BIOL 4900/CHEM 4900 – Biocomputing
Course Syllabus – Spring 2016

• Course Description • Outcomes • Instructor Information • Class Info • Required Materials
• Evaluation • Grading • Mid-Term Progress • Course Schedule • Course Policies • Operation Study

Individuals with disabilities who need to request accommodations should contact the Disability Services Coordinator, Student Center 255, (678) 466-5445, disabilityservices@mail.clayton.edu.

COURSE DESCRIPTION:

COURSE NUMBER AND TITLE

BIOL 4900/CHEM 4900 – Biocomputing

CREDIT HOURS

3.0 semester credit hours

CATALOG DESCRIPTION

The human genome project and the web revolution present new challenges and opportunities for biologists and biochemists. The only way to deal effectively with the information explosion in biology and related disciplines is to use computers. Students in this course will use computer applications to search databases, perform calculations, and develop models concerning biological problems. This course is considered a capstone course for the biology degree program. A student may not receive credit for both BIOL 4900 and CHEM 4900.

COURSE PREREQUISITES AND CO-REQUISITES

Prerequisites:
BIOL 3250
BIOL 3250L
BIOL 3201
MATH 1231

NOTEBOOK 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://www.clayton.edu/hub/ITP-Choice/Notebook-Computer-Policy.

COMPUTER SKILL PREREQUISITES:

• Able to use Windows™ or other computer operating system
• Able to use Microsoft Word™ or other word processing program
• Able to send and receive e-mail using Outlook™, Outlook Express™, or other e-mail program
• Able to attach and retrieve attached files via e-mail
• Able to use a Web browser
• Able to download files from a website to your computer
• Able to install new software to your computer
• Able to use Microsoft PowerPoint™

Students who do not have the required skills should go to the HUB and/or Student Software Support Services for training and help. Your instructor is not able to provide this training. Assignments will require use of your computer and an inability to complete an assignment due to a lack of the above (or other general computer issues) will not be an acceptable excuse.

IN-CLASS USE OF STUDENT NOTEBOOK COMPUTERS:

Student notebook computers will be used during EVERY class meeting in this course. Computers will also be required to access course materials, work on assignments outside of class, and to communicate with your instructor. In addition, instructors reserve the right to forbid computer use to particular students if those students are found using them for purposes not related to the course (e.g., web surfing, email, instant messaging, etc.). This same limitations apply to the use of other electronic devices in class (including, but not limited to cell phones, personal digital assistants, etc.). Violation of these rules may result in loss of points, so check with your instructor to determine what is acceptable.

Desire2Learn (Online Classroom):

On-line activity will take place in Desire2Learn (D2L), the virtual classroom for the course.

You can gain access to D2L by signing into the SWAN portal and selecting “D2L” on the top right side. If you experience any difficulties in Desire2Learn, please e-mail or call the HUB at TheHub@mail.clayton.edu or (678) 466-HELP. You will need to provide the date and time of your problem, your SWAN username, the name of the course that you are attempting to access, and your instructor’s name.

LEARNING OUTCOMES:

COURSE LEARNING OUTCOMES:

• To learn the concepts behind bioinformatics tools and to learn how to use tools in bioinformatics to study the phylogeny, expression, structure, and function of genes and proteins.

PROGRAM LEARNING OUTCOMES:

Biology Outcomes

• Students will display knowledge of the basic principles of major fields of biology. This class will provide the student with a knowledge base in bioinformatics.
• Students will display knowledge of physical science, mathematics, and statistics required to support an understanding of biology.
• Students will be able to communicate orally and in writing in a clear, concise manner. Writing skills will be displayed on class assignments and exams and oral communication skills will be displayed in a presentation.
• Students will demonstrate the ability to collect, evaluate, and interpret scientific data, and employ critical thinking to solve problems in biological science and supporting fields. Students will demonstrate this in their ability to answer questions on class assignments and exams and through work on a class project.
• Students will demonstrate the ability to function effectively on team-oriented projects. Students will demonstrate this in their ability to work with other students on a class project.
• Students will develop an appreciation for the impact of biological and physical science on the environment and society. This will be developed as part of class assignments.
Chemistry Outcomes

- Students will display knowledge of the basic principles of major fields of chemistry.
- Students will display knowledge of technology related to chemistry, including laboratory instrumentation.
- Students will be able to communicate scientific information in a clear and concise manner both orally and in writing. Writing skills will be displayed on class assignments and exams and oral communication skills will be displayed in a presentation.
- Students will demonstrate the ability to collect, evaluate, and interpret scientific data, and employ critical thinking to solve problems in chemistry and supporting fields. Students will demonstrate this in their ability to answer questions on class assignments and exams and through work on a class project.
- Students will demonstrate the ability to collaborate effectively on team-oriented projects. Students will demonstrate this in their ability to work with other students on a class project.

