

School for New Learning  
DePaul University

### **Course Syllabus: SW 261 Explorations in Biology**

Instructor: Barbara Berchioli  
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MEETING DAY/TIME: W 6:30-9:30 PM  
Office Hours: after class, 9:30-10:30 PM

O' Hare Campus  
2 units

#### **Course Description**

A human is an elaborate and highly developed form of life. To appreciate the complexity of the human design we must pay attention to the tools that were used in making it: genetics and the shaping forces of the environment. The works of genetics gave rise to a form of life that was shaped by limiting environmental resources. An understanding of how humans receive their endowment of genes from previous generations will allow us to see how genes manufacture specific traits, which in turn are continuously tested and edited by the environment to ensure the continuation of the species. The theme that will be stressed throughout the course is the interdependence of the three biological subspecialties of genetics, the environment and evolution.

This course requires a substantial time commitment to the reading and understanding of a complex subject matter, nine group activities (four group activities for a five-week course), and a short summary of research findings that accompanies the final oral presentation.

Instructor's Biographical Sketch:

I completed my undergraduate and graduate work in the field of biology with emphasis in botany, at the University of Rome, Italy where I received my degree of doctor in natural sciences (M.S. in natural sciences in the US). I also completed additional graduate studies and received a M.A. in education at the California State University of Northridge.

#### **Competencies Offered**

In the following paragraphs I will outline how the requirements of each offered competence are fulfilled in this course.

S-4: Can describe and explain connections among diverse aspects of nature.

This course is specifically designed to stress the interdependence of three diverse, but related aspects of nature: genetics, the environment and the change of species over time (evolution).

S-1-A: Can explore natural phenomena or the world of everyday experiences using scientific methods, and can use theories to interpret observations.

In this course we will learn that the scientific process is a reliable method of investigation because it is based on experimental data, and because its results are testable and repeatable. Students will also see that the scientific process' logical and methodical way to solve a problem can be applied to everyday experiences.

S-2-C: Can describe, categorize and explain development or change within physical or biological systems.

In this course we will examine the principles of the theory of evolution and its power to modify the traits of a population over long periods of time.

The learning outcomes of the S-4, S-1A and S-2-C competencies will be addressed throughout the entire course. However, week two will exclusively address the learning outcomes of the S-1-A competence.

### **Learning Outcomes**

Through the completion of the S-4 competence students should be able to identify the existence of a link between genetics, the environment and evolution. The interconnectedness of genetic makeup and evolution will also become apparent when genetic variation among organisms of the same species is explained as a result of evolutionary pressures.

Through the completion of the S1-A competence students will be able to read a research study and identify all the components of the scientific process. Students will also be able to apply the steps of the scientific process to find a solution to a series of teacher created problems.

Through the completion of the S-2-C competence students will be able to explain the process of evolution of the species through natural selection. It will become apparent that mutation, crossing-over, segregation, independent assortment and fertilization are agents of genetic diversity, and that heritable genetic diversity is in turn the raw material for natural selection.

### **Learning Experience and Requirements**

Each concept covered in this course will be approached in a fourfold manner that will include class discussions, teacher's presentations, group activities and student independent research. The group activities are hands-on exercises that provide visual

cues and often use simple tools (e.g., the tools to build a cell's chromosomes and all of the stages of cell division) to present complex information through the more approachable "learning by doing" model. Once that students have been involved in class discussions and teacher's presentations, they will expand and consolidate their understanding of a topic through independent research.

Competencies in this course are satisfied in the following manner. One of the two competencies for which each student is registered is satisfied by completing the nine group activities a ten-week course requires (for a five-week course, four group activities are required). To satisfy the other competence, students must research a particular topic of their choice, which is included in the scope of the competence, and write a 2-page summary of their findings. The summary must be accompanied by an oral presentation. Students will choose what competence they want to use to write the summary and make the presentation.

### **Required Texts**

Ricki Lewis, *Human Genetics: Concepts and Applications*, Wm. C. Brown Publishers, 2008.

Additional reading material may be handed out in class or made available, via a link on Blackboard or via e-reserve.

The guidelines needed to complete the group activities will be posted on Blackboard.

### **Attendance**

Regular attendance is mandatory. Since group activities are a considerable part of a student's grade and can be completed only at the specific time they are scheduled, a student risks failing the course if he or she misses more than one class. If a class is missed the student is responsible for (1) obtaining all notes and assignments from a classmate, and (2) contact a classmate ahead of time to be the "tutor" for the missed session and (3) consult Blackboard. Students are expected to be on time and to remain for the duration of the class.

### **Class Participation**

Attendance is part of a student's class participation grade. Class participation is ten percent of the final grade for each registered competence. Students must read the assigned materials prior to class and must be fully prepared to discuss concepts, ask questions and share their insights with classmates during both the lecture/discussions and group activities.

