

Cell Biology - 10124 - BIOL 4470 - 110
Spring 2020
Texas A&M University-Central Texas

COURSE DATES, MODALITY, AND LOCATION

Course dates: January 13th- May 13th

Warrior Hall, Rm 313 (lecture), Rm 410 (lab)

1:00-2:15 (lecture), Tuesdays and Thursdays; 9:30-12:30 (lab) Thursdays

This course meets face-to-face two times a week, and students are expected to be prepared for class by reading the chapter.

This course uses the A&M-Central Texas Canvas Learning Management System [<https://tamuct.instructure.com>].

INSTRUCTOR AND CONTACT INFORMATION

Instructor: Mr. Dalton Cross

Office: 419 Warrior Hall

Phone: 254-479-7855

Email: dalton.cross@tamuct.edu

Office Hours:

I am available by appointment. As an adjunct instructor I will not be maintaining office hours but will be more than glad to set up visits either before or after class. I encourage you to either call or e-mail me so we can find a time that is mutually convenient.

Student-instructor interaction

I will be more than glad to set up visits either before or after class. I encourage you to either call, text or e-mail with questions or concerns or confer with me to find a time that is mutually convenient to meet face to face. I will check email several times daily and attempt to respond as urgently as possible.

WARRIOR SHIELD

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

Warrior Shield 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 Warrior Shield through their myCT email account.

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

COURSE INFORMATION

Course Overview and description:

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, BIOL 352

Student Learning Outcomes:

Students will:

- A. understand the relationship between molecular structure and function
- B. demonstrate knowledge of the dynamic character of cellular organelles
- C. be familiar with the process of macromolecular biosynthesis
- D. demonstrate knowledge of the use of chemical energy in running cellular activities
- E. understand the nature of cellular regulation and relate it to the development of cancer
- F. be able to relate topics of cell biology to physiological processes in plants and animals

Required Reading and Textbook(s):

- A. Alberts, Bray, Hopkin, Johnson, Lewis, Raff, Roberts, and Walter. 2019. Essential Cell Biology 5th ed. W.W.Norton & Company. ISBN: 9780393679533

I expect you to read the corresponding chapters in your textbook before coming to class.

You will be tested on all of the chapters listed below and held responsible for knowing the materials contained within them. As college students, I expect you to be able to parse out key concepts and vocabulary without every detail being covered in lecture.

COURSE REQUIREMENTS

Course Requirements: (include point values for each- not just a percentage)

- 35% Three lecture exams
 - Exam 1- SLOs will include A,B,C
 - Exam II- SLOs will include C,D,F
 - Exam III- SLOs will include A,E,F
- 25% Comprehensive final exam
 - SLOs will include A-F
- 20% Research paper
 - SLOs will include F
- 15% Laboratory grades- report rubric is at the end of this syllabus
- 5% Participation—includes attendance, discussion, participation

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

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:

Grades will be posted under the student's individual log on to Canvas as quickly as possible. There will be no public posting of grades.

COURSE OUTLINE AND CALENDAR

Complete Course Calendar:

1. Week of January 13
 - a. Lecture Topic: Cells and chemical components of cells
 - i. Chapters 1 and 2
 - b. Laboratory: Safety & Microscopy
2. Week of January 20

- a. Lecture Topic: Energy, catalysis, and biosynthesis
 - i. Chapter 3
- b. Laboratory: Enzyme Activity
3. Week of January 27
 - a. Lecture Topic: Protein structure and function
 - i. Chapter 4
 - b. Laboratory: Protein Standard Curve
4. Week of February 3
 - a. Lecture Topic: **EXAM I** / DNA and chromosomes
 - i. Chapter 5
 - b. Laboratory: DNA, RNA, and protein of bacteria
5. Week of February 10
 - a. Lecture Topic: DNA replication, repair, and recombination/ Protein synthesis
 - i. Chapters 6 and 7
 - b. Laboratory: Qualitative analysis of biomolecules
6. Week of February 17
 - a. Lecture Topic: Protein synthesis/ Gene expression
 - i. Chapters 7 and 8
 - b. Laboratory: Regulation of gene express. by lac operon
7. Week of February 24
 - a. Lecture Topic: Gene evolution
 - i. Chapter 9
 - b. Laboratory: Extraction and quantification of nucleic acids, pt. 1

