Course Description:

Number and Title:

BIOL 4202L (CRN 80712), Biotechnology Laboratory

Credit Hours:

3.0 semester credit hours

Catalog Description:

An experiment-based course in which students use DNA technology to explore topics such as DNA fingerprinting, gene cloning, DNA amplification, genetically modified foods and organisms, gene therapies, inheritance and paternity, and human genetic diseases.

Course Requirement:

Pre-requisite: BIOL3250 and BIOL3250L; BIOL3201

Computer Requirement:

Each CSU student is required to have ready access throughout the semester to a notebook computer that meets faculty-approved hardware and software requirements for the student's academic program. Students will sign a statement attesting to such access. For further information on CSU's Official Notebook Computer Policy, please go to http://itpchoice.clayton.edu/policy.htm .

Computer Skill Prerequisites:

- Able to use the Windows™ operating system.
- Able to use the Microsoft Word™ word processing program.
• Able to send and receive e-mail using the Outlook™ or Outlook Express™ program.
• Able to use a Web browser (preferably Microsoft Explorer™).
• Able to print documents either on your home computer's printer or Smart Print (networked printers on campus).

In-class Use of Student Notebook Computers:

• Student notebook computers will be required periodically in this class. Students will also use the computers to access supplemental lectures, laboratory assignments, protocols, review sheets, internet information, and to communicate with the instructor.

Course Objectives:

• To understand the fundamentals of molecular biotechnology
• To understand the processes involved in DNA replication, RNA synthesis, and protein translation
• To describe the basic application of recombinant DNA technology
• To understand commercial application of DNA technology and use in medicine and research
• To learn to use basic biological laboratory equipment
• To understand and use laboratory math and chemistry
• To learn to perform basic molecular biology techniques
• To learn to prepare laboratory notebooks and write laboratory reports based on experimental data, results and conclusions
• To apply critical thinking and problem-solving skills to laboratory situations
• To learn how to prepare research proposals
• To understand the regulation and patenting of biotechnology inventions

Student Learning Outcomes:

BIOL 4202L supports the following outcomes:

After completing the B.S. in biology program at Clayton State University, graduates will have the ability to:

1. Explain the biological core concepts: evolution; structure and function; information flow, exchange, and storage; pathways and transformations of energy and matter; and systems.
2. Formulate hypotheses and collect, evaluate and interpret scientific data to solve problems in biological science and supporting fields.
3. Apply quantitative reasoning, modelling and simulations, and laboratory skills to answer questions in the biological sciences.
4. Relate knowledge of the other sciences, including computer and social sciences, to biological concepts and skills.
5. Communicate ideas to others outside the sciences and the ability to collaborate with other disciplines.
6. Identify and describe the impact of biological science on the environment and society.

Teacher education standards:

The mission of the Teacher Education Unit is to prepare professional educators who engage in reflective practice and who are competent, caring, committed, collaborative, culturally responsive, and prepared to teach diverse learners in an ever-changing society.

The content of this course syllabus correlates to education standards established by national and state education governing agencies, accrediting agencies and learned society/ professional education associations. Please refer to the course correlation matrices located at the following web site:

http://www.clayton.edu/teachered/standardsoutcomes

Instructor Information:

Dr. Fran Norflus  
Office:  Natural and Behavioral Sciences Building (NBS), Room 153 before August 30, NEW Science Building NBS 135E afterwards  
Phone: 678-466-4852  
e-mail: FNorflus@clayton.edu  
Office Hours:  
Tuesdays and Thursdays from 1:00 – 3:30 PM  
Online virtual office hours Sundays 8:00 – 9:00 PM

Class Meetings:

Laboratory Annex Building, Room 210  
Tuesday and Thursdays, Room C21, 9:45 – 12:35 PM
Textbook and Supply Information:

Textbook Information:

Basic Laboratory Calculations for Biotechnology
Lisa Seidman

ISBN #: 978-0-13-223810-6

Note: Additional reading and laboratory materials will be provided by the instructor.

It is also recommended that you have handy your microbiology or genetics textbook. You may want to refer back to these books for additional background information on the laboratory techniques that we will be performing.


Students must bring to class a laboratory coat, goggles, laboratory notebook, pencils and pens. At times, you may need your cell phone or other camera to take pictures of laboratory experiments.

Cell phones will NOT be used at other times.

