2015

124 The Nature of Disease Lab

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BIOL 124 The Nature of Disease Lab

Instructor: Dr. Heather Balyeat, Room 312B, 745-4324  
Office Hours: Tuesday 10-10:30 AM, Thursday 1-2 PM, Friday 12:30-1 PM

Required text: No text required, but materials will be posted on Canvas.  
Required electronic access to Canvas: Required readings, videos, and online quizzes will be posted on Canvas. You must be able to access and use it on a regular basis.

Course Description: The scientific method has resulted in historically unprecedented changes in our world. In this course you will learn how science proceeds, and practice the scientific method yourself in a weekly laboratory experience. You will learn the qualities of a good hypothesis or model, how to assess its validity, the significance of a scientific theory, and the elusiveness of "proof." On completing the course, you will be better able to understand and evaluate scientific or pseudoscientific claims that have direct impacts on your personal and professional life.

You will explore the scientific method with the nature of disease as backdrop. You will examine the causes, treatment and prevention of diseases along with their evolution. We will look at infectious and genetic diseases, as well as those with environmental causes. You will also have the opportunity to choose your own diseases to explore.

Student Learning Objectives: This course is part of the Xavier Core Curriculum, which aims to develop people of learning and reflection, integrity and achievement, in solidarity for and with others. It addresses the following core learning objectives at the introductory level:

1a: Students recognize and cogently discuss significant questions in the humanities, arts, and the natural and social sciences.
2b: Students evaluate problems using quantitative methods and arguments.
3a: Students identify and critically assess multiple dimensions of an ethical issue in an attempt to reach a conclusion.
4b: Students discuss and evaluate what constitutes human wellness.
5a: Students examine the diverse, complex, and interdependent nature of people in the world.
5b: Students examine the interconnections between humans and the natural environment.

In addition to Xavier core learning objectives, this course includes these other key learning objectives:

1. Students will utilize the scientific method, and differentiate between hypotheses/models, theories and laws.
2. Students will articulate the nature of evidence, objectivity, data interpretation, the elusiveness of "proof", and reproducibility/replicability.
3. Students will compare various types of research studies (e.g., observational, experimental, correlational, mechanistic).
4. Students will utilize analytical and quantitative skills to design experiments, collect data, and make measurements.
5. Students will construct and interpret graphs and tables, and to calculate and interpret appropriate statistics (e.g. mean, variability, correlation).
6. Students will critically analyze and distinguish claims based on science from misinformation based on pseudoscience.
7. Students will analyze claims and information that they encounter regarding science in their everyday lives based on their transfer and utilization of knowledge about science.

When you have finished this course, you should be able to effectively use your knowledge of science and the nature of disease to make decisions required in life. Whether it is making a choice in the ballot box or in the doctor's office, this course will give you tools to get you the information you need and the analysis skills to make choices that are right for you.

How to be successful in this course: Success in this course begins with attendance. Student participation is expected, and in the case of labs activities cannot be duplicated at other times. In order to participate effectively, you must complete the assignments given before class. Otherwise, you will not be prepared to participate in the conversation. For lecture, you should expect to spend an 2-4 hours per week outside of class working, and for lab you would expect to spend 2-3 hours outside of class working on course material.

Homework policy: Homework is due at the beginning of class unless otherwise stated. Deadlines for electronic submissions will be midnight on the date due. Late assignments will lose 20% of their value for each day late.

Tests: Tests and lab practical cannot be made up without making arrangements in advance or providing documentation for reason missed (illness requires a doctor's note). No electronic devices may be used during tests unless provided by the instructor. If you miss an exam or fail to turn in homework without a valid, documented excuse, you will receive a grade of zero. If you do not take an exam on the scheduled date, then you are responsible for providing satisfactory evidence to the instructor to substantiate the reason for absence within 48 hours of the missed exam. There are seven reasons that absences will be considered excused. These are mandatory participation in a University sponsored event, death or major illness in the student's immediate family, illness of a dependent family member, mandatory participation in legal proceedings, religious holy days, severe or contagious illness (doctor documentation required), military duties, or mandatory admission interview for graduate or professional school that can not be rescheduled. Please be sure that you have ample satisfactory written evidence
Lab Safety: In lab, you may be handling delicate equipment or chemicals. All students must read, sign, and adhere to the lab safety guidelines.

