BIOLOGY 105 - CONTEMPORARY BIOLOGY - FALL 2021

Course Description.

The course is "issues based". What this means is that instead of the traditional model of working through the facts and ideas of biology and then connecting it to examples in real life, we will consider four main themes (plus news) and fit the science into these themes. The themes are listed below.

Master Theme 1: Cancer. Almost everyone knows someone who has cancer, who succumbed to it or (thankfully) overcame it. We will discuss cancer and its origins. This will involve a survey of cell structure and function with particular emphasis on the process of cell division. Then we will consider the characteristics of cancer and their medical diagnoses. We will then delve into the causes of cancer with particular emphasis on the genetic mechanisms. Finally, we will talk about the hope for new rational medicine and treatments that potentially could get the root of the disease as opposed to simply treating the symptoms, or even worse, simply making the last days of the cancer patient less miserable.

Master Theme 2: Sickle-Cell Disease and other genetic diseases. Genetic diseases, including sickle cell disease, cystic fibrosis, Huntington's disease, etc. cause untold suffering in real people. We will first conduce an overview of genetic diseases. We will then briefly consider the role of the circulatory system for context. Then we will delve deeply into the central dogma of biology and consider DNA and gene expression. After consideration of sexual reproduction and inheritance, we will discuss treatment of genetic disorders including gene therapy. Excitingly, there is very exciting news on gene therapy for this disease that I hope and expect will provide real long-term relief to patients. (In a sea of recent bad news for in health recently, this is a ray of great news!)

Master Theme 3: Influenza and COVID-19. Viruses make up the most numerous objects in the biosphere but do not meet all the standards for being alive as does cellular-based life. As we have certainly seen recently, they have direct health consequences for humans. We will consider the characteristics of viruses with special reference to those that cause the human flu and COVID-19. This will include a discussion of how viruses can exploit the central dogma of cellular life to their benefit and their host's detriment. We will also consider aspects of their life cycles that make treatment with medicines so difficult and ways to get around these. We then will talk about the evolution of viruses, why the flu vaccine is frequently is only partially effective and how the virus that causes COVID-19 was evolved the ability to infect humans. Finally, we will consider how the immune system works and discuss progress towards a possible "universal" flu vaccine and the development of a vaccine that might work against the cause of COVID.

Master Theme 4: Climate change. We will fist consider the evidence for human-induced climate change. Then we will talk about the mechanism that has given rise to these changes. The role of carbon and the earth's carbon cycle will be examined. Then we will move onto the possible consequences of these changes and options for addressing climate change as a society.

Books and Materials.

The "textbook" will be Connect Master: Why Biology 2.0 by Windelspecht. The easiest way to get this is from the Connect course through Canvas. The price online is $90, you would need a credit card or PayPal for this. If you are waiting for scholarship money, you can sign up for complementary access for up to two weeks from the time the first person in the class signs up for it. You can also get an access card from the bookstore (ISBN is: 9781264249206, The author is Windelspecht, Connect Master 2.0 Why Biology?). When ordering materials and when accessing them, please get to McGraw Hill through Canvas. This is easier and will ensure you get credit for your work.

We will also be having in-class quizzes using TopHat. TopHat is free to you (the college pays for it). You will be getting an invitation via email a few days before the class opens.

IMPORTANT: when registering for access to Connect and TopHat, please use your full Geneseo email address "abc123@geneseo.edu" and if appropriate your full Geneseo G number "G0012345" (where the 0s are zeros). We have had all kinds of problems with alternate emails "smiley_toothless@gmail.com" or butchered G numbers that result in students not getting credit for their work.

Course Management system.

We will be using Canvas for both the lecture and the lab. From the Geneseo main webpage, go to myGeneseo (the shield on the banner), choose canvas then choose this lecture course (there will be separate Canvas courses for the lab and lecture). From Canvas, you can get access to all needed materials. These include access McGraw Hill Connect, supplemental materials, quizzes etc.

Assignments and due dates:

There will be an average of several assignments per week. These will be accessed and submitted through Canvas.

Instructor.

Dr. Harold Hoops, ISC- 353
Telephone: (585) 245-5378
Remote (Zoom office hrs): M and R, 9:00-10:00 am. Tues 8:00-9:00 pm. These can be reached though Canvas.
In person office hrs (ISC353): W 4:00-5:00 & F 9:30-10:30, or by appointment. (Subject to change after fall 2021 faculty obligations are announced)
E-mail: hoops@geneseo.edu

SI:

Josh Thomas
Email: jdt5@geneseo.edu

Course Mission Statement & Learning Outcomes.

Contemporary Biology (BIOL 105) is a non-biology major's course which, when taken together with the laboratory (BIOL 106) fulfills a Natural Science core requirement at Geneseo. BIOL 105 is a lecture course that concerns the application of biology to contemporary personal, social, and environmental problems, especially those resulting from the use of modern technology.