In the beginning of this class, we will learn how to use certain equipment and how to perform calculations. Once we start performing experiments, each student will be required to wear his/her laboratory coat and goggles. NO EXCEPTIONS!!!
**Evaluation:**

<table>
<thead>
<tr>
<th>Item</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skills test</td>
<td>50 points</td>
</tr>
<tr>
<td>Exam 1</td>
<td>200 points</td>
</tr>
<tr>
<td>Project poster based on original research project*</td>
<td>50 points</td>
</tr>
<tr>
<td>Lab notebook *</td>
<td>50 points</td>
</tr>
<tr>
<td>Lab Report #1 (pGLO)*</td>
<td>100 points</td>
</tr>
<tr>
<td>Lab Report #2 (PCR)*</td>
<td>50 points</td>
</tr>
<tr>
<td>Assignments/Quizzes (your top 5 quizzes will count)</td>
<td>50 points</td>
</tr>
<tr>
<td>Final exam</td>
<td>100 points</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>650 points</td>
</tr>
</tbody>
</table>

*Descriptions of these assignments will be posted in separate documents in D2L.

Many of these assignments require performing math calculations. If you do not learn how to do them, you will not do well in this class.

Dr. Norflus does not think that you need a calculator to perform these calculations. If you do, then you have not set up the calculation correctly. But, you can use a standard non programmable calculator on the tests and quizzes. You cannot use your cell phone.

Although you will not get any points for it, students may be asked to explain the experiment that will be performed on a given day or other background information.

There will be 3 opportunities for extra credit in this class. Do not ask if there are any other opportunities because the answer will be NO. Each opportunity is worth 10 points. Some activities require more time than others but they are all worth 10 points. You may have to adjust your work or other activities scheduled at this time.
1. On October 15, there is a volunteer opportunity at Reynolds Nature Preserve which is near campus. More details will be given later in the semester but it will take place during class time.
   - [http://www.reynoldsnaturepreserve.org/](http://www.reynoldsnaturepreserve.org/)

2. On Saturday, October 31 (yes, Halloween), Clayton State will be involved with a STEM initiative/YELL academy. Students from a local middle school will visit Clayton State and you can design/help in teaching some of these students about biotechnology or any other aspect of biology. More details to follow.

3. At the end of every semester, there is a research symposium for students who give oral and poster presentations about the research that they performed during the semester. These presentations are usually the last Friday of classes. Tentatively, the date is December 4.

Dr. Norflus may not be at some of these activities but other teachers will be there. You will be required to put your name on the sign in sheet if you want to get credit.

**Grading:**

Your final grade will be determined as follows:

<table>
<thead>
<tr>
<th>grade</th>
<th>percentage range</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>90 - 100%</td>
</tr>
<tr>
<td>B</td>
<td>80 - 89%</td>
</tr>
<tr>
<td>C</td>
<td>70 - 79%</td>
</tr>
<tr>
<td>D</td>
<td>60 - 69%</td>
</tr>
<tr>
<td>F</td>
<td>below 60%</td>
</tr>
</tbody>
</table>

**Mid-Term Progress Report**

The mid-term grade in this course will be based solely on your grade for the first exam. Based on this grade, students may choose to officially withdraw from the course by **Friday October 9, 2015** and receive a grade of "W".

The course schedule will be posted in a separate document.
Final Examination Schedule:

<table>
<thead>
<tr>
<th>CRN</th>
<th>Instructor</th>
<th>Date of final exam</th>
<th>Time of final exam</th>
</tr>
</thead>
<tbody>
<tr>
<td>80712</td>
<td>Norflus</td>
<td>December 3, 2015</td>
<td>9:45 AM – 11:45 AM</td>
</tr>
</tbody>
</table>

Course Policies:

**Laboratory Safety:**

Students must follow safety rules and guidelines at all times. These rules will be discussed during the first meeting. If a student misses the first lab meeting, he/she will be required to read about the safety rules and watch a film before being allowed to perform any experiments.

Students are encouraged to report any violations of the safety rules to the instructor immediately. **Failure to follow specified safety rules will result in dismissal from the laboratory and receive a grade of zero for that lab.**

**Under no circumstances, may you come to class in sandals, flip flops, high heels, shorts or short skirts/dresses.** If you do, you will need to leave the laboratory and receive a grade of 0 on all lab assignments for that day. **You must wear covered shoes!!!! You must comply with this dress code even if we are not performing a laboratory exercise on a specific day.**

No eating or drinking will be allowed in the lab. You may not bring any food or beverages to the laboratory. If you do have anything, it must be in your book bag covered and out of site. You may not have any beverages on the bench tops, even if they are closed. If you are caught with any food or beverages, you will be asked to leave the lab and you will receive a grade of 0 for that lab.

