BTEC 1000

Biotechnology: Engineering Life

CATALOG DESCRIPTION: Biotechnology uses materials from living organisms to improve the quality of life: insulin saves lives, smallpox has been eradicated, and altered organisms can produce biofuel. In this course, students conduct experiments that are used in biotechnology, explore current global issues, and consider the ethical implications and conflicts inherent in altering living organisms to improve lives.

IN-DEPTH COURSE DESCRIPTION: Biotechnology has eradicated smallpox from the globe, altered crops, and produced mosquitos that can reduce transmission of diseases (and spread beyond geopolitical boundaries). Now it’s genetically engineering patients’ own immune cells against certain cancers—if the patient can afford it. And while current laws forbid it, the technology exists to genetically engineer human babies. *Biotechnology: Engineering Life* combines hands-on experimentation with analysis of the effects of these powerful technologies on global populations, both human and non-human. The signature assignment requires students to research and think critically about a current issue in biotechnology, explore the various possible effects of the issue, and form an opinion on what should or should not be done. Students will be expected to use legitimate, evidence-based sources, and to justify their choices of sources. Students must effectively communicate their knowledge and opinion of a current issue in biotechnology, in a modality of their own choice, and use graphs and/or other quantitative data in their analysis. Because biotechnology is predominantly a tool of educated, wealthy populations, the assignment requires students to consider the effects on human populations that may not have the resources to use the technologies themselves, and those who might disagree with their use. Students will be given the opportunity to realize that we are not isolated populations but that the choices we make will have a broad impact eventually felt by all peoples.

LEAD INSTRUCTOR: Jean M. Bower, PhD

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801-957-6337

JHS 257 (please feel free to come by and talk!)

PREREQUISITES: None.

COURSE MATERIALS: Students need access to the Canvas online course management system (slcc.instructure.com). Instructional material can only be accessed through Canvas.

COURSE FORMAT and OBJECTIVES: The course uses a hybrid, competency-based format in which online instruction and activities are reinforced by select laboratory experiences. Students may conduct experiments during the open lab hours whenever it suits their own schedule.

This course has four primary learning objectives (referred to as competencies). Within each competency, there are multiple objectives.

1. The student explains how biotechnology can both benefit and harm members of the global population.
2. The student produces a genetically modified organism (GMO).
3. The student purifies a useful protein from a genetically modified organism (GMO) in a process analogous to modern pharmaceutical production.
4. The student analyzes their own DNA to predict a (non-medically relevant) trait.

LEARNING LAB: **JHS 263**. The standard hours for the learning lab are Monday – Thursday 10am – 8pm, Friday 10am –4pm, and Saturday 8am – 2pm. Semester breaks and college holidays are observed. Students must sign up for lab time through [biotech.youcanbook.me](http://biotech.youcanbook.me/). All students who work in the lab must clean up after themselves, participate in community chores, and maintain an environment conducive to experimentation and learning for all who use the learning lab. **To receive credit for completing the labs, you must have an instructor sign off in the Lab Log Book.**

GENERAL EDUCATION: This course fulfills the International and Global Learning requirement (with focus on Global Learning) for the General Education Program at Salt Lake Community College. Each student in General Education courses at SLCC maintains a General Education ePortfolio. Instructors in every Gen Ed course will ask you to put at least one assignment from the course into your ePortfolio, and accompany it with reflective writing. It is a requirement in this class for you to add to your ePortfolio, and this syllabus details the assignments and reflections you are to include. Your ePortfolio will allow you to include your educational goals, describe your extracurricular activities, and post your resume. When you finish your time at SLCC, your ePortfolio will then be a multi-media showcase of your educational experience. For detailed information visit:<http://www.slcc.edu/gened/eportfolio> or [http://eportresource.weebly.com](http://eportresource.weebly.com/)

Starting Fall 2016, all students new to SLCC will use Digication as their ePortfolio platform. Any students who have created ePortfolios prior to Fall 2016 on other platforms will be allowed to continue using those sites. For Digication tutorials, please go to the following site:

<https://slcc.digication.com/slcc_digication_tutorials/Welcome/>

If you would like in-person help with your ePortfolio please visit an ePortfolio Lab on the Taylorsville-Redwood, Jordan, or South City Campus during business hours, and staff will help you. No appointment necessary. For lab hours and locations please look at the following site:<http://eportresource.weebly.com/lab-information.html>

Questions regarding the ePortfolio can be directed to Emily.Dibble@slcc.edu.

SIGNATURE ASSIGNMENT: Students will research a current issue in biotechnology, and create some form of media (e.g., podcast, video, article) that explains the technology, its applications, and how its use or non-use will affect the global population. Because biotechnology is predominantly a tool of educated, wealthy populations, students must especially consider the effects on human (and non-human) populations that may not have the resources to use the technologies themselves, and those who might disagree with their use. The signature assignment must be uploaded to the student's eportfolio.

Related general education learning outcomes:

* Students communicate effectively.
* Students think critically and creatively.
* Students develop civic literacy and the capacity to be community-engaged learners who act in mutually beneficial ways with community partners.
* Students develop the knowledge and skills to work with others in a professional and constructive manner.
* Students develop computer and information literacy.

GRADING: Your grade in this course is determined by successful completion of three labs, and several Canvas submissions, as shown in the table below. To get credit via the Lab Log Book, you must obtain an instructor’s signature certifying successful completion of the lab. Always log your progress before leaving the lab.

**Students must achieve a B or better on all aspects of each assignment to proceed to the next biotechnology course.**

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| **Assignment** | **Weight** | **How do I get credit?** |
| pGLO Transformation Lab | 20% | Lab log book |
| GFP Purification Lab | 20% | Lab log book |
| Testing Your Own DNA Lab | 20% | Lab log book, plus Canvas submission of figure, hypothesis, and conclusion |
| Research a Diagnostic Test | 20% | Canvas submission |
| Current Biotechnology Position Paper | 20% | Canvas submission of ePortfolio link |
| **Total** | **100%** |  |

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| --- | --- |
| **Final %** | **Grade** |
| 90–100 | A |
| 80–90 | B |
| 70–80 | C |
| 60–70 | D |
| Below 60 | E |