INSTRUCTOR INFORMATION:

Dr. Nikki T. Sawyer
Office: LDSC 135J
Phone: (678) 466-4787
e-mail: NikkiSawyer@clayton.edu
Internet address: http://faculty.clayton.edu/nsawyer2
Office hours: Mondays: 9 am – 12 pm
Tuesdays: 3 – 4 pm
Thursdays: 10 am – 12 pm
Other times may be available by appointment (e-mail Dr. Sawyer)

CLASS INFO:

<table>
<thead>
<tr>
<th>Section</th>
<th>CRN</th>
<th>Days</th>
<th>Times</th>
<th>Room</th>
<th>Instructors</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>20723</td>
<td>MWF</td>
<td>8:00 am – 8:50 am</td>
<td>LAB 107</td>
<td>Sawyer</td>
</tr>
</tbody>
</table>

REQUIRED MATERIALS:

Required Text and Materials:

- Students are encouraged to use PriceLoch.com to comparison shop for textbooks

EVALUATION:

<table>
<thead>
<tr>
<th>Item</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework Assignments</td>
<td>100</td>
</tr>
<tr>
<td>In-Class Assignments*</td>
<td>50</td>
</tr>
<tr>
<td>Exams (2 Exams and a Final Exam)</td>
<td>250</td>
</tr>
<tr>
<td>Final Project</td>
<td>75</td>
</tr>
<tr>
<td>Total</td>
<td>475</td>
</tr>
</tbody>
</table>

* In-class assignments will be completed in class. Absence from class on those days will result in the loss of the points for those assignments. **You cannot make-up an in-class assignment**, but if you have an **excused** absence from that class period, those points will not count in your total.
GRADING:

Your final grade will be determined as follows:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage Range</th>
<th>Point Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>90 - 100%</td>
<td>428 – 475</td>
</tr>
<tr>
<td>B</td>
<td>80 - 89%</td>
<td>380 – 427</td>
</tr>
<tr>
<td>C</td>
<td>70 - 79%</td>
<td>333 – 379</td>
</tr>
<tr>
<td>D</td>
<td>60 - 69%</td>
<td>285 – 332</td>
</tr>
<tr>
<td>F</td>
<td>below 60%</td>
<td>&lt; 284</td>
</tr>
</tbody>
</table>

Your grade will be calculated by taking the total number of points you earned, dividing by the total number of points possible (based on the total possible value of all exams, quizzes, assignments, etc.), and multiplying by 100 to obtain the percentage.

\[
\text{Points Earned} \times \frac{100}{\text{Points Possible}} = \text{Final Course Grade}
\]

MID-TERM PROGRESS REPORT:

The mid-term grade in this course reflects approximately 30% of the entire course grade. This grade will be posted by February 29th. The last day to withdraw from lecture is Friday, March 4th, 2016. Based on the mid-term grade, students may choose to withdraw from the course and receive a grade of “W”. Students pursuing this option must withdraw from the course using the DUCK or filling out an official withdrawal form, available in the Office of the Registrar, by mid-term, which occurs March 4, 2016. Instructions for withdrawing are provided at this link. It is each student’s responsibility to keep up with their academic progress. If you have any questions as to whether or not you are making satisfactory progress, contact your instructor BEFORE March 4, 2016.

The last day to withdraw without academic accountability is Friday, March 4, 2016.

