

BIOL 4451 – 110, BIOINFORMATICS

Spring 2023

Texas A&M University-Central Texas

COURSE DATES, MODALITY, AND LOCATION

Course Dates: January 17 – May 12, 2023

This course meets face-to-face for lecture on Monday and Wednesday from 4:00 PM - 5:15 PM, at Warrior Hall 410, and for laboratory on Monday from 5.30 PM – 8.30 PM, at Warrior Hall 410, with supplemental materials made available online through the A&M-Central Texas Canvas Learning Management System [<https://tamuct.instructure.com/>].

INSTRUCTOR AND CONTACT INFORMATION

Instructor: Dr. Chamindika Siriwardana

Office: 302G Heritage Hall

Phone: 254-519-8717

Email: c.siriwardana@tamuct.edu

Office Hours: In-office on Monday 9.00 PM – 10.00 AM and Tuesday 1.00 PM – 4.00 PM, or by appointment (in-office and virtual).

Student-instructor interaction

Email: Important information about the class will be communicated via email. All students must have an active email account that is checked daily. I try to answer all emails the day I get it, but if you get no answer in 24hrs please resend it. Please write “BIOL 4451- (type your specific topic here)” in the subject line of the email. This tells me to prioritize your message because it is course related.

Emergency Warning System for Texas A&M University-Central Texas

SAFEZONE. SafeZone provides a public safety application that gives you the ability to call for help with the push of a button. It also provides Texas A&M University-Central Texas the ability to communicate emergency information quickly via push notifications, email, and text messages. All students automatically receive email and text messages via their myCT accounts.

Downloading SafeZone allows access to push notifications and enables you to connect directly for help through the app.

You can download SafeZone from the app store and use your myCT credentials to log in. If you would like more information, you can visit the [SafeZone](http://www.safezoneapp.com) website [www.safezoneapp.com].

To register SafeZone on your phone, please follow these 3 easy steps:

1. Download the SafeZone App from your phone store using the link below:
 - o [iPhone/iPad](https://apps.apple.com/app/safezone/id533054756): [<https://apps.apple.com/app/safezone/id533054756>]

- [Android Phone / Tablet](#)
[<https://play.google.com/store/apps/details?id=com.criticalarc.safezoneapp>]
- 2. Launch the app and enter your myCT email address (e.g. {name}@tamuct.edu)
- 3. Complete your profile and accept the terms of service

For updates on COVID information, please monitor the University [website](#)
[<https://www.tamuct.edu/covid19/>]

If at any point during this semester this course needs to meet online, we will use the synchronous online format (with all meetings recorded and available for students). The meetings will be held on WebEx on the course Canvas page.

COURSE INFORMATION

Course Overview and description

Bioinformatics (BIOL-4451-110) is an undergraduate level (4-credit) course offered by Science and Mathematics department. It is a combined lecture and laboratory course.

In this course students will study how genomic sequence and its variations affect phenotypes. Focuses on the information available from DNA sequencing projects, ranging from the sequences of individual genes to those of entire genomes. Learn analytical techniques that can be used to evaluate sequence data, and examples of their biological significance.

Prerequisite(s): BIOL 4470 and BIOL 4471.

Course Objective or Goal

There is a vast world of freely available data that is available for you to download, investigate, and use however you see fit. This course will introduce you the sources to obtain data and the software available to analyze them. At the end of this course, you will have confidence in your ability to join a research laboratory and use your newly acquired skills to begin exploring the mountains of publicly available biological data!

Student Learning Outcomes

At the end of this course students will:

1. Be familiar with a variety of issues in cellular and molecular biology that can be investigated using computational approaches.
2. Understand the biological and mathematical process involved in bioinformatics.
3. Be able to use different bioinformatics software to address questions in cellular and molecular biology.
4. Be able to disseminate research data orally and through a written report.

Required Reading and Textbook(s)

Bioinformatics and Functional Genomics, by Jonathan Pevsner (3rd Edition).
<http://www.wiley.com/WileyCDA/WileyTitle/productCd-1118581784.html>

COURSE REQUIREMENTS

Assignment/ Assessment Type	Percentage	Assignment/Assessment	Points	SLOs
Exams	50%	Quizzes (8)	40	1, 2, 3
		Final Exam	10	1, 2, 3
Participation	25%	Midterm Presentation	15	1, 3, 4
		Poster	10	1, 3, 4
Laboratory	25%	Lab Reports (10)	20	1, 3, 4
		Show & Tell	5	1, 3, 4
Course Total	100%		100	

Quizzes:

We will have eight 10-15 min. quizzes at one to two-week intervals, which will be notified beforehand. Each quiz will be worth five points. A quiz will include material you learned until the previous quiz. I will not quiz you on nitty-gritty details that anyone with the proper knowledge can lookup on-line or at a library but test if you understood the concepts. Combined the quizzes will contribute to the largest portion of your grade so make sure you do not miss them.

Midterm Presentations:

Each student will make a 15-minute presentation. You will select and present a paper of your choice from a high-ranking Bioinformatics journal. You will have to submit your paper two weeks in advance and must be preapproved.

Posters:

A student group poster session will be presented at the conclusion of the semester. The poster will be over your group's independent laboratory project.

Lab Reports:

At the end of each lab, you will write a lab report based on your independent project. Instructions about the lab reports are posted on Canvas. You will upload the lab report on to Canvas. You will have a total of 10 lab reports during the semester. Plagiarism is a serious offense, and any instances of plagiarism will result in action against the offending student(s).

