

BIOL 4470 – 110, CELL BIOLOGY

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 1:00 PM - 2:15 PM, at Warrior Hall 315, and for laboratory on Wednesday from 9.30 AM – 12.30 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 AM – 10.00 AM and Tuesday 1.00 PM – 4.00 PM, or by appointment (in-office and virtual on WebEx).

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

Cell Biology (BIOL 4470) is an undergraduate level, 4-credit course, offered by the Department of Science and Mathematics. It is a combined lecture and laboratory course.

In the course, students will study the cell at the structural, functional, and molecular levels. Emphasis is placed on the molecular mechanisms of cell metabolism, growth, division, and communication. The laboratory focuses on cell structure and laboratory techniques.

Prerequisites: BIOL 1407

Course Objective or Goal

Student Learning Outcomes (SLOs)

At the end of this course students will:

1. understand the relationship between molecular structure and function.
2. demonstrate knowledge of the dynamic character of cellular organelles.
3. be familiar with the process of macromolecular biosynthesis.
4. demonstrate knowledge of the use of chemical energy in running cellular activities.
5. understand the nature of cellular regulation and relate it to the development of cancer.
6. be able to relate topics of cell biology to physiological processes in plants and animals.

Required Reading and Textbook(s)

Alberts, Bray, Hopkin, Johnson, Lewis, Raff, Roberts, and Walter. 2019. Essential Cell Biology 5th ed. W.W.Norton & Company. ISBN 13:9780393680362

COURSE REQUIREMENTS

Course Requirements:

| Assignment/ Assessment Type | Percentage | Assignment/Assessment | Points | SLOs |
|-----------------------------------|-------------|--------------------------|------------|------|
| Exams | 75% | Exam 1 | 18 | 1-3 |
| | | Exam 2 | 18 | 3-5 |
| | | Exam 3 | 18 | 5-6 |
| | | Final Comprehensive Exam | 21 | 1-6 |
| Literature Review Paper | 10% | Literature Review Paper | 10 | 6 |
| Laboratory Reports | 15% | Laboratory Reports | 15 | 5-6 |
| Course Total | 100% | | 100 | |

Exams:

There will be three non-cumulative lecture exams and one cumulative final exam. The three non-cumulative exams will be administered during the normal lecture time. The cumulative final exam will be administered in the lecture classroom during finals week.

Literature Review Paper:

Each student will write an 8 – 10-page paper on a topic listed on a topic related to the course. Information about the assignment is posted on Canvas.

Laboratory 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 to Canvas. You will have a total of five lab reports during the semester. Plagiarism is a serious offense, and any instances of plagiarism will result in action against the offending student(s).

Extra Credit:

This assignment is optional. The maximum extra credit you can earn is 3% of your total grade. Note that your total grade cannot exceed 100 points, therefore if you have a perfect 100 points score, the 3% extra credit will not be applied. The extra credit option will be posted on the Canvas homepage and students will submit the assignments on Canvas on or the last day of class.

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 extra credit.

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

| Week | Lecture Topic | Reading | Laboratory Topic |
|----------------|---|----------------|---|
| 1 (1/18) | Introduction to the course | | Introductory Lab: Lab safety; Using Micropipettes |
| 2 (1/23-1/25) | Chemical Components of Cells | Ch. 2 & 5 | Lab 1: Model Organisms & Introduction to Arabidopsis |
| 3 (1/30-2/1) | Chemical Components of Cells; Literature Review – Topics due 2/1 | Ch. 2 & 5 | Lab 2: Introduction to Microscopy & Observation of Arabidopsis; Lab Report 1 due 2/1. |
| 4 (2/6-2/8) | Membrane structure and transport Exam 1 (2/8) | Ch. 11 & 12 | Lab 3: Test for Macronutrients in Arabidopsis; Lab Report 2 due 2/8. |
| 5 (2/13-2/15) | Energy, Enzymes, and Metabolism; Literature Review – First Paper Outline due 2/15 | Ch. 3 | Lab 4: Plasmid Extraction: GFP Containing Plasmid; Lab Report 3 due 2/15. |
| 6 (2/20-2/22) | Cellular Respiration | Ch. 13 & 14 | Lab 4 Cont.: Bacterial Transformation of GFP Containing Plasmid. |
| 7 (2/27-3/1) | Photosynthesis; Literature Review – Annotated Outline due 3/1 | Ch. 14 | Lab 5: Quick DNA Extractions & DNA Extraction from Arabidopsis; Lab Report 4 due 3/1. |
| 8 (3/6-3/8) | Exam 2 (3/6) Nucleic acid structure | Ch. 6 | Lab 5 Cont.: PCR |
| 3/13-3/17 | <i>Spring Break (no classes)</i> | | |
| 9 (3/20-3/22) | DNA Replication Transcription & translation | Ch. 6 Ch. 7 | Lab 5 Cont.: Agarose Gel Electrophoresis |
| 10 (3/27-3/29) | Transcription & translation | | Lab 6: unPAK: Start of experiment; Lab Report 5 due 3/29. |
| 11 (4/3-4/5) | Exam 3 (4/3) Recombinant DNA technology | Ch. 10 | Lab 7: Protein extraction from Arabidopsis |
| 12 (4/10-4/12) | Cell Signaling | Ch. 16 | Lab 7 cont. SDS-PAGE Gel and staining to observe Rubisco enzyme |
| 13 (4/17-4/19) | Cell Cycle; Literature Review – First Submission due 4/19 | Ch. 18 | Lab 8: Protoplast isolation and microscopic observation; Lab Report 7 due 4/12. |
| 14 (4/24-4/26) | Genetics | Ch. 19 | Lab 6 cont. unPAK: Record results; Lab Report 8 due 4/26 |
| 15 (5/1-5/3) | Genetics | Ch. 19 | Lab 6 cont. unPAK: Analyze results |
| 5/8 | Final Exam; Lab Report 6 due 5/8; Literature Review due 5/8. | | |

