lab___ Lab___			Science Programs Office: 546-9630	

Course Description: Biol 107 [B] Introductory Biology: Cell Biology and Genetics 4 (3-3) Prereq one semester of chemistry. *If you have not had one semester of college-level chemistry, you must see me for permission to remain enrolled in this class.* Cellular and molecular biology including genetics. **Credit not granted for more than one of Biol 101, 102, 107.**

Required Texts:

Campbell, Neil A. and Jane B. Reece. 2005. *Biology*, 7th edition, Pearson/Benjamin Cummings, New York. ISBN 080537146X.

Morgan, Judith G. and M. Eloise Brown Carter. 2005. *Investigating Biology Lab Manual*. 5th edition. Pearson/Benjamin Cummings, New York. ISBN 0-8053-7179-6. **Note: you may use the lab manual you purchased for Biol 106. You may not use a lab manual in which the previous owner has completed questions/assignments for this semester.**

General Education Requirement: Biol 107 fulfills three credits of biological science [B] and one credit of biological laboratory science [L] for General Education Requirements. All science courses fulfilling General Education requirements are focused on the **Critical Thinking University Learning Goal**. Other University Learning goals will also be addressed, and I will make this clear in the assignments related to these goals. I will also be linking course content and assignments to the 2006-07 WSU Vancouver **Campus Theme, Global Change in a Local Context**. As we study fundamental biological concepts, we will be exploring the relationship of science to social, environmental, and cultural change. Written lecture and laboratory assignments fulfill the writing requirements for general education courses. Some of these assignments will be posted in your **electronic portfolio** (e-Portfolio). This course will also **link** to course content in Chem 106, Phys 102 and Sci 220 through guest mini-lectures and assignments (see schedule of topics).

Class Website: <http://www.blackboard.wsu.edu/>

To Login: username=your WSU User ID

Password: network ID#

If you don't know your WSU User ID and network ID numbers go to

<http://www.vancouver.wsu.edu/vis/vit/vithome.html> or contact the Information Technology Help Desk by sending an e-mail to helpdesk@wsu.edu or call 509-335-0522.

You should check the class website on a regular basis for announcements. Lecture outlines (Power Point presentations), laboratory updates, and assignments will also be posted on the website. I will make every effort to post lecture presentations by 8 a.m. the day of lecture (if not before.)

Also--update your e-mail address in the myWSU system (go to my Tools/my profile and follow instructions). *Make sure that you have forwarded your e-mail from your WSU Vancouver e-mail address to your home e-mail account or to your "name.vancouver.wsu.edu" account.* (Your WSU e-mail address is inactive until you do this.)

Grading: Grades will be calculated based on a percentage of total points.

Grading scale: A=93.0%-100; A-=90.0-92.9%; B+=87.6-89.9%; B=82.6-87.5%; B-=80.0-82.5%; C+=77.6%-79.9; C=72.6-77.5%; C-=70.0-72.5; D+=67.6%-67.5%; D=60.0-67.5%; F=59.9% and below

Parameter	Points possible
Lecture Test 1	100
Lecture Test 2	100
Lecture Test 3	100
Final Exam	100
Written Lecture Assignments	50
Lecture Attendance/Participation	50
Laboratory Assignments and Exams	175
Laboratory Participation	25
Total points possible	700

Attendance Policy: You are expected to attend class. Your absences and/or tardiness will affect your general progress and that of your peers. You will receive a grade for attendance and participation in class discussions in lecture. Laboratory attendance is mandatory, and absences may not be made up. If more than two laboratories are missed, an automatic failing grade for the entire class will result.

LECTURE:

Lecture Tests: Lecture tests are a combination of multiple choice, short answer, and essay questions.

Missing Lecture Tests: If you must miss test 1, 2, or 3 for any reason, you must contact me prior to the test to discuss your particular circumstances. Documentation of emergencies (medical, etc.) is required. If I think that your excuse is valid, you may take a comprehensive make-up test, to be given the last week of classes at a time to be arranged. The make-up test will cover material on tests 1, 2, and 3 (but will not be the same questions); you will be responsible for all material covered during the semester.

Final Exam: The final exam will be comprehensive. No make-up will be given for the final exam. University policy (Rule 80) does not allow students to be given early examinations. Plan on taking your exam at the regularly scheduled time during final exam week (Time to be announced.)

Lecture Assignments: Lecture assignments will include written assignments based on questions related to lecture topics. These assignments are then used as the basis for collaborative learning in class. Written assignments are due at the **beginning** of class, at 10:35 a.m. No late assignments will be accepted.