Show and Tell (S/T):

Just like when you were a kid, who doesn't still enjoy bringing in something cool to show the

class? To satisfy this burning desire, each student will have one “Show and Tell” sessions during the semester. On your assigned dates, you will describe a new bioinformatics tool or information website that we did not discuss in class. For example, while you are online investigating Your Favorite Gene (YFG), you will naturally bump into interesting new tools. These tools will often tell you something about gene function that you did not learn about in class. What I want you to do individually is to keep track of these findings and develop a 5-minute presentation for the whole class.

Final Exam:

The final exam will cover all subject matter learned during the semester. The final exam will be a take home exam and will be posted on Canvas.

Writing in the Biological Sciences Tutorials:

The writing in biological sciences tutorials is posted on the Canvas home page. These tutorials are uniform across the Department of Biology at TAMUCT. Please refer to these tutorials for writing assignments such as the lab reports.

Grading Criteria Rubric and Conversion

A 4.00 (90 +) Achievement that is outstanding relative to the level necessary to meet course requirements.

B 3.00 (80-89%) Achievement that is significantly above the level necessary to meet course requirements.

C 2.00 (70–79%) Achievement that meets the course requirements in every respect.

D 1.00 (60–69%) Achievement that is worthy of credit even though it fails to meet fully course requirements.

F 0.00 (less than 60%) Represents failure and signifies that the work was either (1) completed but at a level of achievement that is not worthy of credit or (2) was not completed and there was no agreement between the instructor and the student that the student would be awarded an “I” (incomplete).

I (Incomplete) The “I” shall be assigned at the discretion of the instructor when, due to extraordinary circumstances, the student was prevented from completing the work of the course on time. The assignment of an “I” requires a written agreement between the instructor and student specifying the time and manner in which the student will complete the course requirements. In no event may any such written agreement allow a period of longer than one year to complete the course requirements. For graduate and professional students, an “I” is to remain on the transcript until changed by the instructor or department. For all other students, work to make up an I must be submitted within one year of the last day of final examinations of the term in which the “I” was given; if not submitted by that time, then the “I” will automatically change to an F. To obtain an incomplete you must have been doing passing work in the course

Posting of Grades

All grades will be posted on the Canvas grade book within one week of the due date for the exam/assignment.

Grading Policies

Read these carefully as I am strict with my policies.

Grading Policy and Point Breakdown: Grades in this course will be criteria-based on a number of activities including exams and projects. This means that grades will not be curved and anyone achieving a 90% or above will receive an A in this course.

Grade Dispute Policy: Grading disputes must be put in writing (with justification such as supporting statements from the text or another credible source) and given to me no earlier than 24 hours after the assignment has been returned. I will consider your request carefully but reserve the right to adjust your grade up or down.

Assignments: These will be varied in nature, but will consist of activities that cause the students to reflect upon the state of knowledge of the topic of the week, how that topic is perceived in the media, and/or analysis of specific research projects relevant to the subject. All assignments are to be turned in, on time (i.e. at class time on due date), to the Canvas website. I will not accept e-mailed assignments of any kind.

Late Assignments: I expect all assignments to be turned in on time. Late assignments interfere with my ability to provide timely, detailed feedback, as well as with your ability to learn and process new material. Accordingly, any unauthorized late assignment will receive a 5% reduction in grade for each day it is late. No assignments will be accepted after it has been graded and returned.

Exams/Quizzes: The exams/quizzes will be a mixture of matching, multiple-choice, and short answers, designed to provoke reflection, critical thought, and application of knowledge. You will receive a list of several samples or real exam questions ahead of time. You are encouraged to prepare for the exam by reviewing reading materials, outlining a draft of a response, and discussing these thoughts with your peers. You will then demonstrate your individual, integrated thoughts on the topic in a closed-book exam during the class period.

Missed exams: If you know you will miss an exam, please contact me BEFORE the exam. I will gladly give make-up exams if the student has an unavoidable reason for missing the exam (i.e. death in the family, severe illness). Keep in mind that I will expect documentation of your reason for missing the exam (e.g. doctor's note, obituary notice). Exams must be made up within a week of the originally scheduled date, with no exceptions regardless of excuse.