**Laboratory Attendance:**

Students are expected to attend all class meeting. However, I will not take attendance. But, you will need to explain to your lab partners why you could not do the laboratories but they needed to do them. If you miss excessive laboratories, your lab partners may kick you out of the group. Then, you will be on your own and if there are no extra supplies, you will not be able to do the laboratories and will receive a grade of 0 on all of these laboratories.

You will also be graded on your laboratory notebook. If you miss a laboratory, regardless of the excuse, you may NOT under any circumstances record results in your laboratory
notebook for experiments that you did not complete. You may NOT copy your partner’s results.

Students are expected to come to class on time and bring laboratory materials, laboratory notebook, and colored pens/pencils (or digital cameras) to each class meeting. If you come in late, please don’t ask me to explain the lab that I already explained.

**Lab notebook:**

All students will be required to maintain a laboratory notebook throughout the semester. The format will be posted on the course web page at the beginning of the semester. However, please note that if you miss a laboratory then you will not be allowed to record any results from that day in your lab notebook and your grade on that assignment will be 0. You may NOT get the results from your lab partner and write it in your lab notebook.

I would like for you to purchase a composition notebook that will be displayed on the first day of class. You may NOT use a loose-leaf. Any of the following composition notebooks are acceptable:

http://www.staples.com/Staples-Composition-Notebook-Blue-Cover/product_639653

I will formally grade your notebook two times during the semester. However, I will also randomly look at notebooks throughout the semester. If you have not recorded the proper information in the notebook, you will have points deducted from your notebook grade.

All notebooks are due at the end of class on the day that I tell you that I will collect them. If you do not hand it in, you will receive a grade of 0. If you have a valid excuse, you may hand it in late as described below. Oversleeping, car problems or getting stuck in traffic are not valid excuses and you will be given a grade of 0.

A description of the notebook requirements will be posted separately.

**Quizzes and Assignments:**

All assignments must be **typed** unless the instructor directs otherwise. All assignments that are more than one page must be stapled. If you use paper clips or fold the pages over, the assignment will be returned to you. All reports/assignments are due at the beginning of class and must neat and stapled. For each day that the assignment is late, 10% will be deducted. Late means after I start lecturing for the day or the lab begins. No assignments will be accepted after 3 days past the due date.

I will drop your lowest quiz/assignment grade. I will not collect any excuses that you have but if you miss 2 assignments, regardless of the excuse, you will be given a grade of 0.
Laboratory Class Meeting and Exams:

Absences from **EXAMS** must be accompanied by a signed physician's or judge's excuse (**there are no exceptions**). The instructor must be notified immediately **before or after** missing an exam. **THERE WILL BE NO MAKEUP LABS.** Without an excuse provided within one week, a grade of zero points will be assigned for the missed work. **If you miss exam 1 that is worth 200 points, you will be given a makeup if you have a valid excuse. If you do not have a valid excuse, you will be given a grade of 0.** If you miss exam 2 with a valid excuse, the final exam will be doubled to make up for the missed exam. If you do not have a valid excuse, you will receive a grade of 0. If a student misses the final exam and has a valid excuse, a makeup will be administered.

If you are absent the day that I collect the lab notebooks, you must bring your excuse and notebook to class on the day that you return or you will receive a grade of 0.

Students will only be allowed to miss one exam during the semester. After that, a grade of 0 will be given for the missed exam.

If you miss the skills test, half of your assignment grade will count in place of the skill test grade. However, you must provide a valid excuse upon returning to class.

Students will be allowed one excused absence for the experiments for lab report 1. There will be at least 4 days required for these experiments. That means that I will not deduct points for attendance but you will still not get full credit on the lab report since you will be missing a lot of data. You should make every effort possible to attend the lab for the experiments involved with the first lab report.

The labs used for the second lab report will be done on approximately 2 days. There will be no excused absences.

**D2L**

All materials for the class will be posted in D2L. It is your responsible to keep up with any changes in the course schedule and any notes posted.

**E-mail accounts:**

All students must establish and maintain their CSU e-mail accounts. Please e-mail Dr. Norflus any questions through the official CSU e-mail and NOT through the D2L e-mail.