Lecture Attendance/Participation: Collaborative learning is an integral part of this class. Group discussions may be assigned at any time during any lecture; therefore discussions are not always posted in advance on the schedule. If you miss a discussion, you will receive zero points for that day. These points may not be made up. Participation grades will be docked for inappropriate classroom behavior: tardiness, surfing the internet, e-mail correspondence, cell phone use (including text messaging), disrespectful behavior (especially to your peers), etc. will result in a lower participation grade.

Lecture Assignments:

A. Format:

- Unless otherwise noted, all assignments must be typed: 12 point font, 1 inch margins, double-spaced.
- Use of quotation marks should be kept to a minimum--it usually means that a student does not understand something well enough to explain it in his/her own words. If you DO use quotation marks to answer part of a question, you MUST be able to explain the passage to me IN YOUR OWN WORDS.
- Bring two copies to class--one will be turned in at the beginning of class, and the other will be for your use during group discussions.
- All sources, including your textbook, must be cited using APA format. See the following webpage for instructions: http://owl.english.purdue.edu/handouts/print/research/r_apa.html

B. Late assignments: All assignments are due at the beginning of class on date due. No exceptions will be made. If you are ill, you may e-mail the assignment to me, but it must arrive by the beginning of class. It is your responsibility to make sure I receive the assignment before class. I recommend that you call and leave a voice mail message if you are uncertain about receipt of your assignment. (360-546-9478) **Late assignments will not be accepted and may not be made up.**

LABORATORY:

A. TAs: The Teaching Assistants assigned to the lab sessions of Biol 107 are graduate students pursuing advanced degrees. Your TAs are in charge of teaching the laboratories, administering quizzes and exams, and grading write-ups. Questions about laboratory assignments and grading should be discussed with your TA.

B. Preparation for lab: You are expected to read the laboratory exercise before lab. Laboratory assignments include lab quizzes, exercises and written laboratory reports. Lab quizzes may include a short paper describing the laboratory experiment for the day or a summary of the concepts learned in the previous laboratory. Laboratory exercises may include completion of questions in your laboratory manual related to the assignment for the day. Laboratory reports are written in scientific report format, summarizing the experimental procedures, results and conclusions for each laboratory.

C. Attendance: Participation in the laboratory is mandatory; if more than two labs are missed, you will receive a failing grade for Biol 107. Make-up laboratories are not allowed.

D. Participation grade: Participation grades will be docked for inappropriate classroom behavior: tardiness, surfing the internet, e-mail correspondence, cell phone use (including text messaging), disrespectful behavior (especially to your peers), etc. will result in a lower participation grade.

E. Late assignments: All assignments are due at the beginning of laboratory on date due. No exceptions will be made. If you are ill, you may e-mail the assignment to the TA, but it must arrive by the beginning of the laboratory. It is your responsibility to make sure the TA receives the assignment before lab. **Late assignments will not be accepted and may not be made up.**

F. NOTE: You must earn a passing score in lab. Failure to earn a passing grade in lab will result in a failing grade in the course (Biol 107 lecture and lab). Failure to pass either the lecture or lab will result in a failing grade for the course. Students who fail the course must repeat both the lecture and lab.

Academic Integrity: When a student enrolls in Washington State University, the student assumes an obligation to pursue academic endeavors in a manner consistent with the standards of academic integrity adopted by the University. To maintain the academic integrity of the community, the University cannot tolerate acts of academic dishonesty. Academic dishonesty includes cheating, falsification, fabrication, multiple submission, plagiarism, abuse of academic materials, complicity, or misconduct in research. Academic dishonesty in this class will result in a failing grade on the assignment, quiz etc. and possible failure of the course. All instances of academic dishonesty will be reported to the Office of Student Services as dictated by University policy. Consult the WSU Student Handbook for further details:
(<http://www.vancouver.wsu.edu/ss/handbook/handbook.html>)

Disability Accommodations: Reasonable accommodations are available for students who have a documented disability. Please notify the instructor during the first week of class of any accommodations needed for the course. Late notification may mean that requested accommodations might not be available. All accommodations must be approved through Disability Services located in VMCC Lower Level (360) 546-9155.

Weather policy: For emergency weather closure policy, see:
<http://www.vancouver.wsu.edu/adm/fo/psafety/weather.htm>

Evacuation policy: Emergency evacuation plans are posted in each classroom. Read and be familiar with these plans. In case of emergency, follow these instructions.

BIOL 107 Lecture Schedule: (NOTE: This schedule is TENTATIVE, and subject to change. All changes to schedule will be posted on Blackboard.)