COURSE OUTLINE AND CALENDAR

Complete Course Calendar

Date	Lecture Topic & Quiz Dates	Lab Topic & S/T Dates
1/18	Introduction to the course	
1/23-1/25	Review the Central Dogma of Molecular Biology	Laboratory Safety Training, Lab 1: Literature Survey on YFG / Lab Report 1, due 2/1
1/30-2/1	Retrieving Biological Data from Databases/ Quiz 1 (1/25)	Lab 2: Retrieve biological information for YFG/ Lab Report 2, due 2/8;
2/6-2/8	BLAST	Lab 3: BLAST analysis for YFG/ Lab Report 3 due 2/15
2/13- 2/15	Pairwise Alignments/ Quiz 2 (2/13)	Lab 4: Pairwise alignment for YFG/ Lab Report 4, due 2/22; S/T1
2/20-2/22	Multiple Sequence Alignment (MSA)/ Quiz 3 (2/20)	Lab 5: Constructing Multiple Sequence Alignment for YFG/ Lab Report 5, due 2/27; S/T2
2/27-3/1	Phylogenetic Analysis	Lab 6: Constructing a phylogenetic tree in MEGA7 for YFG/ Lab Report 6, due 3/1; S/T3
3/6-3/8	Introduction to Genomes/ Quiz 4 (3/6)	Lab 7: Analysis of YFG within Geneious/ Lab Report 7, due 3/22; S/T4
3/20-3/22	MIDTERM PAPER PRESENTATIONS	MIDTERM PAPER PRESENTATIONS
3/27-3/29	Bioinformatics software platform Geneious/ Introduction to Genomes Quiz 5 (3/27)	Lab 8: In Silico Cloning of YFG/ Lab Report 8, due 4/5; S/T5
4/3-4/5	Cloning a gene	Lab 9: Building a Network map for YFG/ Lab Report 9, due 4/12; S/T6
4/10-4/12	Network Analysis/ Genomes – Viruses & Bacteria –/ Quiz 6 (4/10)	Lab 10: GO map for YFG/ Lab Report 10, due 4/19; S/T7
4/17-4/19	Gene Ontology (GO)/Genomes – Fungi	Lab 11: Analysis of RNA-Seq data; No lab reports due.
4/24-4/26	RNA-Seq/ Genomes – Eukaryotes/ Quiz 7 (4/24)	Lab 12: Writing a script in PERL; No lab reports due.
5/1-5/3	Introduction to PERL and PYTHON/ Genomes – Human Genome Human Disease/ Quiz 8 (5/3)	POSTER SESSION
5/8	Final Exam	

*YFG - Your Favorite Gene. Actually, by the end of the semester, it might be your least favorite gene - hopefully not - but you will certainly know a lot about it!

**S/T - Show and Tell.

Important University Dates

Link to the current academic calendar: <https://www.tamuct.edu/registrar/academic-calendar.html>

TECHNOLOGY REQUIREMENTS AND SUPPORT

Technology Requirements

This course will use the A&M-Central Texas Instructure Canvas learning management system. **We strongly recommend the latest versions of Chrome or Firefox browsers. Canvas no longer supports any version of Internet Explorer.**

Logon to A&M-Central Texas Canvas [<https://tamuct.instructure.com/>] or access Canvas through the TAMUCT Online link in myCT [<https://tamuct.onecampus.com/>]. You will log in through our Microsoft portal.

Username: Your MyCT email address. Password: Your MyCT password

Canvas Support

Use the Canvas Help link, located at the bottom of the left-hand menu, for issues with Canvas. You can select “Chat with Canvas Support,” submit a support request through “Report a Problem,” or call the Canvas support line: 1-844-757-0953.

For issues related to course content and requirements, contact your instructor.

Online Proctored Testing

A&M-Central Texas uses Proctorio for online identity verification and proctored testing. This service is provided at no direct cost to students. If the course requires identity verification or proctored testing, the technology requirements are: Any computer meeting the minimum computing requirements, plus web camera, speaker, and microphone (or headset). Proctorio also requires the Chrome web browser with their custom plug in.

Other Technology Support

For log-in problems, students should contact Help Desk Central, 24 hours a day, 7 days a week

Email: helpdesk@tamu.edu

Phone: (254) 519-5466

[Web Chat](http://hdc.tamu.edu): [<http://hdc.tamu.edu>]

Please let the support technician know you are an A&M-Central Texas student.

UNIVERSITY RESOURCES, PROCEDURES, AND GUIDELINES

Academic Accommodations

At Texas A&M University-Central Texas, we value an inclusive learning environment where every student has an equal chance to succeed and has the right to a barrier-free education. The Warrior Center for Student Success, Equity and Inclusion is responsible for ensuring that students with a disability receive equal access to the university’s programs, services and activities. If you believe you have a disability requiring reasonable accommodations, please contact the Office of Access and Inclusion, WH-212; or call (254) 501-5836. Any information you provide is private and confidential and will be treated as such.

For more information, please visit our [Access & Inclusion](#) Canvas page (log-in required)

[<https://tamuct.instructure.com/courses/717>]

Academic Integrity

Texas A&M University-Central Texas values the integrity of the academic enterprise and strives for the highest standards of academic conduct. A&M-Central Texas expects its students, faculty, and staff to support the adherence to high standards of personal and scholarly conduct to preserve the honor and integrity of the creative community. Any deviation by students from this expectation may result in a failing grade for the assignment and potentially a failing grade for the course. All academic misconduct concerns will be referred to the Office of Student Conduct. When in doubt on collaboration, citation, or any issue, please contact your instructor before taking a course of action.

For more [information regarding the student conduct process](https://www.tamuct.edu/student-affairs/student-conduct.html), [<https://www.tamuct.edu/student-affairs/student-conduct.html>].

If you know of potential honor violations by other students, you may [submit a referral](https://cm.maxient.com/reportingform.php?TAMUCentralTexas&layout_id=0), [https://cm.maxient.com/reportingform.php?TAMUCentralTexas&layout_id=0].

Drop Policy

If you discover that you need to drop this class, you must complete the [Drop Request](#) Dynamic Form through Warrior Web.

[<https://federation.ngwebsolutions.com/sp/startSSO.ping?PartnerIdId=https://eis-prod.ec.tamuct.edu:443/samlssso&SpSessionAuthnAdapterId=tamuctDF&TargetResource=https%3a%2f%2fdynamicforms.ngwebsolutions.com%2fSubmit%2fStart%2f53b8369e-0502-4f36-be43-f02a4202f612>].

Faculty cannot drop students; this is always the responsibility of the student. The Registrar's Office will provide a deadline on the Academic Calendar for which the form must be completed. Once you submit the completed form to the Registrar's Office, you must go into Warrior Web and confirm that you are no longer enrolled. If you still show as enrolled, FOLLOW-UP with the Registrar's Office immediately. You are to attend class until the procedure is complete to avoid penalty for absence. Should you miss the drop deadline or fail to follow the procedure, you will receive an F in the course, which may affect your financial aid and/or VA educational benefits.

