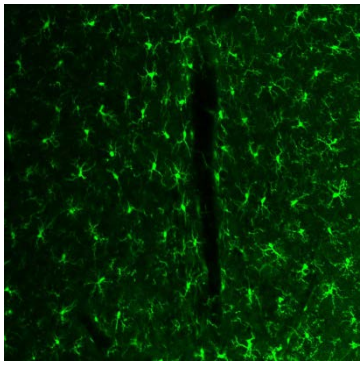
Biology 201 01: Foundations I, Cell Biology & Genetics
Spring Semester 2012, Course Syllabus



COURSE DESCRIPTION: This course, the first of three, is an introduction to the foundational concepts of biology for students who have chosen biology as a major or minor, or who need it to fulfill a scientific discovery intellectual perspective (SDIP). A combination of lectures, laboratory exercises, and assignments will introduce you to the fundamental concepts and processes common to all living organisms (cell chemistry, energy acquisition, DNA function and genetics). Various resources in lecture and laboratory will be utilized to reinforce biological concepts, enhance the learning experience and use of scientific skills, and to improve critical thinking skills.
Microglia in the brain of a stressed rat.

This course is a prerequisite for all other courses in biology, and for many that are required to complete the molecular biology, neuroscience or environmental science majors. **The concepts you learn during this course will not be reviewed again later, but will be further developed in your upper level courses. It is important that you learn and understand these concepts now.**

Instructor: Dr. Veronica Porterfield
Office: HSC 312
Office Phone: 7784
e-mail: portervm@westminster.edu
Office hours: M 2:00-3:30 pm and R 10:00-11:30am
(If your schedule conflicts with these times, please make an appointment to meet with me at another time)

Class times and Location: Lecture; M, W, F 12:50-1:50 PM, HSC 152
Lab; T 7:45 – 10:45 AM, HSC 342

Required texts: *BIOLOGY* by Campbell and Reece, *9th edition*
A Handbook of Biological Investigation by Ambrose and Ambrose, *6th edition*

Lab manual: WC Biology Faculty *Laboratory Manual for Biology 201*
(will be provided by the department of Biology)

Composition-style, quad-lined laboratory note book (available from the book store, other types of notebooks are not accepted)

COURSE OBJECTIVES: Students who successfully complete this course should:

- develop a **college level understanding** of processes that are fundamental to living organisms (cell structure and function, cell metabolism, energy acquisition and use, cell division, DNA structure and function, and molecular evolution).

- demonstrate proficiency with the scientific method of inquiry as it pertains to fieldwork and the laboratory and demonstrate proficiency with quantitative skills as they apply to data collection and analysis.

- demonstrate proficiency with reading scientific literature, critical evaluation of information, integration of scientific information, and scientific writing.

- demonstrate a sense of integrity and responsibility for their own learning.

ATTENDANCE POLICY: Attendance in labs and exams is mandatory. If you are unable to attend either a lab or an exam, you MUST inform you instructor at least a week in advance so that a 'make-up' can be arranged. It is your responsibility to meet with your instructor to find out if any assignments have been missed due to your absence and to set up arrangements to make up missed assignments. The only excused absences for exams or labs are the ones stated in the Westminster catalog (college-sponsored activities; personal medical emergencies, *etc.*) It is ***your responsibility*** to inform your instructor of your expected absence; an e-mail from your coach will not suffice.

COURSE COMPONENTS

Exams – There will be three (3) exams throughout the semester followed by a final that combines material from the fourth section of the course with comprehensive material from the previous sections. **The three semester exams and the comprehensive final are worth >50% of the course grade, so you must do well in your exams to pass the class (C-).**

Lab Modules and Research Papers – During the course of the semester there will be three, three-week long, laboratory modules. During these modules you will perform mini research projects that pertain to different topics and are designed to reinforce concepts learned in class. The results of the experiments done during each module will be written up in the style of a primary research paper from the Tri-Beta Biology Honors Society Undergraduate Research Journal; BIOS. You will be provided with guidelines on how to do this correctly. Each research paper is worth 60 points. You will also be provided with a lab protocol before you start to each lab module. You must read it so that you know what you are doing before you start. At the beginning of each module there will be a 5-points quiz on the protocol. Research papers are due the lab session following the completion of the experiment unless instructed otherwise. Late research papers will be deducted 20% of the total points per day past the due date. You will write 3 research papers this semester.

Lab Workshops and Worksheets – During the course of the semester there will also be three laboratory skills workshops during which you will learn essential, practical skills such as using pipettes, making solutions and microscopy. You will be given worksheets containing the instructions plus some discussion questions and problems, which you will fill out during the workshops. Please read them before you start. There will be a 5-point quiz on each one. The worksheets will be handed in at the end of each workshop and are worth 25 points each.