TENTATIVE COURSE SCHEDULE*:

Dr. Sawyer will also post a Detailed Course Schedule on D2L showing all assignment due dates and exact exam dates

<table>
<thead>
<tr>
<th>Week Of</th>
<th>Topic</th>
<th>Chapters</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/11/16</td>
<td>Course Introduction</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bioinformatics and Genomic Data</td>
<td>1</td>
</tr>
<tr>
<td>1/19/16</td>
<td>Bioinformatics and Genomic Data</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Computational Manipulation of DNA</td>
<td>2</td>
</tr>
<tr>
<td>1/25/16</td>
<td>Computational Manipulation of DNA</td>
<td>2</td>
</tr>
</tbody>
</table>

NO CLASSES MONDAY, January 18th (MLK DAY)
<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Week</th>
</tr>
</thead>
<tbody>
<tr>
<td>2/1/16</td>
<td>Sequence Alignment</td>
<td>3</td>
</tr>
<tr>
<td>2/8/16</td>
<td>Sequence Alignment</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Database Searching and Multiple Alignment</td>
<td>4</td>
</tr>
<tr>
<td>2/15/16</td>
<td>Database Searching and Multiple Alignment</td>
<td></td>
</tr>
<tr>
<td>2/22/16</td>
<td>EXAM 1</td>
<td>1-4</td>
</tr>
<tr>
<td></td>
<td>Substitution Matrices and Protein Alignments</td>
<td>5</td>
</tr>
<tr>
<td>2/29/16</td>
<td>Substitution Matrices and Protein Alignments</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td><strong>Last Day to Drop w/o Academic Penalty: Friday, March 4&lt;sup&gt;th&lt;/sup&gt;</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>NO CLASSES March 7&lt;sup&gt;th&lt;/sup&gt; – March 11&lt;sup&gt;th&lt;/sup&gt; : SPRING BREAK</strong></td>
<td></td>
</tr>
<tr>
<td>3/14/16</td>
<td>Distance Measurements in Molecular Phylogenetics</td>
<td>6</td>
</tr>
<tr>
<td>3/21/16</td>
<td>Tree-Building in Molecular Phylogenetics</td>
<td>7</td>
</tr>
<tr>
<td>3/28/16</td>
<td>EXAM 2</td>
<td>5-7</td>
</tr>
<tr>
<td></td>
<td>Protein Structure Prediction and Analysis</td>
<td>11</td>
</tr>
<tr>
<td>4/4/16</td>
<td>Protein Structure Prediction and Analysis</td>
<td>11</td>
</tr>
<tr>
<td>4/11/16</td>
<td>Group Project Work Day</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>DNA Sequencing</td>
<td></td>
</tr>
<tr>
<td>4/18/16</td>
<td>DNA Sequencing</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Sequence-Based Gene Prediction</td>
<td>9</td>
</tr>
<tr>
<td>4/25/16</td>
<td>Sequence-Based Gene Prediction</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Group Project Presentations (3 groups)</td>
<td></td>
</tr>
<tr>
<td>5/2/15</td>
<td>Group Project Presentations (2 groups)</td>
<td></td>
</tr>
<tr>
<td><strong>FINAL</strong></td>
<td><strong>EXAM</strong></td>
<td>1-9, 11</td>
</tr>
<tr>
<td></td>
<td><strong>Wednesday, May 4&lt;sup&gt;th&lt;/sup&gt;: 8:00 am – 10:00 am</strong></td>
<td>Cumulative</td>
</tr>
</tbody>
</table>

*This lecture schedule and lecture testing is tentative and may change at the discretion of the instructor. Tests may be given the week before or the week after the week listed here—or during the week predicted. Specific test dates will be announced approximately one week in advance in class. Due dates for assignments may be changed at the instructor’s discretion. You are responsible for keeping track of due dates and turning in your work when it is required.

**COURSE POLICIES:**

**General Policy:**

Students must abide by policies in the [Clayton State University Student Resource Handbook](https://www.clayton.edu/student-life/student-resource-handbook) (part of the Academic Catalog and Student Handbook, and begins on page 6), and the [Basic Undergraduate Student Responsibilities](https://www.clayton.edu/student-life/student-resource-handbook#undergraduate-student-responsibilities).
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.

Course Attendance Policy:

Attendance is required at all class meetings and will be checked at each class meeting with the student's signature on the class roll or by using RollCall (CSU's online attendance program). If you are absent from more than 50% of the classes this semester (excused or unexcused) you will be automatically withdrawn from the class. Come to class prepared. If you do not have your computer with you in class, you are unprepared and will lose in-class activity points for that day.

Quizzes and tests will be given at the beginning of the class; if you arrive late, you may be permitted to take the quiz/exam as long as the materials have not been collected from the class. However, you will be required to turn in the assignment at the same time as the rest of the class - NO extra time will be given. Exceptions to this policy can be made only under extenuating circumstances and with a WRITTEN excuse or explanation for tardiness or absence.