Date	Lecture Topic & Reading <i>(from Campbell and Reece)</i>	Assignment	Outcomes Addressed by Learning Goals
T 1/7	Chapter 5: Macromolecules, with supporting material from Chapters 2-4		
TH 1/9	Ch 5, continued	Discussion of written assignment: "Nicole Kidman's hair".	Critical Thinking (1, 2) (introduced)
T 1/14	Chapter 6: The Cell: Prokaryotic vs. Eukaryotic, Cell Structure	Link to Chem 106: Mini-lecture: pH	
TH 1/16	Chapter 6, continued		
T 1/21	Chapter 7: Membrane Structure and Function	Link to Physics 102: Mini-lecture: membrane potential	
TH 1/23	Chapter 7, continued		
T 1/28	Lecture Test 1		
TH 1/30	Chapter 8: Metabolism		
T 2/4	Chapter 9: Cell Respiration		
TH 2/6	Chapter 10: Photosynthesis	Discussion of written assignment: Glycolysis	Critical Thinking (1,2,6,9,10) (applied/used)
T 2/11	Chapter 11: Cell Communication		
TH 2/13	Chapter 12: Cell Cycle		
T 2/18	Chapter 13: Meiosis		
TH 2/20	Chapter 14: Mendel and the Gene Idea	Discussion of written assignment: Meiosis Review	Critical Thinking (1) (applied/used)
T 2/25	Chapter 15: Chromosomal Basis of Inheritance		
TH 2/27	Lecture Test 2		
T 3/3	Chapter 16: The Molecular Basis of Inheritance		
TH 3/5	Chapter 16, continued		
3/10-14	SPRING BREAK		
T 3/17	Chapter 16, continued; Chapter 17: From Gene to Protein		
TH 3/19	Chapter 17: From Gene to Protein, continued	Discussion of written assignment: Modeling Transcription and Translation: What Processes Produce RNA from DNA and Protein from mRNA?	Critical Thinking (1,2) (applied/used)

Date	Lecture Topic & Reading <i>(from Campbell and Reece)</i>	Assignment	Outcomes Addressed by Learning Goals
T 3/24	Guest Lecturer: Dr. Steve Sylvester. Chapter 20: DNA Technology & Genomics	Link to Sci 220: mini-lecture: DNA Technology & Genomics	
TH 3/26	Gene to Protein, continued		
T 3/31	Review for Test 3		
TH 4/2	Lecture Test 3		
T 4/7	Discussion of Test 3		
TH 4/9	Activity related to campus theme	Discussion of written assignment: West Nile Virus, Emerging Infectious Disease, and campus theme: "Global Change in a Local Context" Background reading: Concepts 18.1 & 18.2, 334-344	Critical Thinking (1, 2, 6) (applied/used)
T 4/14	Chapter 11: Cell Communication		
TH 4/16	Cell Communication	Discussion of written assignment: Flight-or-flight response	Critical Thinking (1, 2, 6, 8) (applied/used)
T 4/21	Activity related to campus theme	Discussion of written assignment: Golden Rice, Biotechnology, and campus theme: "Global Change in a Local Context".	Critical Thinking (1, 2, 5, 8, 10) (applied/used)
TH 4/23	Big Picture/Review		
4/28-5/2	Final Exam Week (Note: NO EARLY EXAMS; University Policy Rule 80)		

Key to Critical Thinking Learning Goals:

1. Define the question or problem and its contextual boundaries.
2. Identify and define key concepts that are the foundation for a line of reasoning.
3. Identify personal beliefs, values, etc. that can be barriers to knowing other belief systems, values, etc.
4. Evaluate underlying assumptions and values such as unstated conceptual and cultural paradigms.
5. Identify the presence of traps and blocks to creative thinking such as perceptual, emotional, or cultural blocks that interfere with the ability to explore, manipulate ideas freely.
6. Select and evaluate evidence as appropriate to the context or situation.
7. Distinguish between fact and opinion.
8. Identify contradictions and faulty logic.
9. Apply relevant causal relationships, explanations, and/or theory for addressing the problem.
10. Evaluate possible alternative perspectives, explanations, and solutions.

