Course Syllabus: SW 261 Explorations in Biology

Summer Quarter 2016

General Information

Faculty: Barbara Berchiolli
School for New Learning, De Paul University,
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Office Hours: after class, 9:30 PM or by appointment
June 13, 2017-July 18, 2017

Location: O’Hare Campus

Dates/Times: T 6:15-9:30 PM

Credit Hours: 2

Required Texts

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 an intelligent mind used to make 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. More specifically, students must complete four group activities, an oral presentation, and an outline that details the contents of the 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.Ed. 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. Week one of the term will primarily 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 environmental pressures.
Through the completion of the S1-A competence students will be able to read the summary of 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 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 Strategies & Resources

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 the stages of cell division) to present complex information through the more approachable “learning by doing” model. Ultimately, students will expand and consolidate their understanding of a topic through independent research.

The one competence for which each student is registered is satisfied in a twofold manner, by completing four group activities and by preparing an oral presentation of research. Each student will choose and research a particular topic, which is included in the scope of his or her competence, and will present the research to the class. The presentation must be accompanied by a one-page outline. The outline will list the main ideas the presenter will discuss and the order in which the ideas will be discussed.

Additional reading material may be handed out in class or made available, via a link on Desire2Learn or via e-reserve.

The guidelines needed to complete the required group activities will be discussed in class or posted on Desire2Learn.

Learning Deliverables

Group Activities

Students must complete five group activities, which represent forty five percent of the final grade. Each activity includes a written component and many include a hands-on component. Constructing a model of a biological process (a model of cell division or the formation of sex cells) and predicting the inheritance of Mendelian traits are some examples of group activities. Group activities are completed in class and must be handed in no later than a week after the activity is completed. Group activities cannot be
repeated. If a student misses a class section he or she will miss the points assigned to that particular activity. All group activities will be uploaded on Desire2Learn. Students should print a copy of each activity and bring it to class at the scheduled time. Students should consult Desire2Learn for more details.

Outline of Oral Presentation

Students must research a topic included in the scope of their competence and prepare an oral presentation of their research to be delivered to the classroom. The oral presentation topic must be approved by the instructor. Students must submit for approval a one paragraph typed research proposal. The proposal must describe the topic of the oral presentation and how it relates to the competence for which the student is registered. Students’ topics will be approved during week three. The oral presentation must be accompanied by a one-page outline of the research. The outline will list the main ideas the presenter will discuss and the order in which the ideas will be discussed. The outline must be submitted during week four. Only a hard copy of the outline will be accepted. The outline is twenty percent of the final grade. The outline must include a separate “Works Cited” page with a list of at least three sources a student has used in compiling his or her outline. The sources must be cited in MLA style and at least one of them should not be a website. Specific guidelines to write an outline can be found by visiting http://owl.english.purdue.edu/owl/resource/544/01/.

Oral Presentation

Students must prepare a ten-minute presentation of their research. 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 educate and to capture audience attention. Presentations will be delivered during week five. The oral presentation is thirty percent of the final grade. Specific guidelines for completing the oral presentation will be discussed in class or posted on Desire2Learn.

Class Participation

Attendance is part of a student’s class participation grade. Class participation is five percent of the final grade. 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.

Assessment of Student Learning

Specific guidelines pertinent to the evaluation of group activities and the oral presentation will be discussed in class or posted on Desire2Learn. Typically, during a group activity, the instructor will visit all student groups to answer questions, demonstrate a procedure and guide student thinking process. Each activity is submitted within one week from the
day the activity is completed. Graded activities are returned to students (summative assessment) approximately a week after their submission.

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 of the presentation. Students are encouraged to schedule a time, during the instructor’s office hours, to do a mock presentation (formative assessment) with the intent to receive feedback they can use during their real presentation (summative assessment). Likewise, students are also encouraged to submit a rough draft of their outline of research findings (formative assessment) with the intent to receive feedback they can use to write their final draft (summative assessment). The outline will be evaluated according to the following DePaul’s Written Work Evaluation guidelines.

**Grading Criteria and Scale**

**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.

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 fourth week of the course to receive an incomplete grade.

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.

Fractional points/percentage will be rounded to the higher grade.

**Grading Scale:**

A = 93-100%
A- = 90-92%
B+ = 87-89%
B = 83-86%
B- = 80-82%
C+ = 77-79%
C = 73-76%
C- = 70-72%
D+ = 67-69%
D = 63-66%
D- = 60-62%
F = ≤ 59%

The following class schedule is tentative and subject to change at the discretion of the instructor. Any changes to the syllabus will be discussed by the instructor in class.
<table>
<thead>
<tr>
<th>Week</th>
<th>Discussion Topic</th>
<th>Class Activity</th>
<th>Chapter in Textbook or Other Reading Material</th>
<th>Homework</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><strong>Introduction and Overview.</strong> The Scientific Process: What makes the scientific process a reliable method of investigation? What are the tools of the scientific process? Evolution by Natural Selection: How are genetics, the environment and evolution interrelated? How do they relate to the competencies? How does differential reproduction produce evolutionary changes?</td>
<td>Survival of the Fittest. Read the summary of a controlled experiment and identify all the components of the scientific process. Read the summary of an experiment pertinent to natural selection and identify the control group, controlled variables and the environmental pressures that triggered natural selection</td>
<td>1 Class Notes</td>
<td>Chapters 1 &amp; 2</td>
</tr>
<tr>
<td>2</td>
<td><strong>Cells and Mitosis:</strong> How can inherited characteristics be explained at the cellular level? What regulates cell division and death?</td>
<td>Construct a 3-D model of mitosis Mitosis video</td>
<td>2 Class Notes</td>
<td>Ch. 2</td>
</tr>
</tbody>
</table>
### Course Policies

#### 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 any classes. A student can obtain permission to miss a class only in the event of an extenuating circumstance, such as a major illness or hospitalization. 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) consulting Desire2Learn to obtain a list of the missed events and classroom activities. Students are expected to be on time and to remain for the duration of each class.

This course includes and adheres to the college and university policies described in the links below:
Academic Integrity Policy
Incomplete Policy
Offices.depaul.edu (Course Withdrawal Timelines and Grade/Fee Consequences)
Accommodations Based on the Impact of a Disability
Protection of Human Research Participants

Course Resources
University Center for Writing-based Learning
SNL Writing Guide
Dean of Students Office