Lab Notebooks – Maintaining a lab notebook is an essential part of scientific documentation and analysis. This provides you, along with any others in your "scientific community," with documentation of all your hypotheses, ideas, observations, data, data analysis, conclusions, *etc.* **You must use pen**; pencils are not permitted. **Try to make a habit of writing as much as possible in your lab notebook.** You will need comprehensive lab book notes in order to write good research papers. Guidelines for lab notebook organization and formatting will be discussed during the first week of classes. Your lab notebook will be graded for 50 points.

Biology Seminars – You will be required to attend two biology seminars during the semester. Information about the seminar schedule is posted on the Biology Department website. Attendance at the seminars is worth a total of 20 points (10 points each).

Undergraduate Research Day – Foundations students will have the opportunity to attend and review biology and molecular biology honors research/individual investigation/capstone projects. Foundations students will be required to attend and write up 2 talks. More information on the assignment will be given closer to the date of the Undergraduate Research Day. Attendance and completion of the assignment is required. (20 points)

Discretionary points – Throughout the semester each instructor will utilize a variety of learning tools to augment student instruction and assessment of course and student goals. These include, but are not limited to, announced or unannounced quizzes at the beginning of lectures or labs, group assignments, and problem sets. ~100 points has been reserved for these activities, but depending on how many there are they may add up to more or less than 100.

Late Assignments- Late assignments will be deducted 20% of the total points per day past the due date.

COURSE GRADING:

Point breakdown

Lecture Exams (3; 100 pts. ea.)	300 points
Comprehensive Final Exam	200 points
Lab Notebooks	50 points
Skills workshop worksheets (25 pts. ea.)	75 points
Research Papers (60 pts. ea.)	180 points
Lab quizzes (5 pts. ea.)	30 points
Biology Seminars (2; 10 pts. ea.)	20 points
Undergraduate Research Day	20 points
Discretionary	100 points
Total	**975 points**

Grading

A.....	93% or greater	C^+.....	77% - 79.95%	D^-.....	60% - 62.95%
A^-.....	90% - 92.95%	C.....	73% - 76.95%	F.....	below 60%
B^+.....	87% - 89.95%	C^-.....	70% - 72.95%		
B.....	83% - 86.95%	D^+.....	67% - 69.95%		
B^-.....	80% - 82.95%	D.....	63% - 66.95%		

ACADEMIC INTEGRITY:
The issue of academic integrity is taken very seriously at Westminster. Students are expected to abide by the College Policy on Academic Integrity. The policy can be found at http://www.westminster.edu/acad/pdf/undergraduate_catalog.pdf.
I encourage you to work together and discuss your assignments with your colleagues, but **all written and oral assignments must be your own work.** Quotes, data, photographs or ideas taken from another source must be cited correctly. You will be given advice on how to do this throughout the course, but if you have any questions or doubts – you MUST ASK. **If there is plagiarism in one of your assignments, you will receive a score of zero (0) for that assignment, and a report will be sent, in writing, to the Dean. More than one incident of plagiarism may result in you being awarded an F for the course.**

Plagiarism includes: extensive quoting, paraphrasing or copying, from any other source: books, articles, websites, other students work or class material; Incorrect or inadequate citation of quotes, data, ideas or images; Directly copying experiments or research projects that have been developed by another student, or published by another researcher.

Classroom Etiquette: The classroom is the place where students will gain the most from this course, so it is imperative that we create and maintain an appropriate learning environment. In order to do so, it is important that one person speaks at a time. When I am speaking, I should have your full attention in class. If you have a question, please lift up your hand and the floor is yours. Your classmates should not be talking while you are asking your question. Any items or activities that may be disruptive to the class will not be tolerated. This includes the use of cell phones, text messaging, instant messaging, email, MP3 players, etc. Repeated disruptions and disruptive behavior in the class may result in the lowering of your grade and formal notification of the disruptive behavior to the Dean of the College. All cell phones must be switched off before you enter the class or lab.