8. Week of March 2

- a. Lecture Topic: **EXAM II** / Recombinant DNA Technology
 - i. Chapter 10
- b. Laboratory: Extraction and quantification of nucleic acids, pt. 2

9. Week of March 9

- a. Spring Break - No Class or Lab

10. Week of March 16

- a. Lecture Topic: Membrane structure and transport
 - i. Chapters 11 and 12
- b. Laboratory: Membrane transport

11. Week of March 23

- a. Lecture Topic: How cells obtain energy from food
 - i. Chapter 13
- b. Laboratory: Transformation of E. coli

12. Week of March 30

- a. Lecture Topic: Energy generation in mitochondria and chloroplasts
 - i. Chapter 14
- b. Laboratory: Chloroplast isolation

13. Week of April 6

- a. Lecture Topic: **EXAM III** / Intracellular compartments and transport
 - i. Chapter 15
- b. Laboratory: Hill reaction

14. Week of April 13

- a. Lecture Topic: Cell Signaling
 - i. Chapter 16
- b. Laboratory: Phagocytosis/exocytosis

15. Week of April 20

- a. Lecture Topic: Cytoskeleton/ The cell division cycle
 - i. Chapters 17 and 18
- b. Laboratory: Mitosis/Meiosis

16. Week of April 27

- a. Lecture Topic: The cell division cycle/ Sexual reproduction and power of genetics
 - i. Chapters 18,19 and 20
- b. Assignment: **TBA**

16. Week of May 4

- a. **Comprehensive Final Exam**

Important University Dates

Date	Description
January 13, 2020	Add, Drop and Late Registration Begins for 16- and First 8-Week Classes \$25 Fee assessed for late registrants
January 13, 2020	Classes Begin for Spring Semester
January 15, 2020	Deadline for Add, Drop, and Late Registration for 16- and First 8-Week Classes
January 20, 2020	Martin Luther King, Jr Day (University Closed)
January 21, 2020	Deadline to Drop First 8-Week Classes with No Record
January 29, 2020	Deadline to Drop 16-Week Classes with No Record
February 21, 2020	Deadline to Drop First 8-Week Classes with a Quit (Q) or Withdraw (W)

Date	Description
March 1, 2020	Deadline for Teacher Education and Professional Certification Applications
March 6, 2020	Classes end for 1st 8-Weeks
March 9-12, 2020	Spring Break (No Classes - Administrative Offices Open)
March 13, 2020	Spring Break (University Closed)
March 10, 2020	Deadline for Faculty Submission of First 8-Week Final Class Grades (due by 3pm)
March 15, 2020	Deadline for Clinical Teaching/Practicum Applications
March 16, 2020	Add, Drop, and Late Registration Begins for Second 8-Week Classes \$25 Fee assessed for late registrants
March 16, 2020	Classes Begin for Second 8-Week Session
March 16, 2020	Class Schedule Published for Summer Semester
March 18, 2020	Deadline for Add, Drop, and Late Registration for Second 8-Week Classes
March 23, 2020	Deadline to Drop Second 8-Week Classes with No Record
March 27, 2020	Deadline for Graduation Application for Ceremony Participation
March 30, 2020	Registration Opens for Seniors, Post-Bacc, and Graduate Students for Summer Semester
April 3, 2020	Deadline to Drop 16-Week Classes with a Quit (Q) or Withdraw (W)
April 6, 2020	Registration opens for all students for the Summer and Fall Semesters
April 24, 2020	Deadline to Drop Second 8-Week Classes with a Quit (Q) or Withdraw (W)
May 8, 2020	Deadline for Applications for Tuition Rebate for Spring Graduation (5pm)

Date	Description
May 8, 2020	Deadline for Degree Conferral Applications to the Registrar's Office. \$20 Late Application Fee.
May 8, 2020	Deadline to Withdraw from the University for 16- and Second 8-Week Classes
May 8, 2020	Spring Semester Ends

TECHNOLOGY REQUIREMENTS AND SUPPORT

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/>] 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.