BIOL 107 LABORATORY SCHEDULE (Laboratory reading assignments are from Morgan & Carter, *Investigating Biology Lab Manual*, unless noted)

Week	Lab Topic/Reading	Activities/Exams	Outcomes Addressed by Learning Goals
1/7	Introduction to lab	E-Portfolios and University Learning Goals Introduction to Laboratory Blackboard Tutorial Campbell Website and DVD Review Chapter 2, Campbell: Pre-test, Activities, Self-Test BRING TEXTBOOK WITH DVD TO LAB	
1/14	Biologically Important Macromolecules/ Handout	Laboratory tests for detection of carbohydrates, proteins, lipids Discuss the scientific process, propose hypotheses, make predictions based on hypotheses.	Critical Thinking (1, 2) (introduced)
1/21			
1/28	Microscopes and Cells: Ex. 3.1-3.4: Microscopes Ex. 3.5 (A-D): Organization of cells Plant seeds for Week 8: Organisms in Genetics	Identify parts of compound and stereoscopic microscopes and practice correct use in biological investigation. Electron micrographs, study organisms and unknown samples Discussion of evolutionary history of cells	Critical Thinking (1, 2) (introduced)
2/4	Diffusion & Osmosis: Ex. 4.1 (A & B): Diffusion Ex. 4.2 (A & B): Osmosis Ex. 4.3 (A): Plant cell osmolarity Write-up: Methods Section	Diffusion of molecules: osmotic activity of animal and plant cells. Propose hypotheses, make predictions, collect data, determine dependent and independent variables, plot data points, and come to conclusions based on results of experiments.	Critical Thinking (1,2,6,9,10) (applied/used)
2/11	Enzymes: Ex. 2.3 (A,B,C) : Amylase Activity	Experimental method and action of catechol oxidase; Competitive vs. non-competitive inhibition, influence of concentration, pH, temperature on enzyme activity. Practice scientific persuasion and communication by constructing and interpreting graphs of enzyme activity.	Critical Thinking (1,2,6,9,10) (applied/used)
2/18	Cell Respiration: Ex. 5.1 (A): Alcoholic Ferm. Ex. 5.2 (A): Cell Respiration Write-up: Results Section	Alcoholic fermentation, cellular respiration, oxidation-reduction reactions Design and perform an experiment investigating factors that influence activities influencing fermentation or cellular respiration.	Critical Thinking (1,2,6,9,10) (applied/used)

Week	Lab Topic/Reading	Activities/Exams	Outcomes Addressed by Learning Goals
2/25	Photosynthesis: Ex. 6.1: Wavelengths Ex. 6.2: Pigments Ex. 6.3: Chromatography Ex. 6.4: Absorption of Spectrum for Leaf Pigments Write-up: Introduction Section	Wavelengths of light and pigments in photosynthesis. Investigative processes: Use of Paper Chromatography, spectrophometry Practice using scientific method, asking questions, developing hypotheses, making predictions, recording data.	Critical Thinking (1,2,6,9,10) (applied/used)
3/3	Mitosis & Meiosis: Ex. 7.1 (A & B): Modeling Mitosis Ex. 7.2 Plant Mitosis Ex. 7.3 (A & B): Animal Mitosis Ex. 7.4 (A-C): Modeling Meiosis Handout: Human Karyotype Ex.	Modeling the cell cycle, mitosis and meiosis in an animal cell. Observation of mitosis and cytokinesis in plant cells and animal cells Investigative processes: preparation of slides of asci in perithecia of <i>Sordaria fimicola</i> , predict and interpret arrangements of ascospores where crossing over has taken place; scientific writing	Critical Thinking (1,2,6,9,10) (applied/used)
3/10	SPRING BREAK		
3/17	Organisms in Genetics Ex. 8.1: Fast Plants Drosophila Handout (167-171) Ex. 1: Culturing Fruit Flies Ex. 2: Sex Determination Ex. 3: WT and Mutant Flies Human Genetics Handout (173-180) Ex. 5: Human Genetics	Introduction to genetic terminology. Investigative processes: make monohybrid, dihybrid, and reciprocal crosses and interpret results. Introduction of chi-square test to analyze results. Propose hypotheses, predictions, collect data, compare observed and predicted results; scientific writing	Critical Thinking (1,2,6,9,10) (applied/used)
3/24	BRING TEXTBOOK TO LAB DNA Replication and Protein Synthesis: Handout (181-188): DNA Extraction from Wheat Germ Part I.: DNA Model Building Part II: Replication of DNA Part III: Protein Synthesis	Use of models: DNA to proteins Investigation: Mutagens and DNA	Critical Thinking (1,2,6,9,10) (applied/used)
3/31	Molecular Biology: Ex. 10.1: Mapping DNA; <i>substitute instructions for Flashgels (Handout)</i> Ex. 10.2: Practice Problem Write-up: Conclusion Section	Mapping DNA using enzymes and electrophoresis Investigative processes: electrophoresis as a technique for separation of molecules; scientific writing	Critical Thinking (1,2,6,9,10) (applied/used)