Important information for Pregnant and/or Parenting Students

Texas A&M University-Central Texas supports students who are pregnant, experiencing pregnancy-related conditions, and/or parenting. In accordance with requirements of Title IX and related guidance from US Department of Education's Office of Civil Rights, the Dean of Student Affairs' Office can assist students who are pregnant and/or parenting in seeking accommodations related to pregnancy and/or parenting. Students should seek out assistance as early in the pregnancy as possible. For more information, please visit [Student Affairs](https://www.tamuct.edu/student-affairs/pregnant-and-parenting-students.html) [<https://www.tamuct.edu/student-affairs/pregnant-and-parenting-students.html>]. Students may also contact the institution's Title IX Coordinator. If you would like to read more about these [requirements and guidelines](http://www2.ed.gov/about/offices/list/ocr/docs/pregnancy.pdf) online, please visit the website [<http://www2.ed.gov/about/offices/list/ocr/docs/pregnancy.pdf>].

Title IX of the Education Amendments Act of 1972 prohibits discrimination on the basis of sex and gender—including pregnancy, parenting, and all related conditions. A&M-Central Texas is able to provide flexible and individualized reasonable accommodation to pregnant and parenting students. All pregnant and parenting students should contact the Associate Dean in the Division of Student Affairs at (254) 501-5909 to seek out assistance. Students may also contact the University’s Title IX Coordinator.

Tutoring

Tutoring is available to all A&M-Central Texas students, both virtually and in-person. Student success coaching is available online upon request.

If you have a question, are interested in becoming a tutor, or in need of success coaching contact the Warrior Center for Student Success, Equity and Inclusion at (254) 501-5836, visit the Warrior Center at 212 Warrior Hall, or by emailing WarriorCenter@tamuct.edu.

To schedule tutoring sessions and view tutor availability, please visit [Tutor Matching Services](https://tutormatchingservice.com/TAMUCT) [https://tutormatchingservice.com/TAMUCT] or visit the Tutoring Center in 111 Warrior Hall.

Chat live with a remote tutor 24/7 for almost any subject from on your computer! Tutor.com is an online tutoring platform that enables A&M-Central Texas students to log in and receive online tutoring support at no additional cost. This tool provides tutoring in over 40 subject areas except writing support. Access Tutor.com through Canvas.

University Library & Archives

The University Library & Archives provides many services in support of research across campus and at a distance. We offer over 350 electronic databases containing approximately 631,525 eBooks and 75,149 journals, in addition to the 97,443 items in our print collection, which can be mailed to students who live more than 50 miles from campus. Research guides for each subject taught at A&M-Central Texas are available through our website to help students navigate these resources. On campus, the library offers technology including cameras, laptops, microphones, webcams, and digital sound recorders.

Research assistance from a librarian is also available 24 hours a day through our online chat service, and at the reference desk when the library is open. Research sessions can be scheduled for more comprehensive assistance, and may take place virtually through WebEx, Microsoft Teams or in-person at the library. [Schedule an appointment here](https://tamuct.libcal.com/appointments) [https://tamuct.libcal.com/appointments]. Assistance may cover many topics, including how to find articles in peer-reviewed journals, how to cite resources, and how to piece together research for written assignments.

Our 27,000-square-foot facility on the A&M-Central Texas main campus includes student lounges, private study rooms, group work spaces, computer labs, family areas suitable for all ages, and many other features. Services such as interlibrary loan, TexShare, binding, and laminating are available. The library frequently offers workshops, tours, readings, and other events. For more information, please visit our [Library website](https://tamuct.libguides.com/index) [https://tamuct.libguides.com/index]

University Writing Center

University Writing Center: Located in Warrior Hall 416, the University Writing Center (UWC) at Texas A&M University–Central Texas (A&M–Central Texas) is a free service open to all A&M–Central Texas students. The hours of operation are from 10:00 a.m.-5:00 p.m. Monday thru Thursday in Warrior Hall 416 (with online tutoring available every hour as well) with satellite hours available online only Monday thru Thursday from 6:00-9:00 p.m. and Saturday 12:00-3:00 p.m.

Tutors are prepared to help writers of all levels and abilities at any stage of the writing process. While tutors will not write, edit, or grade papers, they will assist students in developing more effective composing practices. By providing a practice audience for students' ideas and writing, our tutors highlight the ways in which they read and interpret students' texts, offering guidance and support throughout the various stages of the writing process. In addition, students may work independently in the UWC by checking out a laptop that runs the Microsoft Office suite and connects to WIFI, or by consulting our resources on writing, including all of the relevant style guides. Whether you need help brainstorming ideas, organizing an essay, proofreading, understanding proper citation practices, or just want a quiet place to work, the UWC is here to help!

Students may arrange a one-to-one session with a trained and experienced writing tutor by making an appointment via [WCOOnline](https://tamuct.mywconline.com/) [https://tamuct.mywconline.com/]. In addition, you can email Dr. Bruce Bowles Jr. at bruce.bowles@tamuct.edu if you have any questions about the UWC, need any assistance with scheduling, or would like to schedule a recurring appointment with your favorite tutor.