In-class assignments will be completed during class time and an absence from that class period will result in a zero for that class assignment. If you have an acceptable excuse (see below), those points will not count in your grade. You are responsible for all the material that was covered during any missed class period. You will need to work with a classmate to get any notes that you missed.

Excusable Absence Policy:

For any excuse to be "acceptable", you must provide the instructor with an original (no photocopies) of a document from a competent authority (doctor or other healthcare provider, a subpoena, jury summons, etc.). For this purpose, a note from your parents is NOT acceptable. The excuse must specifically indicate the dates that are to be excused, must be presented upon the first class day that the student returns to school. Excuses will not be accepted for routine procedures (checkups, teeth cleanings, eye exams, etc). Students should not schedule such appointments for class times.

Due to the difficulty of making up missed work, missed work will be graded as zero unless other arrangements were made with the instructor prior to the missed work.

There will only be three exams, two regular exams and a final exam (comprehensive). Attendance is mandatory. If a student has an excused absence on exam day, the student’s final exam percentage score will be used in place of the missed midterm exam score. No make-up exams will be given. Without a valid excuse, a grade of zero points will be assigned.

You cannot have an excused absence from the Final Exam – if you are unable to take the Final Exam at the scheduled time, and you have a valid excuse, it is up to the instructor what option will be available to you. This will be based on the instructor's schedule as well as the time when you are able to return to school after your absence. There are only two options:

1. You may be permitted to take a makeup version of the Final Exam.
2. You will need to take an Incomplete and take the Final Exam during the next semester you are enrolled at CSU. An Incomplete exam must be scheduled at the beginning of the next semester.

NOTE: Excuses for graded assignments can only be applied if you were NOT present to take the assignment. If you take the assignment, you cannot ask to not count that assignment in your grade after the fact. In such situations, you will receive the score you earned on the assignment. If you know of an extenuating circumstance, it is in your best interest to discuss it with your instructor ASAP.
Assignment Policies:

Calculators are permitted (encouraged) for homework and assessments. Scientific calculators are highly encouraged. You may **NOT** use a calculator memory for storage of data or information (formulas) for use on assessments or the final exam. This would result in an automatic zero grade on the assessment. The battery and normal functioning of your calculator will be your responsibility. You will find it useful to have your calculator in class. **You may not use your computer or cell phone calculators for exams.**

Assignments are due at the start of class on the due date provided by your instructor.

Printing problems or other general computer issues are not an acceptable excuse for submitting work late and will result in a loss of points.

Exam Policies:

**Exams and Quizzes** start at the beginning of class. Specific policies on exams will be provided on the day of the exam, but several rules apply to all testing situations:

1. All electronic devices including cell phones, palm pilots, pagers, MP3 players, etc. are not allowed during exams or quizzes, unless specifically permitted by the instructor. Calculators as described above may be used. During exams/quizzes, these devices are not permitted to be in your possession **at all** (which means they cannot be clipped to your belt, in your pocket, etc.). Possession and/or use of these items during an exam or quiz will result in an **automatic** zero on the graded activity, and may result in a charge for academic misconduct.

2. If a cell phone or other electronic device makes noise (by ringing, buzzing, etc.) and disrupts the testing environment, even if it is not on your person, the instructor will penalize the responsible student(s) by taking points from their score.

The **Final Exam** is comprehensive.

All examinations are closed book. NO student-produced study sheets, note cards, notes from class, electronic information, etc. may be used on exams. All bookbags, books, notebooks, papers, etc. will be placed along the walls on the sides of the room during examinations. During exams you may have only pen/pencil(s), eraser, and a calculator at your desk.

Academic Dishonesty:

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 grade of zero for the work involved. All instances of academic dishonesty will be reported to the [Office of Community Standards](#). Judicial procedures are described in the [Student Resource Handbook](#) (beginning on page 19, in the section titled “Procedures for Adjudicating Alleged Academic Conduct Infractions”).