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].

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.

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 report](https://cm.maxient.com/reportingform.php?TAMUCentralTexas&layout_id=0), [https://cm.maxient.com/reportingform.php?TAMUCentralTexas&layout_id=0].

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, 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>]

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 [Student Affairs](https://www.tamuct.edu/student-affairs/index.html) [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](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 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. Tutor.com tutoring **will not** offer writing support beginning August 1, 2019.

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 deadra.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 online tutoring support at no additional cost. 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.

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 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/) [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 and/or need any assistance with scheduling.

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].

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, who are exhibiting behaviors that pose a threat to safety, or individuals causing a significant disruption to our community, please make a referral to the Behavioral Intervention Team. You can complete the [referral](https://cm.maxient.com/reportingform.php?TAMUCentralTexas&layout_id=2) online [https://cm.maxient.com/reportingform.php?TAMUCentralTexas&layout_id=2].

Anonymous referrals are accepted. Please see the [Behavioral Intervention Team](https://www.tamuct.edu/student-affairs/bat.html) website for more information [https://www.tamuct.edu/student-affairs/bat.html]. If a person's behavior poses an imminent threat to you or another, contact 911 or A&M-Central Texas University Police at 254-501-5800.

INSTRUCTOR 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, discussion, 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.

Labs. The weekly lab points will consist of 1 or 2 items; a lab quiz and/or a lab report. The lab quiz will be based on the current week's laboratory exercise to be sure that you have read your lab book before coming to lab. Quizzes will be distributed at the beginning of class. To be fair to the students who arrive to lab on time, if you arrive after the quiz has been distributed, you miss the quiz. No exceptions regardless of excuse. A maximum of 3 absences will be allowed; additional absences in lab will result in an "F" for the entire course, regardless of excuse. See lab report rubric at end of the syllabus.

Laboratory Coats

Students who have laboratories in Warrior Hall (rms. 407, 410, 413) are required to purchase a laboratory coat from the TAMUCT Hanik Bookstore in Founder's Hall or other source. Due to the nature of chemicals used in Heritage Hall, lab coats will be provided for these laboratories.

Exams. The exams will be a mixture of matching, multiple choice and short answer, designed to provoke reflection, critical thought, and application of knowledge. You will receive a list of several sample 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 original scheduled date, no exceptions regardless of excuse. Exams may have to be made up by arrangement with the TAMUCT Testing Center. I will provide them the exam and any instructions.

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 you will 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 in order to earn an average grade.

Class Structure. Classes will involve a balance of active lecture 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.

Drop Policy. If you discover that you need to drop this class, you must go to the Records Office and ask for the necessary paperwork. Professors cannot drop students; this is always the responsibility of the student. The record's office will provide a deadline for which the form must be returned, completed and signed. Once you return the signed form to the records office and wait 24 hours, you must go into Warrior Web and confirm that you are no longer enrolled. Should you still be enrolled, FOLLOW-UP with the records office immediately? You are to attend class until the procedure is complete to avoid penalty for absence. Should you miss the deadline or fail to follow the procedure, you will receive an F in the course.

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.

Copyright. (2019) by (Dalton Cross) at Texas A&M University-Central Texas, (College of Arts and Sciences); 1001 Leadership Place, Killeen, TX 76549;
(dalton.cross@tamuct.edu)

NOTE! The following *Science policies* are now in effect:

- a. Lecture courses
 - i. 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. Cell phones, smart watches, backpacks, coats, jackets, sweaters, purses, headphones, airpods and all other personal items must be handed to the teacher to be placed in front of the room, to be picked up by students when they hand in the exam.
6. No jackets or sweaters may be worn without discussing with the instructor, and no jackets, sweaters or other items may be placed over the student's legs or any other body part while they are taking the test.