OTHER POLICY STATEMENTS

A Note about Sexual Violence at A&M-Central Texas

Sexual violence is a serious safety, social justice, and public health issue. The university offers support for anyone struggling with these issues. University faculty are mandated reporters, so if someone discloses that they were sexually assaulted (or a victim of Domestic/Dating Violence or Stalking) while a student at TAMUCT, faculty members are required to inform the Title IX Office. If you want to discuss any of these issues confidentially, you can do so through Student Wellness and Counseling (254-501-5955) located on the second floor of Warrior Hall (207L).

Sexual violence can occur on our campus because predators often feel emboldened, and victims often feel silenced or shamed. It is incumbent on ALL of us to find ways to actively create environments that tell predators we don't agree with their behaviors and tell survivors we will support them. Your actions matter. Don't be a bystander; be an agent of change. For additional information on campus policy and resources visit the [Title IX webpage](https://www.tamuct.edu/compliance/titleix.html) [https://www.tamuct.edu/compliance/titleix.html].

Behavioral Intervention

Texas A&M University-Central Texas cares about the safety, health, and well-being of its

students, faculty, staff, and community. If you are aware of individuals for whom you have a concern, please make a referral to the Behavioral Intervention Team. Referring your concern shows you care. You can complete the [referral](#) online

[https://cm.maxient.com/reportingform.php?TAMUCentralTexas&layout_id=2].

Anonymous referrals are accepted. Please see the [Behavioral Intervention Team](#) website for more information [<https://www.tamuct.edu/bit>]. If a person's behavior poses an imminent threat to you or another, contact 911 or A&M-Central Texas University Police at 254-501-5805.

OTHER POLICIES

SCIENCE POLICIES

Lecture courses

Exams:

1. There will be no bathroom breaks allowed during any exam. Be sure that you address this issue before beginning an exam.
2. Any student needing to take an exam at a different time as rest of students due to sickness or other accommodations will receive a different version of exam. This includes sickness, special accommodations, etc.
3. All students needing special accommodations must submit an accommodation form from the Office of Access and Inclusion listing the specific accommodations needed. Students are responsible for scheduling their own exam times with the TAMUCT Testing Center.
4. Any student missing an exam in class for any other reason (i.e., illness, death in family, etc.) must provide documentation for missing the exam (e.g., doctor's note, obituary notice, etc.). Exams must be made up within one week of original scheduled date, no exceptions.
5. All backpacks and materials as well as cell phones, smart watches, and other electronic devices, must be turned off and placed at the front of the room on test day.
6. Jackets, sweaters, etc. must be placed in the front of the room on test day, unless otherwise indicated by teacher.

Laboratory courses

Attendance policy:

1. A maximum of 3 absences will be allowed; additional absences in lab will result in an "F" for the entire course, regardless of excuse. In extreme circumstances, discuss with instructor BEFORE you reach 3 absences.

Laboratory Safety training

1. All students are required to take the mandatory Laboratory Safety Training Module - found on in your Modules tab in CANVAS. You must take the training and bring the signed "Safety Agreement Form" to your instructor before you are allowed in lab!!! This is YOUR RESPONSIBILITY - any lab absences because you have not taken the training will be considered unexcused!

Laboratory Coats

1. Students are required to purchase a laboratory coat from the TAMUCT Hanik Bookstore in Founder's Hall. Students must keep their laboratory coat in the laboratory room (you will be provided a storage bag); you cannot transport coats from lab to lab or bring outside the laboratory.

INSTRUCTOR POLICIES.

What I expect of you. To get the most out of this class, you are expected to conduct yourself in a professional manner, which includes contributing to class discussions, being punctual, and notifying me of absences in advance.

Class Attendance. I expect that you attend each class session and arrive on time. If an unavoidable situation arises that prevents you from attending class, I expect that you also promptly contact me to discuss the missed material and get the notes from a classmate. I will not distribute my notes to students as they are often abbreviated and do not contain the detail needed to sufficiently understand the material.

What you can expect of me. You can expect me to start and end class on time, be available through office hours, e-mail, and by appointment, be responsive to student suggestions for course improvement, answer questions to the fullest extent possible and/or direct you to appropriate resources, return graded assignments and exams within a reasonable time frame, and treat you with respect as future colleagues.

Discussion. The topics in this class encompass a diversity of issues that merit in-depth thought and discussion. Since individuals will be expressing their opinions, I expect that will you respect others' contributions, as you would want them to do for you.

Credits and Workload expectations. For undergraduate courses, one credit is defined as equivalent to an average of two hours of learning effort per week (over a full semester) necessary for an average student to receive an average grade for the course. A student taking a four-credit class that meets for four hours a week should expect to spend an additional eight hours a week outside the classroom to earn an average grade.

Class Structure. Classes will involve a balance of active lectures and engaging learning activities. I believe that students learn the theories and concepts much better when they have an active role. I know that this may be new to some of you, but please keep an open mind and I know that you will get more out of this class because of it.

Copyright Notice

Students should assume that all course material is copyrighted by the respective author(s). Reproduction of course material is prohibited without consent by the author and/or course instructor. Violation of copyright is against the law and Texas A&M University-Central Texas' Code of Academic Honesty. All alleged violations will be reported to the Office of Student Conduct.

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Instructions for Midterm research paper presentation

Each student will give a short PowerPoint presentation in the middle of the semester. The following guidelines describe this assignment.

Subject

Each student will present the data from one published paper obtained from the following list of acceptable journals:

- Bioinformatics - <https://academic.oup.com/bioinformatics>
- BMC Bioinformatics - <https://bmcbioinformatics.biomedcentral.com/>
- PLoS Computational Biology - <http://journals.plos.org/ploscompbiol/>

Review articles are **NOT** suitable for this assignment.