Week	Lab Topic/Reading	Activities/Exams	Outcomes Addressed by Learning Goals
4/7	Microbiology I Handout (211-219) Ex. 1: Microorg. in the Environment Ex. 2: Isolation of Bt. from Soil Ex. 3: Streak Plating Ex. 4: Gram Stain Ex. 5: Capsules Ex. 6: Spores Ex. 7: Flagella <i>Design your own microbiology experiment/turn in written proposal to TA</i>	Bacteria in the environment Investigative processes: isolation of spore-forming bacteria from the environment Propose hypotheses, predictions, collect data, compare observed and predicted results; scientific writing	Critical Thinking (1,2,6,9,10) (emphasized)
4/14	Microbiology II Handout (221-229) Ex. 1: Bacterial Colonies Ex. 2: Isolation of Spore-Forming Ex. 3: Streaking Ex. 4: Bacteria Analysis of Water Ex. 5: Microbial Examination Foods Ex. 6: Chemical Agents Ex. 7: Antibiotics, etc. Ex. 8: UV Light Dilutions <i>Set up your microbiology experiment.</i>	Microbiology of foods Investigative process: serial dilutions Propose hypotheses, predictions, collect data, compare observed and predicted results; scientific writing	Critical Thinking (1,2,6,9,10) (emphasized)
4/21	Microbiology III: (Handout) Analyze results you're your experiments set up last week: Ex. 2: Bacterial Analysis of Water Ex. 3: Microbial Exam. of Foods Ex. 4: Chemical Agents/Antibiotics Ex. 5: UV Light <i>Evaluate results of your microbiology experiment.</i>	Anti-microbials Investigative processes: investigate control of bacterial growth using antibiotics, antiseptics, disinfectants Propose hypotheses, predictions, collect data, compare observed and predicted results; scientific writing	Critical Thinking (1,2,6,9,10) (emphasized)
4/28 -5/2	NO LABS— FINAL EXAMS	Full write-up (Intro, Methods, Results, Conclusion) of your microbiology experiment is due. Turn in at ELS 230 by the start time of your regularly scheduled lab.	<i>NOTE: <u>Post this full lab write-up to your Electronic Portfolio.</u> Also keep a copy for your Writing Portfolio</i>

Biology 107 Rationale Statement
Dawn Banker
12-12-07

Rationale Statement Checklist

Be as specific as needed to allow members of the Board to understand your course and how it addresses the general education components.

For each WSU Vancouver Learning Outcome that you list on your syllabus,

_____When (in conjunction with which course-specific topics) during your course will students engage with this outcome?

See Lecture and Laboratory Schedules in syllabus.

_____Which activities/assignments/discussions will allow students to practice and assess their progress towards meeting this outcome?

See Lecture and Laboratory Schedules in syllabus.

_____How will you determine whether your assignments/discussions/activities assigned to an outcome are effective?

Informal assessment will include monitoring participation and understanding during class discussions of written assignments. Formal assessment will include grades on written assignments designed to allow students to practice critical thinking. Students will also be required to design an experiment and submit a full laboratory report to their electronic portfolios to demonstrate progress towards meeting the critical thinking learning goal.

_____How do you intend on incorporating the Campus Theme into your course?

Two written assignments, “Case Study: West Nile Virus” and “Golden Rice” are designed to link to the Campus Theme. West Nile Virus is an emerging infectious disease linked to global climate changes. Golden rice is a bioengineered crop developed to address Vitamin A deficiency in third-world countries.

_____ How will you develop the link from your course to another course?

Formal links will include mini-lectures from instructors of Chem 106 (pH), Phys 101 (membrane potential), and Sci 220 (biotech). In addition, I encourage students to identify links to other courses in which they are enrolled. When I taught this course in spring 2006, students were enthusiastic about sharing insights about connections to their other courses during our lecture discussions.

_____ How do the writing or communication experiences in your course contribute to learning and to the course grade?

Students are required to submit at least seven written assignments for lecture (See Lecture Schedule in syllabus). These assignments represent approximately 7% of their total course grade. Student participation in discussion of the assignments represents approximately 7% of their total course grade.

For laboratory, students are assigned “pieces” of a full laboratory report throughout the semester. For example, students are assigned the “Methods” section of a lab report for the Diffusion and Osmosis laboratory. This assignment is graded and feedback is given so that the student knows what changes need to be made in their final “full” lab report at the end of the semester. The final full lab report is based on an experiment designed and carried out by each student. Written lab assignments constitute 10-15% of the total course grade.

_____ How will you use the ePortfolio to support your course (post assignments, use of the discussion board, method to collect feedback, etc)?

Students will post assignments to their ePortfolio.

_____ What activities/assignments in your class will result in artifacts which can be stored in the student’s repository within the ePortfolio?

Students are required to submit their “full” final laboratory report to their ePortfolio.