### **Group Activities**

Students must complete nine group activities for a ten-week course (or four group activities for a five-week course), which are forty percent of the final grade of each

registered competence. Each activity comprises a written component and many of them also comprise a hands-on component. Some examples of activities in which students will be engaged include constructing a model that depicts a biological process (a model of cell division or the formation of sex cells) or predicting the inheritance of Mendelian traits. Class activities are completed in class and must be handed in no later than a week after the activity is completed. Class activities cannot be repeated. If a student misses a class section he or she will miss the points assigned to that particular activity. All class activities will be uploaded on Blackboard. Students should print a copy of each activity and bring it to class at the scheduled time. Class activities are forty percent of the final grade for each registered competence. Students should consult Blackboard for more details.

### **Summary of Research Findings**

Students must research a topic included in the scope of one of their two registered competencies (or in the scope of their one registered competency for a five-week course) and write a 2-page summary of their findings. The topic must be approved by the instructor. Students' topics will be approved during week five (or during week three for a five-week course). The submission of the summary will be followed by the student's oral presentation of his or her findings to the class. The summary must be submitted during week eight and nine (or during week four for a five-week course) or one week before the student's presentations is scheduled. Only a hard copy of the summary will be accepted. In the event of a missed submission the student **must** inform the instructor of the reasons for the missed submission and must submit the summary within one week of the missed deadline. The Summary of Research Findings is twenty percent of the final grade for each registered competence. Specific guidelines for completing the summary will be posted on Blackboard or discussed in class.

### **Oral Presentation**

Students must prepare a ten-minute presentation of their research findings on the specific topic they have investigated. A ten-minute question and answer session will follow the presentation. Presentations should serve a dual purpose: to enrich the presenter's knowledge and understanding of a topic and to create fascination and curiosity for a topic among the audience. Presentations will be delivered during week nine and ten or during week five, for a five-week course. The Oral Presentation is thirty percent of the final grade for each registered competence. Specific guidelines for completing the class presentation will be posted on Blackboard or discussed in class.

### **Criteria for Assessment**

Specific guidelines pertinent to the evaluation of group activities and the oral presentation will be posted on Blackboard and discussed in class. Typically, during a group activity, the instructor will visit all groups to answer questions, demonstrate a procedure and stir students in the right direction when completing the assignment related to the activity. Each assignment is then graded and returned to students (summative assessment).

The instructor will provide a written guideline that identifies all the components students must include in their oral presentation, (e.g., providing supporting arguments and acknowledging sources) and how points are assigned to each component. Students are encouraged to schedule a time, during the instructor's office hours, to do a mock presentation with the intent to receive feedback they can use during their real presentation (formative assessment). Likewise, students are also encouraged to submit a rough draft of their summary of research findings with the intent to receive feedback they can use to write their final draft (formative assessment). The summary of research findings will be evaluated according to the following DePaul's Written Work Evaluation guidelines (summative assessment).

### **All Written Work Will Be Evaluated As Follows:**

**A=** designates work of high quality; reflects thorough and comprehensive understanding of the issues at hand; reflects a clearly identifiable thesis and argument that demonstrates cogent and creative development and support of idea.

**B=** designates work of good quality; reflects clearly organized and comprehensive understanding of issues at hand; presents substantive thesis and argument with evident development and support of ideas.

**C=** designates work which minimally meets requirements set forward in assignment; reflect some organization and development of ideas but develops argument in superficial or simplistic manner; may only address part of the assignment or be otherwise incomplete.

**D=** designates work of poor quality which does not meet minimum requirements set forth in the assignment; demonstrates poor organization of ideas and/or inattention to development of ideas, grammar, and spelling; treatment of material is superficial and/or simplistic; may indicate that student has not done reading assignments thoroughly.

Students have the option of taking the course on a Pass/Fail basis. Students who intend to do so must inform the instructor early in the course. Once students commit to taking a course Pass/Fail, they cannot switch back to a letter grade.

In order for a student to have an incomplete grade granted in this course, there must be a significant extenuating circumstance evidenced by a student (e.g., medical and/or significant personal issues). To qualify for the IN, the student must have regularly attended class, and must have completed two thirds of assignments. The student must also initiate and file an SNL Incomplete grade contract before the ninth week (third week for a five-week course) of the course to receive an incomplete grade.