How to write up a laboratory report

The general format for a scientific paper will be used in this course. Scientific papers have an introduction, materials and methods, results, discussion and literature cited. Keep in mind that scientists often pay for a paper to be peer-reviewed and published (not the other way around). Peer-review means that all articles are read by other scientists (peers) who make editorial suggestions and ultimately decide whether a paper contains sound research and should be published. Publishing is essential for graduate students and faculty, but costly at \$50-200 per page, thus it is important to write concisely.

The Abstract section:

Should be a brief summary of your entire paper. Use a little from each section to make a clear, cohesive summary. Readers will decide from your abstract whether or not they will continue to read your entire research paper. Limit to 200 words.

The Introduction section:

This section is as short as a few paragraphs or as long as a few pages. It serves to introduce your experiment. Start with general statements and become more specific. The first part of the introduction should set the context for your experiment by briefly providing background information. You should provide background and context, present what information is known from previous studies, and then state what additional information your experiment may provide. Be sure to give proper citations when you state facts or ideas from outside sources (see Literature Cited section).

In the second part of the introduction, you should describe the specific questions you

chose to study. State what you did in a general way, e.g., "We investigated the effect of obesity on heart rate by comparing heart rates of fat and thin people after they climbed stairs", but do not give away the specific details of your Methods or Results. Specifically, state your hypothesis at the end of the Introduction.

The Materials and Methods section:

The experiment has been completed by the time you write your report, so use past tense. This section includes a brief outline of the methods used in the experiments. The purpose of this section is to allow other experimenters to duplicate the methods you used, so it should be detailed enough so that someone else could read your report and repeat the experiment. However, you should NOT include trivial details ("we used test tubes that were 10cm long"). Be sure to state how you analyzed your data (e.g. ANOVA, T-test, Chi Square, etc...)

Good Example:

"We exposed cells to 0, 15, 30, or 45 seconds of ultraviolet irradiation (400nm). Cells from each irradiation treatment were diluted to 10^{-3} and 10^{-5} of their original concentration. One ml of each of these dilutions was plated on nutrient agar and incubated overnight. The number of colonies was counted the next day."

Bad Example:

"Our lab bench received cells from treatment #1, and these were serially diluted, so that there were 2 different concentrations of bacteria to count on the petri dishes. Lab bench 2 received cells from treatment 2. These were also serially diluted, resulting in 2 different concentrations of bacteria to count."

The Results section:

The results section always starts with normal paragraph (text) format, NOT with tables or figures. You MUST first direct the reader's attention to EACH table and figure before they appear, indicate what they show, and summarize the important data in each.

Good Example of How to Begin the Results:

"The mean IQ of TAMUCT biology students was found to be higher than the mean IQ of Harvard students and of students from many colleges (Figure 1)".

Bad Example of How to Begin the Results:

"Figure 1 clearly shows the results of the experiment."

As with all writing, the results should be organized into coherent logically organized paragraphs and sentences. Data are reported in 3 ways:

Text or paragraph form, if there are just a few numbers to report. *Always required!!!!

Figure: a graph, picture, or diagram

***** A figure will have a detailed legend at the bottom *****

Table: something that contains only numbers, and has a detailed legend at the top.

Do NOT discuss the implications of the results in this section, nor attempt to explain why various results occurred. Only the important points of each figure and table should be described in paragraph format; don't reiterate the whole figure.

Raw data is NOT reported in the Results (i.e. the numbers you collect). Readers are usually interested only in summarized data (e.g. means, standard deviations, totals, etc). However, since this is not going to be submitted for publication, you should include any calculations in an Appendix so your professor can detect any errors you may have made.

The Discussion section:

This is usually the most important part of your paper. This is your chance to be original, cleverly interpret the results you obtained and draw general conclusions from them. Information in the discussion should go from the specific to the general.

This is a typical order of topics which might occur in the Discussion:

Begin the discussion by briefly stating the major conclusions from the results. Explain what the results mean. Discuss whether the results SUPPORT or do NOT support your original hypothesis (es). Your experiment is really very limited in scope, so DO NOT claim that you have "proven" or "disproven" a hypothesis; you perhaps obtained some small bit of evidence to support a hypothesis, or you provided some evidence which contradicts a hypothesis.