**Group Work:**

Students will work in groups of 2-3 to complete laboratory experiments. Students are encouraged to work in groups to discuss laboratory experiments but all written work
must be unique and completed separately be each student. All lab reports, tests, quizzes and the final poster are independent projects to be completed by each student individually.

**Course Policies:**

Students must read **course policies** as stated below on first day of class.

Students must abide by policies in the [Clayton State University Student Handbook](http://www.clayton.edu/Portals/5/DisruptiveClassroomBehavior.pdf), and the [Basic Undergraduate Student Responsibilities](http://www.clayton.edu/Portals/5/DisruptiveClassroomBehavior.pdf).

No disruptive behavior of any kind will be tolerated.

**No form of disruptive behavior will be tolerated in this class.**

While a variety of behaviors can be disruptive in a classroom setting, more serious examples include belligerent, abusive, profane, and/or threatening behavior. A student who fails to respond to reasonable faculty direction regarding classroom behavior and/or is found to be repeatedly disruptive while participating in classroom activities may be dismissed from class. A student who is dismissed is entitled to due process and will be afforded such rights as soon as possible following dismissal. If found in violation, a student may be administratively withdrawn and may receive a grade of WF. For more information, please refer to:


Regular and punctual attendance is highly recommended. We will be covering material in class that may not be found in the textbook. Announcements concerning changes in test dates, and assignment due dates will be made during class. If you must be absent due to illness or other unforeseeable event, you are still responsible for any and all information given during class. This may include changes in test dates, assignment due dates, and the syllabus. If the instructor gives out any handouts during a class that you missed, you must contact **ANOTHER STUDENT** to get this information. The instructor will not be carrying around extra copies waiting for you to return to class.

Some lab experiments last longer than others. As such, some classes will last longer than others. It is disruptive to ask Dr. Norflus – how long will this lab last? Will we leave early today? If we are done early, and there is nothing more to lecture on, then you will leave early. If there is more material to cover, you will stay the full time.

Exams will generally be given at the start of class. You are expected to be in class at the beginning of the period. It is very disruptive of your other students if you show up late.
No form of academic dishonesty will be tolerated in this class. Any type of activity that is considered dishonest by reasonable standards may constitute academic misconduct. The most common forms of academic misconduct are cheating and plagiarism. All instances of academic dishonesty will result in a MINIMUM penalty of a grade of zero for the work involved. All instances of academic dishonesty will be reported to the Office of Student Life/Judicial Affairs. Judicial procedures are described at http://adminservices.clayton.edu/judicial/.

**University Attendance Policy**
Students are expected to attend and participate in every class meeting. Instructors establish specific policies relating to absences in their courses and communicate these policies to the students through the course syllabi. Individual instructors, based upon the nature of the course, determine what effect excused and unexcused absences have in determining grades and upon students’ ability to remain enrolled in their courses. The university reserves the right to determine that excessive absences, whether justified or not, are sufficient cause for institutional withdrawals or failing grades.

- Cell phones are only allowed in the biotechnology laboratory to perform tasks relating to the learning of biotechnology. Use of electronic devices in the laboratory is considered a violation of laboratory safety procedures and the university’s disruptive behavior policy. The only exception will be to take pictures of gels with your cell phone, material written on the board or if there is an emergency. These calls must be taken in the hallway. Routine texting is NOT considered an emergency. You cannot use your cell phone while experiments are incubating.

- Lab protocols will be posted in D2L or handed out by Dr. Norflus. If you need to print additional materials, you must print them **BEFORE** coming to class.

- Visitors (friends, children, etc) are strictly prohibited from attending class without the permission of the instructor. You cannot just show up with your child and expect to stay in class with them. If you have childcare issues, you must miss class that day.

- No smoking, eating or drinking is permitted at any time in the laboratory. If you are caught, you will be asked to leave.

- **NO CHEATING.** Cheating is defined as copying anything that is not your own work. This applies to laboratory report, laboratory notebooks, laboratory assignments, laboratory quizzes and exams. You are not to copy word for word what I post as background for the labs in your lab notebook or lab reports. You must write it in your own words. You are also not to copy word for word what you find on the Internet. **Cheating in any form will result in a zero on the assignment and academic misconduct forms will be filed with the Office of Judicial Affairs for any violation.**
Judicial procedures are described at http://adminservices.clayton.edu/judicial/

Last update: 8/15/15