

BIOL-4451-110, CRN 10609, Bioinformatics
Texas A&M University-Central Texas

INSTRUCTOR AND CONTACT INFORMATION

Instructor: Gunisha Sagar

Office: 419 Warrior Hall

Phone: None

Email: gunisha_sagar@tamuct.edu

Office Hours:

I will be available before and after lecture and laboratory class session.

Mode of instruction and course access:

BIOL-4451-110 is an in class undergraduate level (4 credit) course offered by Science and Mathematics department. It is a combined lecture and laboratory course that involves face to face method of instruction & learning. The lecture session is twice a week on Tuesday and Thursday (1.30 -2.45 am) and laboratory is held once a week on Thursday (10.00 to 1.00pm). This course uses the A&M-Central Texas Canvas Learning Management System [<https://tamuct.instructure.com>].

Student-instructor interaction:

I would be prompt in checking and replying to emails. I will be available before and after class (lecture & laboratory) for questions and discussions. The appointments to meet could be made via email at least a day prior to lecture or laboratory session.

911 Cellular:

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

911Cellular is an emergency notification service that gives Texas A&M University-Central Texas the ability to communicate health and safety emergency information quickly via email, text message, and social media. All students are automatically enrolled in 911 Cellular through their myCT email account.

Connect at [911Cellular](https://portal.publicsafetycloud.net/Texas-AM-Central/alert-management) [<https://portal.publicsafetycloud.net/Texas-AM-Central/alert-management>] to change where you receive your alerts or to opt out. By staying enrolled in 911Cellular, university officials can quickly pass on safety-related information, regardless of your location.

COURSE INFORMATION

Course Overview and description: There is a vast world of freely available data that is available for you to download, investigate, and use. This course will introduce you to the sources/databases to obtain data and the software available to analyze them. At the end of this course you will be able to use your newly acquired skills to explore publicly available biological data.

Three hours of lecture and three hours of laboratory session each week.

Prerequisites: BIOL 4470 & BIOL 4471.

Course Objectives:

- a) to use bioinformatics tools to analyze and interpret various types of biological data.
- b) be familiar with a variety of issues in cellular and molecular biology that can be investigated using computational approaches.

Student Learning Outcomes:

Students will:

- a) be able to use different bioinformatics software to address questions in cellular and molecular biology.
- b) understand how genomic sequence and its variations affect phenotypes.

Competency Goals Statements (certification or standards):

Required Reading and Textbook(s):

Bioinformatics and Functional Genomics, by Jonathan Pevsner (3rd Edition), Publisher Wiley Blackwell, ISBN: 9781118581780.

Course Requirements:

| Contents | Points |
|-----------------------------|-----------------------------|
| a) Quizzes | 160 points (20 points each) |
| b) Portfolio | 80 points |
| c) Presentation | 80 points |
| d) Poster | 80 points |
| e) Final comprehensive exam | 100 points |
| Total | 500 points |

Mandatory Laboratory Safety Training:

- 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!**

Grading Criteria Rubric and Conversion

The **final grade** will be calculated from combining points from: Eight Quizzes (32% of final grade), final comprehensive exam (20% of final grade), Portfolio (16% of final grade), Poster,

(16 % of final grade) & Presentation (16% of final grade).

Grading scheme

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 (<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

- The grades will be posted promptly on canvas grade book.

COURSE OUTLINE AND CALENDAR

Complete Course Calendar

(T: Tuesday & R: Thursday)

BIOL-4451 Lecture & Laboratory Schedule: Subject to change

- Jan. 15 (T) Introduction
17 (R) Lecture: Review Central Dogma
Lab: Laboratory Safety Training, Introduction to YFG, Literature Survey on YFG, Introduction to Citation Management Software i.e. EndNote
- 22 (T) Lecture: Introduction to Databases
24 (R) Lecture: Retrieving Biological Data from Database
Lab: Retrieve biological information (ex. nucleic acid sequence, protein sequence, domains present in protein) for YFG
- 29 (T) Lecture: Introduction to BLAST, **Quiz 1**
31 (R) Lecture: BLAST
Lab: BLAST analysis for YFG
- Feb. 5 (T) Lecture: Pairwise Alignment
7 (R) Lecture: Pairwise Alignment, **Quiz 2**
Lab: Pairwise alignment for YFG
- 12 (T) Lecture: Multiple Sequence Alignment (MSA),
14 (R) Lecture: MSA, **Quiz 3**
Lab: Constructing a MSA for YFG
- 19 (T) Lecture: Phylogenetic Analysis
21 (R) Lecture: MEGA7
Lab: Constructing a phylogenetic tree in MEGA7 for YFG
- 26 (T) Lecture: Review, **Quiz 4**
28 (R) Lecture: Discuss papers on YFG
Lab: Portfolio and Presentation
- Mar. 5 (T) Paper Presentation
7 (R) Paper Presentation
- 12 (T) Spring Break
14 (R) Spring Break
- 19 (T) Lecture: Genomes – Introduction
21 (R) Lecture: Introduction to the bioinformatics software platform Geneious, **Quiz 5**
Lab: Analysis of YFG within Geneious
- 26 (T) Lecture: Genomes – Viruses and Bacteria
28 (R) Lecture: Cloning a gene
Lab: In Silico Cloning of YFG