Each student must choose their paper and send it to me no later than **Feb 20th** (I recommend earlier). You are encouraged to find an article that you find interesting and appealing - and will, thus, enjoy presenting.

Presentations

Each presentation should give a brief background and introduction to the problems addressed in the paper, a description of the actual findings, and overall conclusions. Presentations should be about **12 minutes in length** with 1-2 minutes left for audience questions. Talks that are excessively under/over time will lose points in grading. **NOTE:** To get the timing and delivery right, **presentations require practice**. Further, you will not be able to relax and present the material in a conversational tone if you have not practiced ahead of time. The following web links have quite a bit of excellent information on giving a good talk - read and follow this advice! **Especially note the concepts of “zooming in” and “telling a story.”**

<http://www.ibiology.org/ibioseminars/techniques/susan-mcconnell-part-1.html>

Presentation Sections and Grading Rubric

The following list is the generally expected format for each presentation. When preparing and practicing your talk, be sure to check over this guide.

Title Slide: (5%)

This slide should give the title and author(s) of the paper covered, your name, and the name of the class.

Introduction: (25%)

The introduction should include:

- 1) A brief and succinct outline of the presentation
- 2) Appropriate background information to introduce the larger problem - you will likely need to obtain information from a few previous papers and/or a review paper or two to adequately

introduce your subject (Cite any background papers in small font at the bottom of the slide where introduced)

- 3) A sense of “zooming in” to the more narrow question(s) addressed in the paper

Data Presentation: (25%)

- 1) After introducing and zooming in to the specific problem in your paper, the majority of your talk should present the actual data, implementation of the bioinformatics tools, etc. **NOTE:** You do not have to present every figure or piece of information from the paper! Pick and choose the essential information that will help you tell a good story.
- 2) Each slide should present one piece of data/information from the paper (i.e., do not overly complicate individual slides)
- 3) Each graph, table, graphic, etc. should be carefully explained in detail in a sensible order (“This graph shows the following...,the X-axis shows..., the Y-axis shows...”)
- 4) There should be a clear sense of flow from one slide to the next (“This data showed the following...Next, the authors wished to address...” CLICK to next slide.

Overall Conclusions: (10%)

If you have built a flowing, zooming in narrative through the Introduction and Data sections of your talk, the Conclusions will flow easily and simply reinforce what your readers have already heard - this portion of the talk should not exceed 2 slides (and may only be a single slide).

Future Directions and Finality: (5%)

Future directions should be a single slide with 1-2 ideas for the next questions to be addressed - these can be taken from the paper or can be your own thoughts on where this work should proceed. Be concise and thoughtful here. **Finality** - don’t leave us hanging! When the talk is over, let us know - the easiest way to do this is with a simple declaration of finality, such as “That’s everything I wanted to cover today. I would be happy to answer any questions.”

Preparation and Overall Style: (30%)

1. Obviously know the material
2. Clearly prepared thoughts for each slide
3. The talk flows - clear segues (i.e., connections) between slides
4. Speak clearly with your body, voice, and eyes directed towards your audience
5. Slides should be attractive and easily read - remember, colorful can be nice, but avoid unnecessarily flowery slides. Also, dark text against dark backgrounds and light against light is hard to see - pay careful attention to easily seen, contrasting images and text.
6. Overall confident and assertive speaking style - everyone has their own style, but confidence flows easily when you know the material and have practiced your talk
7. Timing – 10-15 minutes! Points off for too short or long

Grading rubric for Midterm research paper presentation

Category	Exceeds expectations	Meet expectations	Below expectations	Does not meet expectations	Score
Title Slide	All the following are included; (1) Title, (2) author(s), (3) your name, (4) name of the class.	All the following are included; (1) Title, (2) author(s), (3) your name, (4) name of the class.	Only two to three of the four components are included.	Less than two components are included, or no title slide is provided.	5
Introduction	(1) Appropriate background information to introduce the larger problem. (2) Cites relevant past publications.	Appropriate background information from the paper presented. Does not cite other relevant publications.	Background information is provided; however, it is inadequate for the listener follow the presentation.	The background information provided does not correlate with the presentation.	25
Data Presentation	(1) Each slide presents one piece of data/ information from the paper. (2) Each graph, table is carefully explained in detail in a sensible order.	(1) Each slide presents one piece of data/ information from the paper. (2) Each graph, table is carefully explained.	(1) there are multiple pieces of data/ information in one slide (2) Graphs and tables are explained inadequately (no mention of x and Y axis etc.)	(1) there are multiple pieces of data/ information in one slide (2) Graphs and tables are not explained.	25
Overall Conclusions	Reinforce what the listeners have already heard in a logical manner. Does not exceed 1-2 slides.	Reinforce what the listeners have already heard.	The conclusion does not succinctly address the research paper that was discussed.	The conclusion does not correlate with the presentation.	10
Future Directions and Finality	Clearly defines future directions both (1) from the paper and (2) your own thoughts. When the talk is over lets the audience know.	Clearly defines future directions from the paper.	Future directions are not clearly defined.	No future directions are provided.	5
Preparation and overall style	(1) Obviously knows the material, (2) Clearly prepared thoughts for each slide, (3) The talk flows with clear segues between slides (4) Speak clearly with your body, voice, and eyes directed towards your audience, (5) slides are attractive and easy to read, (6) Overall confident and assertive speaking style, (7) Timing is ± 2 minutes of allocated time.	(1) Knows the material, (2) Clearly prepared thoughts for each slide, (3) The talk flows, however, some segues between slides are not clear (4) Speak clearly with your body, voice, and eyes directed towards your audience, (5) slides are attractive and easy to read, (6) Overall confident and assertive speaking style, (7) Timing is ± 4 minutes of allocated time.	(1) Some knowledge of the material, (2) The talk flow, and segues between slides are not clear (3) Speak clearly, however, only some eye contact is maintained. (4) slides are not very clear, (5) Somewhat confident and assertive speaking style, (7) Timing is ± 5 minutes of allocated time.	(1) inadequate knowledge of the material, (2) The talk does not flow, and segues between slides are lacking (4) Does not speak clearly and eye contact is not maintained. (5) slides are not very clear, (6) Lacks confident and assertive speaking style, (7) Timing is more than ± 5 minutes of allocated time.	30
Total					100