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](https://tamuct.instructure.com/courses/717) 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?PartnerIdpId=https://eis-prod.ec.tamuct.edu:443/samlso&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>]. Students may also contact the institution's Title IX Coordinator. If you would like to read more about these [requirements and guidelines](#) 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>] 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>]. 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 [WOnline](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>].

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 Literature Review Paper

During the semester each student will write an 8–10-page literature review paper on one of the topics listed below (topics may not be duplicated – to be determined on a first come, first served basis).

For an Introduction to a literature review, instructions for selecting a topic, finding sources, obtaining full articles, organization of the paper, citing your sources, and writing tips:

Please follow the instructions on the Writing Resources Module (**Writing Basics: The Term Paper and Literature Review**) posted on Canvas. The writing resources were developed by Dr. Laura Weiser-Erlandson and are uniformly used by the Department of Biology.

Suggested Research Topics: *Any topic not on this list must be cleared with Dr. Siriwardana first! *

1. Evolution and biology of cancer cells
2. Therapeutic cloning
3. Reproductive cloning
4. Advances in cell mediated drug delivery
5. Stem Cell Biology
6. Stem Cell medical therapies
7. Autophagy
8. Cellular nanotechnology
9. Regulation of cell growth, size and shape
10. GMO's (Genetically Modified Organisms)
11. Cardiac Cell Function and Heart disease
12. Synthetic Cells
13. CRISPR gene editor
14. Cell Signaling
15. Cell Biology of Extracellular Matrix
16. Viruses
17. Cholesterol
18. Transport Protein with Expanding Role in Cell Biology
19. Cell Biology of Atherosclerosis
20. Translating Cell Biology into Therapeutic Advances in Alzheimer's disease
21. Molecular Cell Biology of Diabetic Complications
22. Cell membrane biology Mitochondria and mitochondrial diseases
23. The Function of Human Islet cells
24. Biology of SARS-CoV-2 and Covid-19 Polymerase Chain Reaction

**Be assured that the university has a strict policy on plagiarism and cheating. I will uphold that policy, and anyone caught conducting academic dishonesty will receive a zero – consider yourself warned! **

Text Format guidelines:

- Double spaced lines (except for literature cited, which should be single spaced)
- 1-inch margins (check this, most defaults are 1.5; you can change it in page setup)
- Times New Roman font, size 12
- No space between paragraphs
- No page breaks between sections
- No cover pages or binders!

Literature Review important dates:

1. Topic Approval (5%) - *Due January 31, 2022* – Please email your topic to Dr. Siriwardana.
2. First Paper Outline (follow instructions in the Writing Basics: The outline & Annotated Outline) (5%) - *Due February 13, 2022* – Please submit onto the Canvas assignment “First Paper Outline”
3. Annotated outline (follow instructions in the Writing Basics: The outline & Annotated Outline) (15%) - *Due February 28, 2022 (includes citations)* - Please submit onto the Canvas assignment “Annotated outline”
4. First Submission (25%) - *Due April 17, 2022 (Note: this is not a “rough” draft! You are expected to have a full paper submitted)* - Please submit onto the Canvas assignment “First Submission”
5. Final Submission (50%) - *Due May 9, 2022* - Please submit onto the Canvas assignment “Literature Review Paper – Final Submission”.