Student participation: This course relies heavily on active student participation. While attendance is not required, failure to attend will affect your student participation grade. Participation will be assessed at various times in the semester, either through attendance or observation of group work.

Students with Special Needs: It is my goal that this class be an accessible and welcoming experience for all students. If you are a student with a disability who may have trouble participating or effectively demonstrating learning in this course, contact me to arrange an appointment to share your Accommodation Letters from Disability Services and to discuss your needs. Disability related information is confidential. If you have not contacted Disability Services (located in the Learning Assistance Center) to arrange accommodations, I encourage you to do so by contacting Cassandra Jones, by phone at 513-745-3280, in person on the Fifth Floor of the Conaton Learning Commons, Room 514, or via e-mail at jonesc20@xavier.edu as soon as possible as accommodations are not retroactive.

Grading: Lab practicals 60%
Homework/quizzes 15%
Written paper and oral presentation 15%
Lab reports 10%

When a test or graded assignment is returned to you, you have one week from the date of its return to bring to my attention any request for grade changes. All regrading requests must be fully explained in writing and must be signed. In addition, the original paper must accompany the request for a regrade. After the one-week deadline has passed, no further grade changes will be made for that particular test or assignment.

The grading will be based upon the traditional 10-point scale with the bottom three percent of the grading range receiving a 'minus' and the top three percent receiving a 'plus' (where applicable - by University policy a 'plus' designation is not available on a grade of 'A'). Before assigning any letter grades, your grade will be rounded to the nearest integer. Thus, 92.50 is the lowest grade that will receive an unqualified 'A', 89.50 is the lowest average that will receive an 'A-', 86.50 is the lowest 'B+', 82.50 is the lowest 'B', etc A 59.50 as a 'D' is the lowest possible passing grade.

Additional Resources: Office of Student Success, 514 Conaton Learning Commons, 745-3036, Email: studentretention@xavier.edu. The Staff in the Office of Student Success is available to assist students to make the most of their Xavier experience. Personal staff consultations, success coaching, referrals to on-campus Solution Centers, and guiding students to effectively navigate their college experience are central to our work. Please visit www.xavier.edu/student-success to learn more.

Academic Misconduct: The Xavier University Handbook states "...violations of certain standards of ethical behavior will not be tolerated at Xavier University. These include theft, cheating, plagiarism, unauthorized assistance in assignments and tests, unauthorized copying of computer software, the falsification of results and material submitted in reports..." With the first cheating incident, the student will receive zero for the assignment. The second incident will result in failure of the course.

Exam dates listed will not change. However, topics can change depending on the needs and interests of the class. There will be additional due dates for projects as the class continues.

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
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<tbody>
<tr>
<td>8/26</td>
<td>Where the Wild things are-exploring the unseen life around us</td>
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<tr>
<td>9/2</td>
<td>That's what is making me hurl? Examining life in the microscope</td>
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<tr>
<td>9/9</td>
<td>No labs Spirit Day. See Canvas for assignment</td>
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<tr>
<td>9/16</td>
<td>Where it all begins-finding patient zero</td>
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<td>9/23</td>
<td>Lab practical 1</td>
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<tr>
<td>9/30</td>
<td>Ewww. Experimental design (ongoing)</td>
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<td>10/7</td>
<td>Does Nicolas Cage make people drown? Correlation and causation</td>
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<td>10/14</td>
<td>Split decisions: Mitosis/meiosis.</td>
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<td>10/21</td>
<td>One of these things is not like the other: Karyotype analysis</td>
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<td>10/28</td>
<td>Lab practical 2</td>
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<td>11/4</td>
<td>Difficult decisions. Cancer diagnosis</td>
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<td>11/11</td>
<td>My heart beats for you. Cardiovascular system.</td>
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<td>11/18</td>
<td>When is enough, enough? Diabetes</td>
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<td>12/2</td>
<td>This I know is true....Presentations</td>
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<td>12/9</td>
<td>Final lab practical</td>
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<td>Aug. 30</td>
<td>Last day to drop/add for 100% refund</td>
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<td>Nov. 23</td>
<td>Last day to withdraw from course</td>
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