Instructions for Poster Presentations

Each student group will give a short Poster presentation at the end of the semester. The following guidelines describe this assignment.

Subject

Students will present the data from the lab experiments done on YFG during the semester. Students can choose to present the maximum of all 10 experiments or a minimum of four experiments.

Format

The poster should be built on power point. You can use your own template to build the poster. In addition, a poster template has been added to Canvas; feel free to use it to build your poster.

Presentations

Student groups will present the poster to their fellow students during the final class of the semester.

Here are some guidelines on making a poster presentation.

<https://guides.nyu.edu/posters>

Poster Sections and Grading Rubric

The following list is the generally expected format for each poster.

Title Slide: (5%)

This slide should give the title of the poster, your name, and the name of the class.

Introduction: (25%)

The introduction should include:

- 4) Appropriate background information to introduce the larger problem. This should start with a broad introduction to the NF-Y and zoom down on to why you conducted the experiments.
- 5) A sense of “zooming in” to the narrower question(s) addressed in the poster.

Data Presentation: (25%)

- 5) **NOTE:** You do not have to present every figure or piece of information from your experiment (a minimum of 4 would receive full credit). Pick and choose the essential information that will help you tell a good story.
- 6) Each graph, table, graphic, etc. should be carefully explained in detail in a sensible order (“This graph shows the following..., the X-axis shows..., the Y-axis shows...”)

Overall Conclusions: (10%)

If you have built a flowing, zooming in narrative through the Introduction and Data sections of your talk, the Conclusions will flow easily and simply reinforce what your audience have already heard.

References: (5%)

Cite all work in a standard format.

Preparation and Overall Style: (30%)

8. Obviously know the material
9. Speak clearly with your body, voice, and eyes directed towards your audience
10. Poster should be attractive and easily read.
11. Overall confident and assertive speaking style - everyone has their own style, but confidence flows easily when you know the material and have practiced your talk
12. Answer audience questions with confidence.

Grading rubric for Poster Presentations

Category	Exceeds expectations	Meet expectations	Below expectations	Does not meet expectations	Score
Title Slide	All the following are included; (1) Title, (2) author(s), (3) your name, (4) name of the class.	All the following are included; (1) Title, (2) author(s), (3) your name, (4) name of the class.	Only two to three of the four components are included.	Less than two components are included, or no title slide is provided.	5
Introduction	(1) Appropriate background information to introduce the larger problem. (2) Cites relevant past publications.	Appropriate background information from the paper presented. Does not cite other relevant publications.	Background information is provided; however, it is inadequate for the listener to follow the presentation.	The background information provided does not correlate with the presentation.	25
Data Presentation	(1) Each section presents one piece of data/ information. (2) Each graph, table is carefully explained in detail in a sensible order.	(1) Each section presents one piece of data/ information. (2) Each graph, table is carefully explained.	(1) there are multiple pieces of data/ information in one section (2) Graphs and tables are explained inadequately (no mention of x and Y axis etc.)	(1) there are multiple pieces of data/ information in one section (2) Graphs and tables are not explained.	25
Overall Conclusions	Reinforce what the listeners have already heard in a logical manner.	Reinforce what the listeners have already heard.	The conclusion does not succinctly address the research question/s that was discussed.	The conclusion does not correlate with the presentation.	10
References	(1) A uniform standard format (e.g., CSE format). (2) More than three references.	(1) A uniform standard format (e.g., CSE format). (2) Three references.	Two references.	One or no references.	5
Preparation and overall style	(1) Obviously knows the material, (2) Clearly prepared thoughts for each slide, (3) The talk flows with clear segues between slides (4) Speak clearly with your body, voice, and eyes directed towards your audience, (5) slides are attractive and	(1) Knows the material, (2) Clearly prepared thoughts for each slide, (3) The talk flows, however, some segues between slides are not clear (4) Speak clearly with your body, voice, and eyes directed towards your audience, (5) slides are attractive	(1) Some knowledge of the material, (2) The talk flow, and segues between slides are not clear (3) Speak clearly, however, only some eye contact is maintained. (4) slides are not very clear, (5) Somewhat confident and assertive speaking style, (7) Timing is ± 5	(1) inadequate knowledge of the material, (2) The talk does not flow, and segues between slides are lacking (4) Does not speak clearly and eye contact is not maintained. (5) slides are not very clear, (6) Lacks confident and assertive speaking	30

	easy to read, (6) Overall confident and assertive speaking style, (7) Timing is \pm 2 minutes of allocated time.	and easy to read, (6) Overall confident and assertive speaking style, (7) Timing is \pm 4 minutes of allocated time.	minutes of allocated time.	style, (7) Timing is more than \pm 5 minutes of allocated time.	
Total					100

Instructions for Show and Tell (S/T) Presentations

Show and Tell Reports are short (5 minute, max!) individual presentations. The purpose of the report is to tell the class about a new bioinformatic program or database that might be of interest to the class. Please be thoughtful in this regard.