**Grading Scale:**

A = 90%-100%

B = 80%-89%

C = 70%-79%

D = 60%-69%

F = 0%-59%

**CLASS SCHEDULE (5-WEEK COURSE)**

<b>Week</b>	<b>Discussion Topic</b>	<b>Class Activity</b> (each activity will exemplify and reinforce the concepts discussed in class)	<b>Chapter in Textbook or Other Reading Material</b>	<b>Homework</b>
1	<p><b>Introduction and Overview and Evolution:</b> How are genetics, the environment and evolution interrelated? How do they relate to the competencies? How does differential reproduction produce evolutionary changes?</p> <p><b>The Scientific Process:</b> What makes the scientific process a reliable method of investigation? What are the tools of the scientific process?</p>	<p>Survival of the Fittest.</p> <p>Analyze a summary of two experiments conducted by scientists to demonstrate natural selection and identify the control group, controlled variables and the environmental pressures that triggered natural selection</p>	<p>1</p> <p>Class Notes</p> <p>Class Notes</p>	<p>Chapters 1 &amp; 2</p> <p>Consult blackboard</p> <p>Consult Blackboard</p>

		Read a summary of a controlled experiment and identify all the components of the scientific process		
2	<b>Cells and Mitosis:</b> How can inherited characteristics be explained at the cellular level? What regulates cell division and death?	Construct a 3-D model of mitosis  Mitosis tape	2  Class Notes	Ch. 3  Consult Blackboard
3	<b>Meiosis:</b> How are sperm and egg cells formed? What generates genetic variability?	Construct a 3-D model of meiosis  Meiosis tape	3  Class Notes  Approval of student's chosen topic for the summary of research findings and oral presentation	Ch. 4  Consult Blackboard
4	<b>Mendelian Inheritance:</b> How are single-gene traits transmitted from one generation to the next? Why does a trait seem to disappear in one generation and reappear in the next one?	Solve a series of genetics problems	4  Class Notes  Submission of Research Finding's Summary. Only hard copies of the summary will be accepted.	Ch. 4  Consult Blackboard

5	<b>Student Presentations</b>	Student Presentations		

## **Addenda**

### **For students Who Need Accommodations Based on the Impact of a Disability**

Students who feel they may need an accommodation based on the impact of a disability should contact the instructor privately to discuss their specific needs. All discussions will remain confidential.

To ensure that you receive the most appropriate accommodation based on your needs contact the instructor as early as possible in the quarter, preferably within the first week of class and make sure you have contacted:

- PLuS Program (for LD, AD/HD) at 773-325-4329 in the Schmidt Academic Center, room 220 or;
- The office for Students with Disabilities (for all other disabilities) at 773-325-7290, DePaul University Student Center, room 307.

### **DePaul University Academic Integrity Policy**

DePaul University is a learning community that fosters the pursuit of knowledge and the transmission of ideas within a context that emphasizes a sense of responsibility for oneself, for others and for society at large. Violations of academic integrity, in any of their forms, are, therefore, detrimental to the values of DePaul, to the students' own development as responsible members of society, and to the pursuit of knowledge and the transmission of ideas. Violations include but are not limited to the following categories: cheating; plagiarism; fabrication; falsification or sabotage of research data; destruction or misuse of the university's academic resources; alteration or falsification of academic records; and academic misconduct. Conduct that is punishable under the Academic Integrity Policy could result in additional disciplinary actions by other university officials and possible civil or criminal prosecution. Please refer to your Student Handbook or visit <http://studetnaffairs.depaul.edu/homehandbook.html> for further details.

### **DePaul University Incomplete Policy**

Undergraduate and graduate students have two quarters to complete an incomplete. At the end of the second quarter (excluding summer) following the term in which the incomplete grade was assigned, remaining incompletes will automatically convert to "F" grades. In the case of the Law School incompletes must be completed by the end of the semester following the one in which the incomplete was assigned. Ordinarily no incomplete grade may be completed after the grace period has expired. Instructors may not change incomplete grades after the end of the grace period without the permission of a college-based Exceptions Committee. This policy applies to undergraduate, graduate

and professional programs. NOTE: In the case of a student who has applied for graduation and who has been approved for an Incomplete in his or her final term, the incomplete must be resolved within the four week grace period before final degree certification.

n.b. The SNL student who wishes to receive the grade of IN must formally request in writing that the instructor issue this grade. This request must be made before the end of the quarter in which the student is enrolled in a course.

### **Protection of Human Research Participants**

[For courses with a student research component only.] This course may involve research activities intended solely for classroom learning outcomes. Collecting data from human beings for such activities do not require institutional review if there is no intent to generalize, publish, or otherwise disseminate the findings. However, students must still abide by federally-mandated guidelines for the protection of human beings who may be the sources of such data. These include, but are not limited to, keeping persons' identifiable characteristics confidential and taking care to minimize or entirely remove the possibility of mental, social, financial, or physical harm. If findings from your research activities may be disseminated beyond classroom discussion, your activities carry risk of harm to the participants, or the identities of the participants are ascertainable, students must obtain approval from the SNL Local Review Board and DePaul Institutional Review Board. Please consult with the course instructor and visit the website of the Office of Research Protections at DePaul University (<http://research.depaul.edu>) for additional information and guidance.

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- PLuS Program (for LD, AD/HD) at 773-325-4239 in the Schmidt Academic Center, room 220 or;