*Tentative** Schedule for Spring 2012: M, W, F, 12:50-1:50 PM

	Dates	Topic (Chapters)	Labs
Week 1	W, 1-18-12 F, 1-20-12	Introduction to class Case Study	NO LAB
Week 2	M, 1-23-12 W, 1-25-12 F, 1-27-12	Case Study Chapter 2: Chemicals of life Continued…	Module #1: Using the Scientific Method
Week 3	M, 1-30-12 W, 2-1-12 F, 2-3-12	Chapter 3: Water and pH Continued… Chapter 4: Carbon	
Week 4	M, 2-6-12 W, 2-8-12 F, 2-10-12	Chapter 5: Macromolecules Continued/Review… EXAM I	
Week 5	M, 2-13-12 W, 2-15-12 F, 2-17-12	Chapter 6: Organelles Chapter7: Membranes Continued…	Skills Workshop #1: Solutions and pH
Week 6	M, 2-20-12 W, 2-22-12 F, 2-24-12	Chapter 8: Metabolism Continued… Chapter 9: Aerobic respiration	Module #2: Investigation of Biological Enzymes
Week 7	M, 2-27-12 W, 2-29-12 F, 3-2-12	Continued… Continued/Review EXAM II	Module #2: continued
Week 8	M, 3-5-12: No class W, 3-7-12: No class F, 3-9-12: No class		NO LAB
Week 9	M, 3-12-12 W, 3-14-12 F, 3-16-12	Chapter 12: The cell cycle Continued… Chapter 13: Meiosis	Module #2: continued
Week 10	M, 3-19-12 W, 3-21-12 F, 3-23-12	Continued… Chapter 14: Mendelian Genetics Continued…	Skills Workshop #2: Microscopy
Week 11	M, 3-26-12 W, 3-28-12 F, 3-30-12	Chapter 15: Chromosomes Continued… Chapter 16: Molecular inheritance	Module #3: DNA Testing in Humans
Week 12	M, 4-2-12 W, 4-4-12 F, 4-6-12: No class	Continued/Review… EXAM III (4-4-12) -	Module #3: continued
Week 13	T, 4-10-12 (Monday) W, 4-11-12 F, 4-13-12	Chapter 17: From genes to protein Continued… Continued…	NO LAB
Week 14	M, 4-16-12 W, 4-18-12 F, 4-20-12	Chapter 18.2: Reg' of gene exp' Continued… Continued….	Module #3: continued
Week 15	M, 4-23-12 W, 4-25-12: No class F, 4-27-12	Chapter 21: Evolutions of genomes - Continued…	NO LAB
Week 16	M, 4-30-12 W, 5-2-12 F, 5-4-12	Continued… Review or catch up Review	Skills Workshop #3: Genetics

Final: Tuesday May 8th: 8:00-10:30 AM

*This is only a ***tentative*** schedule for BIO 201 Section 01 for Spring 2012. I reserve the right to change the syllabus as the semester progresses and as I see fit. In the event there is a change, I will provide advanced notice to the students.

DEPARTMENT OBJECTIVES, COURSE OBJECTIVES, and MEANS of ASSESSMENT: Our world is increasingly influenced by natural phenomena and ethical quandaries that require reason and a basic understanding of the natural world in which we live. With this in mind, students who successfully complete this course shall understand how course objectives align with department objectives and:

Department Objectives	**Course Objectives**	**Means of Assessment**
> demonstrate breadth of knowledge about current biological concepts and principles, including recognition of the inter-relatedness of knowledge among the various biological sub-disciplines > demonstrate an understanding of diversity, organization, and functioning of the living world sufficient to insure informed participation in society and to exhibit a capacity for bioethical decision-making	> develop an appreciation for, and a college level understanding of, biological concepts that are fundamental to most living organisms (the chemical basis of life, cell structure and function, cell metabolism, energy acquisition and use, cell division, principles of heredity, DNA structure and function, and evolution)	> *exams* > *quizzes* > *lab notebook* > *research papers*
> utilize observational, investigational, and critical-thinking skills, including the ability to develop new ideas, to design, implement, and evaluate scientific concepts and theories, and to assess, interpret and understand data and their meaning > participate effectively in collaborative learning with students and faculty	> be familiar with the importance of exploration and the process of scientific inquiry; demonstrate proficiency with this method of inquiry in the field and lab (developing and testing hypotheses, collecting data, interpreting results, and discriminating among valid and invalid conclusions)	> *lab quizzes* > *lab notebook* > *skills workshops*
> communicate scientific ideas through written and oral presentation > participate effectively in collaborative learning with faculty and students	> demonstrate proficiency with reading scientific literature, discover the "art" of scientific notation, and understand the structure, style and purpose of scientific writing. > effectively communicate important concepts, hypotheses, materials and methods, results, and conclusions in a clear and concise manner > demonstrate a sense of scientific integrity and responsibility.	> *information literacy assignments* > *lab notebook* > *skills workshops* > *research papers* > *Capstone assignment*
> participate in co-curricular educational opportunities that enhance interactions with faculty and other students outside of the classroom > acquire a foundation of knowledge and skills that prepare them for a wide range of professions	> demonstrate proficiency with basic computer, internet and technology skills > demonstrate proficiency with time-management, self-motivation, and self-assessment of learning > cultivate an interest in, and appreciation for the ways in which the biological sciences are relevant to our daily lives	> *information literacy assignments* > *lab notebook* > *the College LMS* > *seminars* > *Capstone assignment*

The ultimate goal of all these objectives is to have students realize the potential of using multiple biological perspectives, skills, and tools for understanding biological processes, solving problems, and making well-informed decisions about current and future scientific discoveries and how they relate to human culture and the surrounding community of living organisms.