The goal of Contemporary Biology is:

> *To promote "biological literacy" rigorously and interestingly enough to act as a springboard for future elective studies in biology and to provide a level of skill and understanding that benefit informed citizens as they face life-science related issues (e.g. medicine) in the future.*

Specific Learning Outcomes

1. Develop skills of observation of the living world.
2. Know the basic facts and concepts underlying contemporary biological issues especially issues related to genetic engineering, medicine, and global change.
3. Understand and use scientific reasoning to solve biological problems.
4. Acquire learning skills including locating information and critical thinking to become an independent lifelong learner.

How and What Will You Learn?

Many non-majors Biology courses nationwide are simply watered-down versions of introductory biology courses designed for beginning Biology majors. But the main goal of courses designed for Biology majors is in getting students prepared for advanced study in biology. One of my touchstone principles for this course, is that I want to focus on things that will help inform non-majors about aspects of Biology that are relevant to the increasingly science-centric world we live in rather than prepare you for courses you will never take.

As a result, I have striven to reduce vocabulary and isolated factoids as much as possible. Over the six years I have taught this course, I reduced the reading by about 75% and the bolded words by about 85% from that required by the previous instructor. By moving to an issues-based format where much of the material will be connected to one of four contemporary issues, I have reduced content still further. So, while there is less material to fight through, I expect a higher level of mastery on what is left. College expectations are that you should spend about 9-12 hours a week for a three-credit lecture class inside and outside of the classroom. (Thus 15 credit hours = about 45 hours per week effort = a full-time job.) This includes any time spent in class, reading, doing homework, taking quizzes and exams, watching videos etc. This is a college wide average – some course might require considerably more for individuals with varying talents and backgrounds. This assumes you are studying efficiently. See the Canvas resources I have provided for hints on how to make the most of your study time.

There are multiple studies that indicate that it is more efficient if you spend this much time every week, regardless of the exam schedule, rather than to cram for exams. Also endeavor to study actively – re-reading the text or re-watching videos text multiple times is less effective than reading or watching it fewer time but thinking about what you read. Flashcard studying done well can probably

earn you a "C" – to do better you will have to demonstrate the ability to understand the topics thoroughly and to be able to use information to solve novel problems.

I take the title of the course, Contemporary Biology, very seriously. I expect that perhaps 30% of the course will be supplementary information, too new to be in any textbook. Obviously, that includes information on the virus that causes COVID-19 (severe acute respiratory syndrome coronavirus 2 or SARS-CoV-2), its epidemiology, mode of action and possible treatments. The portion of your grade based on this non-textbook information will be roughly proportional to the time spent on it. Because of the nature of the course, I would suggest not even bothering to look for older course materials (such as exams) to study from, as this year's material and expectations will be different from last year's.

Evaluation.

There will be five grading pools:

1) Pool A will be assignments that are not principally about content. Components might include assignments that allow me to get to know you, to find out what topics interest you, class surveys etc. Each assignment will be graded individually as pass/fail where pass gives you 100% credit. Any assignment that displays a reasonable effort and is finished by the deadline will pass. This pool will make up a minority of your grade but will also not take much time. An honest effort ***will*** help your grade.

2) Pool B will be assignments that are directly associated with learning but are formative. You will get full credit by accomplishing these by the deadline. These will principally be what McGraw Hill calls "Pre-work". These assignments ask quiz questions, but if you get a question wrong it will ask another question about the concept until you get them right. You should use the pre-work quizzes to identify gaps in your understanding and to inform you reading and studying. You can do them before or after your reading. You must do them by the deadline, but completing the pre-work will result in 100% regardless of how many questions you get wrong initially. Of course, it will take longer to do if you do not yet understand the concepts before doing the pre-work.

3) Pool C will be evaluative, but with resources. For example, there will be a "homework" quiz after each module topic in MH Connect. These will have a liberal timing schedule and allow you to look up answers in your notes or the materials, but not necessarily long enough if you have not studied the material before taking them. There will also be similar quizzes based on some material presented in class, but not in the textbook.

4) Pool D will be in class in-class questions that relate to material being covered that day or from material taken from previous classes. These quiz-type questions will be given using an interactive system called TopHat. You will be given a free account to TopHat. To use it, you must bring a smartphone, tablet or your laptop computer to class. These quizzes should be an incentive to make sure you keep up with the work and to help you to understand materials and problems presented in class. You will be given some credit for participation but must get the correct answers for full credit. You must be in class to participate. Because we recognize that emergencies arise, and you may not be able to do all the reading or make all classes, the lowest 25% of the scores for the semester will be dropped. Because of this, no make-up quizzes will be given if you must miss class, if your devise acts up or you otherwise have a bad TopHat day. The average of the remaining 75% of the scores will be

counted for the grade. Again, taking these in-class quizzes seriously will almost certainly improve you grade.