- Apr. 2 (T) Lecture: Genomes – Viruses and Bacteria,
 4 (R) Lecture: Network Analysis, **Quiz 6**
 Lab: Building a Network map for YFG
- 9 (T) Lecture: Genomes – Fungi
 11(R) Lecture - Gene Ontology (GO)
 Lab – GO map for YFG
- 16 (T) Lecture: Genomes – Eukaryotes, **Quiz 7**
 18 (R) Lecture: RNA-Seq
 Lab: Analysis of RNA-Seq data in Galaxy
- 23 (T) Lecture: Human Genome
 25 (R) Lecture: Human Disease
 Lab: Primer design for YFG
- 30 (T) Lecture: Review, **Quiz 8**
- May 2 (T) Work on poster
 7 (R) Poster Session
- 9 (R) Final Exam, Portfolio Due

***YFG** - Your Favorite Gene.

Important University Dates:

| | |
|-----------------|--|
| Jan 14, 2019 | Classes Begin for Spring Semester |
| Jan 16, 2019 | Deadline for Add, Drop, and Late Registration for 16- and First 8-Week Classes |
| Jan 21, 2019 | Martin L. King Jr. Day (University Closed) |
| Jan 30, 2019 | Deadline to Drop 16-Week Classes with No Record |
| Mar 8, 2019 | Deadline for Spring Admissions Applications |
| Mar 11-15, 2019 | Spring Break-No class |
| Mar 18, 2019 | Classes resume after spring break |
| Apr 1, 2019 | Deadline for GRE/GMAT Scores to Office of Graduate Studies |
| Apr 5, 2019 | Deadline to Drop 16-Week Classes with a Quit (Q) or Withdraw (W) |
| Apr 26, 2019 | Deadline to Drop Second 8-Week Classes with a Quit (Q) or Withdraw (W) |
| May 10, 2019 | Spring Semester Ends |

TECHNOLOGY REQUIREMENTS AND SUPPORT

This course will use Canvas learning management system.

Technology Requirements

This course will use the A&M-Central Texas Instructure Canvas learning management system. Logon to A&M-Central Texas Canvas [<https://tamuct.instructure.com>].

Username: Your MyCT username (xx123 or everything before the "@" in your MyCT e-mail 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.

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

Drop Policy.

If you discover that you need to drop this class, you must complete a [Drop Request Form](https://www.tamuct.edu/registrar/docs/Drop_Request_Form.pdf) [https://www.tamuct.edu/registrar/docs/Drop_Request_Form.pdf].

Professors 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, signed and returned. Once you return the signed 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.

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. Academic integrity is defined as a commitment to honesty, trust, fairness, respect, and responsibility. Any deviation by students from this expectation may result in a failing grade for the assignment and potentially a failing grade for the course. Academic misconduct is any act that improperly affects a true and honest evaluation of a student's academic performance and includes, but is not limited to, cheating on an examination or other academic work, plagiarism and improper citation of sources, using another student's work, collusion, and the abuse of resource materials. All academic misconduct concerns will be reported to the university's Office of Student Conduct. Ignorance of the university's standards and expectations is never an excuse to act with a lack of integrity. When in doubt on collaboration, citation, or any issue, please contact your instructor before

taking a course of action.

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 Office of Access 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 at (254) 501-5831. Any information you provide is private and confidential and will be treated as such.

For more information please visit our [Access & Inclusion](https://www.tamuct.edu/student-affairs/access-inclusion.html) web page [https://www.tamuct.edu/student-affairs/access-inclusion.html].

Important information for Pregnant and/or Parenting Students.

Texas A&M University-Central Texas supports students who are pregnant 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 the [Student Affairs](https://www.tamuct.edu/student-affairs/index.html) web page [https://www.tamuct.edu/student-affairs/index.html]. Students may also contact the institution's Title IX Coordinator. If you would like to read more about these [requirements and guidelines online](http://www2.ed.gov/about/offices/list/ocr/docs/pregnancy.pdf), 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 on-campus and online. Subjects tutored on campus include Accounting, Advanced Math, Biology, Finance, Statistics, Mathematics, and Study Skills. Tutors are available at the Tutoring Center in Warrior Hall, Suite 111.