Cheating in any form will not be tolerated; all work that you turn in **must** be in your own words and **must** be your own work. If your brainpower did not generate what you turn in, it is considered cheating. Examples of cheating include, but are not limited to: falsifying data from an experiment, copying the work of another person, allowing another person to do your assignment, allowing another student to copy your work, working in a group on a non-group graded item, copying or closely paraphrasing referenced sources, using anything but your brainpower on an exam, quiz, lab practical, etc. **Misconduct in any form will result in a zero on the assignment for all involved students** and academic misconduct forms will be filed with the Office of Student Conduct for any violation as described in the paragraph above.

Disruption of the Learning Environment:

Behavior which disrupts the teaching-learning process during class activities will not be tolerated. 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 behavior 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.

A more detailed description of examples of disruptive behavior and appeal procedures is provided at this link (and in the Academic Catalog and Student Handbook, beginning on page 14).

Some common examples of disruptive behaviors which should be avoided are:

- Refusal to comply with faculty direction
- Monopolizing classroom discussions
- Talking when the instructor or others are speaking
- Failing to respect the rights of other students to express their viewpoints
- Constant questions or interruptions that interfere with the instructor’s presentation
- Creating excessive noise
- Use of electronic devices (pagers, iPods, MP3 players, or cell phones) in the classroom without the instructor’s approval
- Overt inattentiveness (e.g., sleeping or reading the paper in class)
- Inordinate or inappropriate demands for time or attention
- Routinely entering the class late or leaving early without instructor permission.
- Leaving and re-entering the class during lecture

Conditions attributed to physical or psychological disabilities are not considered a legitimate excuse for disruptive behavior.

No talking while the instructor or another student is talking. Students repeatedly violating this policy will be asked to leave the classroom for being disruptive.

E-Mail Policy:

Each student must activate his/her e-mail account at Clayton State University. The class list serve will be the only method for communicating with the class by email. Important announcements will be sent to the class on the class list serve. You should also check D2L regularly for new postings. Handouts given in class and other important items will be posted on the course page for this class. Grades cannot be discussed via email due to privacy issues.

Communication from personal email accounts (e.g., Yahoo, gmail, etc.) is no longer acceptable due to privacy issues. E-mails sent from a personal email account will not receive a response.

Other Policies:

- Students must read and abide by all course policies as stated in this syllabus and on the first day of class.
- Changes or additions to this syllabus, including readings, exam dates, grading, and course policies can be made at the discretion of the instructor at any time. If such changes are made, they will be posted on the announcements section of the instructor’s web page, D2L, and/or announced in class.
- Visitors, including children, are not allowed in the classroom.
- No smoking or other use of tobacco is permitted at any time in the classroom.
- Snacks and drinks are allowed, within reason. If you make a mess, you are responsible for cleaning it up. Do not bring in foods that make a lot of noise (this includes bags that rattle noisily).
- Electronic devices: Turn off all cell phones, pagers, etc. when entering the classroom. Cell phone use is NOT ALLOWED during lecture classes. Cell phone use during class is disrespectful and distracting to the instructor and other students. Any student using their cell phone during class (ringing, talking, or sending/receiving text messages) may be asked to leave the class.
- General data from this course may be used by the instructor for research on improved methods of teaching, leading to presentation or publication. Data that would be used for this purpose would consist of anonymous data, with no identifying information from particular students (e.g. the overall average for the course, NOT grades from particular students). If you do not wish for your instructor to include your data in such studies, fill out the withdrawal of consent form and bring it to your instructor.
• Grades **will not** be communicated by phone or e-mail. Graded material can only be picked up by the individual to whom it belongs.
• Issues associated with grades on assignments (disputes over points for a question, questions about grading keys, etc.) must be brought to the instructor’s attention in a timely manner. This means that such concerns must be brought to your instructor within **one week** of the assignment being returned to the class. Items that are not brought to the instructor in this time period will NOT be addressed.

**OPERATION STUDY:**

**Operation Study:** At Clayton State University, we expect and support high motivation and academic achievement. To foster a change in the perception of studying, to improve study habits, and hence to promote student success, several Operation Study activities and programs will be offered throughout the semester. Be on the lookout for study sessions, study breaks, workshops, and other opportunities to earn Study Buck Gift Cards (for use in the University Bookstore) and other items. [Use this link to find out more details.](#)

Changes or additions to this syllabus, including reading, exam schedule, grading, and course policies can be made at the discretion of the instructor at any time.

**REMININDER:** The last day to withdraw without academic accountability is Friday, March 4, 2016.

_Last updated: 1/5/2016_