Criteria for evaluation:

For each full submission, the following criteria will be used for evaluation:

Content (70%) Is there thorough coverage of topic, is level of detail appropriate, and are facts accurate?

Organization (10%) Overall organization of paper; does it start broadly, does it flow well between paragraphs, is there a logical sequence of topics, is there a summary paragraph that ties concepts together?

Format (10%) Includes correct font, font size, margins, page spacing, etc...

References (10%) Cited correctly in text and Literature Cited section.

Grading rubric for Literature Review

| Category | Exceeds expectations | Meet expectations | Below expectations | Does not meet expectations | Score |
|--------------|---|---|--|--|-------|
| Content | Thorough coverage of topic includes outside sources, include at least three outside sources, states own conclusion and future directions, level of detail appropriate, facts accurate. Follows the instructions on the Department of Biology writing resources. | Thorough coverage of topic, level of detail appropriate, facts accurate. Follows the instructions on the Department of Biology writing resources. | Lacks appropriate detail and coverage, facts accurate. | Lacks appropriate detail and coverage, facts inaccurate. | 70 |
| Organization | Starts broadly, gets | Starts broadly, gets | Does not start with a | Does not start with a | 10 |

| | | | | | |
|-------------------|---|---|---|---|-----|
| | specific and ends broadly, flows well between paragraphs, there is a logical sequence of topics, and there is a summary paragraph that ties concepts together. Follows the instructions on the Department of Biology writing resources. | specific and ends broadly, flows well between paragraphs, there is a logical sequence of topics. Follows the instructions on the Department of Biology writing resources. | broad introduction and end with a broad conclusion, there is no flow between paragraphs. Shows some logical sequence of topics and flow between paragraphs. | broad introduction and end with a broad conclusion, there is no flow between paragraphs, shows no logical sequence of topics. | |
| Format | Appropriate font, font size, margins, page spacing etc. Follows the instructions on the Department of Biology writing resources. | Appropriate font, font size, margins, page spacing etc. Follows the instructions on the Department of Biology writing resources. | Less than three appropriate formatting requirements are met. | Less than two appropriate formatting requirements are met. Font, font size, margins, page spacing are not appropriate. | 10 |
| References | (1)A uniform standard format (e.g. CSE format). (2) More than three references, Follows the instructions on the Department of Biology writing resources. | (1)A uniform standard format (e.g. CSE format). (2) Three references, Follows the instructions on the Department of Biology writing resources. | Two references. | One or no references. | 10 |
| Total | | | | | 100 |

Instructions for Laboratory Reports

The goal of this project is to develop a portfolio of information regarding your semester long lab investigations. 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.

Grading rubric for the Laboratory Reports

| Category | Exceeds expectations | Meet expectations | Below expectations | Does not meet expectations | Score |
|---------------------|--|---|--|---|-------|
| Title | Includes descriptive title | Includes descriptive title | Non-descriptive title | (1) Non-descriptive title. (2) The title is not included. | 5 |
| Abstract | (1)50-150 words. (2) at least one sentence describing background, question, methods, results & discussion. | At least one sentence describing background, question, methods, results & discussion. | Missing at least one of the following components: background, question, methods, results & discussion. | Missing more than one of the following components: background, question, methods, results & discussion. | 15 |
| Introduction | (1) Clearly and | (1) Clearly and | (1) States the | (1) Incomplete | 20 |

| | | | | | |
|----------------------------------|--|--|---|--|-----|
| | concisely states the purpose of the experiment. Engaging and thought-provoking. (2) Relevant background (3) Discusses what is currently known and unknown. (4) narrow down to specific topic (funnel structure) (5) citations | concisely states the purpose of the experiment. Engaging and thought-provoking. (2) Relevant background (3) Discusses what is currently known and unknown. (4) citations | purpose of the experiment. (2) some background information (3) lacks structure. | statements or confusing. (2)Lacks background information (3) Lacks structure. | |
| Materials & 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. | 10 |
| Results | (1) Paragraph style narrative of results. (2) First paragraph contains main finding. (3) No interpretations. | Paragraph style narrative of results | (1) Paragraph style narrative of results. (2) few results not discussed | Paragraph style narrative of results is not included (directly shows tables and figures). | 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. | 20 |
| 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. | 10 |
| Tables and Figures | (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 |
| Total | | | | | 100 |