If you have a question regarding tutor schedules, need to schedule a tutoring session, are interested in becoming a tutor, or have any other question, contact Academic Support Programs at (254) 519-5796, or by emailing Dr. DeEadra Albert-Green at deeadra.albertgreen@tamuct.edu.

Chat live with a 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 FREE online tutoring and writing support. This tool provides tutoring in over 40 subject areas. Access Tutor.com through Canvas.

University Writing Center.

Located in Warrior Hall 416, the University Writing Center (UWC) at Texas A&M University–Central Texas (TAMUCT) is a free workspace open to all TAMUCT students from 10:00 a.m.-5:00 p.m. Monday thru Thursday with satellite hours in the University Library Monday thru Thursday from 6:00-9:00 p.m. This semester, the UWC is also offering online only hours from 12:00-3:00 p.m. on Saturdays.

Students may arrange a one-on-one session with a trained and experienced writing tutor by visiting the UWC during normal operating hours (both half-hour and hour sessions are available) or by making an appointment via [WOnline](https://tamuct.mywconline.com/) at [https://tamuct.mywconline.com/]. In addition, you can email Dr. Bruce Bowles Jr. at bruce.bowles@tamuct.edu for any assistance needed with scheduling.

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!

If you have any questions about the UWC, please do not hesitate to contact Dr. Bruce Bowles Jr. at bruce.bowles@tamuct.edu.

University Library.

The University Library provides many services in support of research across campus and at a distance. We offer over 200 electronic databases containing approximately 250,000 eBooks and 82,000 journals, in addition to the 85,000 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 on Skype or in-person at the library. 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](http://tamuct.libguides.com/index) [http://tamuct.libguides.com/index].

OPTIONAL 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 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/departments/compliance/titleix.php) [https://www.tamuct.edu/departments/compliance/titleix.php].

INSTRUCTOR POLICIES.

Class Attendance: Full attendance is preferred for both the lecture and laboratory sessions. If a class session or sessions (lecture & laboratory) are missed due to an unavoidable circumstance then I should be informed promptly by email and proof of absence should be brought in next class session.

Laboratory Courses:

Attendance Policy: There is a strict attendance policy for laboratory courses. A maximum of 3 absences will be allowed; additional absences in lab will result in an "F" for the entire course, regardless of the excuse. It is difficult to make up for a missed laboratory session as requires prepping and setting the lab again.

Laboratory Safety Training: All students are **required** to take the mandatory Laboratory Safety Training Module found 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 laboratory**. This is **YOUR RESPONSIBILITY**. Any lab absences because you have not taken the training will be considered **unexcused**. **Laboratory Coats** are mandatory. Students who have laboratories in **Warrior Hall** (rooms. 407, 410, 413) are required to purchase a laboratory coat from the

TAMUCT Hanik Bookstore in Founder's Hall. Due to the nature of chemicals used in *Heritage Hall*, lab coats will be provided for these laboratories.

Quizzes & Final Comprehensive Examination:

A quiz will include material you learned until the previous quiz as per the syllabus schedule. Combined quizzes will contribute to the largest portion of your grade so make sure you do not miss them. The quizzes & exam will be closed-book and will consist of multiple choice and short answer questions. I would encourage you to prepare for the quiz by reviewing reading materials, lecture notes and discussing with your peers. There will be no bathroom breaks allowed during any quiz or exam. Any student needing to take a quiz or exam at a **different time** as rest of students due to sickness or other accommodations will receive a **different version of it**. 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 quiz times with the TAMUCT Testing Center. Any student missing a quiz or an exam in class for any other reason (i.e. illness, death in family, etc....) must provide documentation for missing it (e.g. doctor's note, obituary notice, etc....). Quizzes must be made up within one week of original scheduled date, no exceptions. There will be total eight quizzes and one final comprehensive examination.

Portfolio:

You are responsible for turning in one portfolio at the end of the semester. The portfolio will include the characterization of your favorite gene as a hardcopy. Plagiarism is a serious offense and any instances of plagiarism will result in action against the offending student(s).

Midterm Presentation:

Each student will make a 30-minute presentation. You will select and present a paper of your choice relating to your favorite gene from a high-impact journal.

Posters:

A student poster session will be presented at the conclusion of the semester. The poster will be over your independent project on your favorite gene.

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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