Each student will do one report on the date listed on Canvas. You will be expected to give your report at the beginning of the lab class, so be sure to come early and get your computer set up and ready.

S/T Sections and Grading Rubric

Prepare a short PowerPoint slideshow to report the following information:

Slide 1: Title Slide – Name of the new program or database and your name

Slides ~2-5: Description of the program/database, what it can do, where it can be found, example input with a brief description of any special data formats for entry, example output with a brief description of how to interpret this output

Slide 6: Conclusion slide

You will have **5 minutes** to make your presentation and will be stopped if you go over time – so keep these presentations short, informative, and practiced!

Before or after class, please upload a copy of your presentation to Canvas.

Grading rubric for S/T presentations

Category	Exceeds expectations	Meet expectations	Below expectations	Does not meet expectations	Score
Title Slide	All the following are included; (1) Title, (2) website/author(s), (3) your name, (4) name of the class.	All the following are included; (1) Title, (2) website/author(s), (3) your name, (4) name of the class.	Only two to three of the four components are included.	Less than two components are included, or no title slide is provided.	1
Description of the program/database	(1) Description of the program/database, what it can do, where it can be found, example input with a brief description of any special data formats for entry (2)	(1) Description of the program/database, what it can do, where it can be found, example input with a brief description of any special data formats for entry	(1) Description of the program/database, however the description is lacking details.	(1) Description of the program/database, is very poor.	3

	example output with a brief description of how to interpret the output.				
Overall Conclusions	Reinforce what the listeners have already heard in a logical manner.	Reinforce what the listeners have already heard.	The conclusion does not succinctly address the program that was discussed.	The conclusion does not correlate with the presentation.	1
Total					5

Instructions for Laboratory Reports

The goal of this project is to develop a portfolio of information regarding your assigned gene (YFG). This would be the kind of information that you would collect in order to study a gene in greater detail. You are expected to present and analyze your results in small lab reports at the end of each lab class. The lab reports will be due one week after the lab. The report needs to be uploaded onto Canvas.

Lab Report Format

Please follow the instructions on the Writing Resources Module (The Laboratory Report) posted on Canvas. The writing resources were developed by Dr. Laura Weiser-Erlandson and are uniformly used by the Department of Biology.

Lab Report Topics

As the semester proceeds, we will discuss relevant information regarding each of the Lab Reports, but please feel free to ask me at any time for clarification. Here are the main topics that will be covered during the semester.

- 1) *Literature survey*
- 2) *Text files – CDS and protein sequence of your gene in the FASTA format*
- 3) *BLAST search Results*
- 4) *Pairwise alignment*
- 5) *Multiple sequence alignment*
- 6) *Phylogenetic tree*
- 7) *Analysis within Geneious*
- 8) *Cloning YFG – Vector map of the YFG cloned into the pENTER Vector*
- 9) *Network Map*
- 10) *GO map*

Grading rubric for Laboratory Reports

Grading rubric for the Laboratory Reports

Category	Exceeds expectations	Meet expectations	Below expectations	Does not meet expectations	Score
Title & Date	Includes descriptive title and date	Includes descriptive title and date	Non-descriptive title and date	(1) Non-descriptive title. (2) The title and/or date are not	5

				included.	
Purpose of Experiment	Clearly and concisely states the purpose of the experiment. Engaging and thought-provoking.	Clearly and concisely states the purpose of the experiment.	States the purpose of the experiment.	Incomplete statements or confusing.	25
Methods	The methods are written in such a way that, an independent researcher can read the methods and perform the experiment.	All methods are clearly written.	The methods are written in a way that an independent researcher will have difficulty in performing the experiment.	The methods are written in a way that an independent researcher will not be able to perform the experiment.	25
Results	(1) Tables/figures numbered consecutively in separate series. (2) Title is complete enough to be understood without referring to the text. (3) Legend, headings, and units of measure are included. (4) Footnotes used as necessary to provide clarity concerning: units of measure that do not fit in the heading, explanations of abbreviations and symbols, the statistical significance of entries.	Tables/figures numbered consecutively in separate series Title is complete. Legend, headings, and units of measure are included. Footnotes are used to provide clarity.	Tables/figures numbered, but not sequentially. The title is incomplete. Legend, headings, and units of measure are not fully included. Footnotes used but do not provide enough clarity	Tables/figures not numbered. No title. Legend, headings, and units of measure are not included. Footnotes are not used but are needed.	10
Discussion and Conclusion	In-depth discussion & elaboration in all sections of the paper. The conclusion is engaging and restates the thesis. Relates topic to 'real-world applications.	In-depth discussion & elaboration in most sections of the paper. The conclusion restates the thesis.	Omission of pertinent content or content runs on excessively. Quotations from others outweigh the writer's ideas. The conclusion does not adequately restate the thesis.	Cursory discussion in all the sections of the paper or brief discussion in only a few sections. An incomplete statement or confusing.	30
References	(1)A uniform standard format (e.g. CSE format). (2) More than three references.	(1)A uniform standard format (e.g. CSE format). (2) Three references.	Two references.	One or no references.	5
Total					100