4) Pool E will be exams. These exams will be about 35-40 questions long, and your will take them from within Canvas. You will have 50 minutes to complete them. They will be taken in class (so you will need to bring your laptop). The questions on these examinations will emphasize critical thinking and using the information – simple word recognition is not enough. You may bring a single 3x5 card to the exam with anything you want hand-written on it. (Hint: the card is great for writing down details you might otherwise forget, but it is not a substitute for knowing the material. Over the years I have discovered that the students with the most laboriously constructed cards (who might have spent more time making their cards than studying) and those with the sloppiest cards (who might not have spent enough time preparing for the exams) do less well than students with an intermediate level of detail.)

There will be 5 exams, 4 regular ones and a comprehensive final made up of questions closely patterned on exam questions used on the first 4 exams. Your lowest score of these five exams will dropped. If you are unable to take one of the exams for any reason, that will be the one that gets dropped. If you know that you will miss a scheduled exam for any valid and documented reason, please contact the instructor before the exam – he might allow you to take it *before* the scheduled time. In any cases of verified multiple illness (e.g. if you have more than one excused exam), I will make substitute exams available during the final week. Note that grades in this section are likely to be considerably lower than the other pools. Use the materials in pools a-d to prepare for these exams.

Contribution of each pool to your final grade.

Pool A: feedback	05% of final grade
Pool B: formative MH	20% of final grade
Pool C: homework MH quizzes	20% of final grade
Pool D: in class TopHat	15% of final grade
Pool E: exams	40% of final grade

Note that pools A and B depend on effort alone and should guarantee you 100% on a quarter of your grade. It is really important not to miss these points!

Letter grades will be awarded based on the following point distribution:

> = 93%	A
90-92.99%	A-
87-89.99%	B+
83-86.99%	B
80-82.99%	B-
77-79.99%	C+
73-76.99%	C
70-72.99%	C-
60-69.99%	D
< 60%	E

Deadlines: Deadlines will be posted in Canvas associated with all assignments and will usually be announced in class as well. It is your responsibility to meet them. If the materials are available to you

for multiple days, you don't get to claim that you deserve an extension because something came up the day it was due. For pools A and B, you might be able to get an extension with a verified excuse. For pool C, you will be penalized 20% a day. It is still worth doing if you are late, but it is better to get it done on time. Note that the late penalty might not be applied for a week or more after completing the activity. I normally do not give extensions on exams, but remember your lowest exam will be dropped.

Communication: When appropriate I sometimes send out announcements/reminders/hints using the Canvas announcement feature. I will try and use this responsibly, rather than deluge you with constant notifications that can be ignored. In turn I ask that you have Canvas notify you of class announcements from me, rather than turn off notifications.

Accommodations: SUNY Geneseo will make reasonable accommodations for persons with documented physical, emotional, or cognitive disabilities. Accommodations will also be made for medical conditions related to pregnancy or parenting. Students should contact the Office of Disability Services (https://www.geneseo.edu/dean_office/disability_services) and their instructors to discuss needed accommodations as early as possible in the semester.

Religious holidays: We respect all religious holidays. Contact your instructor if any such conflicts arise *before* the due date of any assignment or exam.

Exam dates:

Exam 1: Wed, Sept 22, in-class 11:30-12:20
Exam 2: Wed, Oct 20, in-class 11:30-12:20
Exam 3: Mon, Nov 15, in-class 11:30-12:20
Exam 4: Fri, Dec 10, in-class 11:30-12:20
Exam 5: Taken during finals week in the classroom, Wed Dec 15, 8:00 am

Please note: The exams are spaced as evenly as practicable. I am not going to force content to wrap-up at particular dates, so that the exams are unlikely to match one to one with the major themes.

Calendar: The due dates for the exams are listed in the syllabus and in Canvas. Other assignments will be listed only on Canvas.

Class time: M, W, F from 11:30-12:20, Newton 204.

Request for feedback on sensitive issues: We may consider some sensitive issues in this class. As a person of privilege, I will attempt to be sensitive to past or current injustice. If I do say something that you feel is inappropriate or insensitive, please tell me or the SI so that I may address it. Such a comment might be the result of poor phrasing that I can clarify. But if it is the result of my ignorance, then I (and perhaps the class) can learn from it.

Self-Isolation and quarantine: If you are feeling sick or have a potential exposure to SARS-CoV-19, please contact Student Health and Counseling and the Dean of Students (Dr. Lenard Sancilio). They will contact us. Although this course is meant to be face to face, we will accommodate isolated and quarantined individuals as best as possible. Thus, we will make available remote zoom access to the lecture, access to exams etc. There is no mechanism to award TopHat points for these days, but for the duration of self-isolation or quarantine we will excuse students from them. Please

go through the college for this; it is not possible to make special arrangements for everyone who just doesn't feel like coming to class today.