In next paragraph(s) expand your discussion of these results. You should compare them to results from other studies, which you should cite properly.

As the discussion continues it is important to offer some original ideas and interpretations. For example, discuss the implications or your results for the biology of the organism(s). For example, why did the behaviors you observe evolve? You may wish to suggest new experiments which would shed further light on the questions raised by your results.

You may discuss sources of error in the experiment, but your BEST guess is that the results reflect reality. Students often feel that their discussion should consist mainly of an analysis of all the things that went wrong with the experiment. I strongly discourage this approach. Naturally all experiments have some weaknesses, but for the purposes of this exercise assume that your results are reasonable. It is OK to get negative results. You should, however, suggest additional experiments using better or different methods.

Always conclude by relating your experiment and results to larger theory and/or applications. Provide context to why your study is important and how your study can be used to further knowledge in that area.

The Literature Cited section:

This section should list all references mentioned in the text. Unlike English papers and other term papers, we do not use footnotes and we don't include factual material from an encyclopedia without crediting it in the appropriate place. You should not

have any books or journals listed in this section unless you have cited the author and year in the text of the paper.

Citing within the text of the paper:

One author: Smith (2017) reported

Two authors: Smith and Jones (2005) observed

More than 2 authors: Smith et al. (2010) examined...

Stating a fact: Trees have leaves (Jones 1997).

In Literature Cited section: all citations used will be listed in alphabetical order

Books: Author (s). Year. Title. Publisher.

Townsend, C. R., M. Begon, and J. L. Harper. 2016. *Essentials of Ecology*, 3rd Ed. Blackwell Publishing, Oxford.

Internet: Author. Year. Title. HTTP address.

Maddison, D. 2001. The Tree of life web project page. <http://tolweb.org/tree/>

Journals: Author (s). Year. Title. Journal title. Volume. Pages.

O'Neil, R. J. and R. N. Wiedenmann. 1987. Adaptations of arthropod predators to agricultural systems. *Florida Entomologist* 70: 40-48.

The following hints will improve your writing:

Use the first person (I or we) to write more concisely.

Avoid long run-on sentences. We are trying to write concisely and clearly. Don't use twelve letter words when simpler ones will do just fine.

Use the active voice: "I counted". Not "The number of animals was counted".

Be positive about your results. Say "the data show" instead of "the data suggest".

Genus and species names in Latin are always italicized or underlined. Only the first letter of the genus is capitalized. ex. *Homo sapiens*, *Danaus plexippus*, etc...

Number all pages and use the metric system. Write numbers as numerals when they are associated with measurement units (2 km), spell them out for numbers < 10 (five hamsters).

In general, DON'T use quotes. Instead, paraphrase the author and cite him/her.

Quotes interrupt the flow of your text.

Scientific writing is formal communication. Don't use conversational language, colloquialisms or slang

Some frequently misused/misspelled words:

affect/effect "Effect" is a noun (usually). "Affect" is always a verb. "The effect of their misuse will be that your grade will be affected by subtracting five points".

it's/its "It's" is the conjunction "it is". "Its" is the possessive form

their/there I assume this is just carelessness, proofread your paper.

between/among Between refers to two things, while among refers to more than two.

fewer/less Use "fewer" if you can count the items, "less" if you can't. (less water, but fewer boats)

amount/number Use "amount" if you can't count them, "number" if you can. (The amount of sand and the number of rocks)

oftentimes Drop the "times"; it's redundant.

different from / different than Different from is correct; different than is not.

than/then "than" refers to a comparison - proofread your paper for mix-ups

Always put a zero in front of a naked decimal point (0.12, not .12).
The word data is plural and the word datum singular (i.e. write “data are ...”, not “data is...”)

Lab Report Grading Rubric:

Abstract (5 max) _____
1. Clear and concise
2. Incorporates all elements
3. Not too verbose

Introduction (20 max) _____
Theory or topics defined
Citations are used properly
Importance for study stated
Question or hypothesis clearly stated

Materials and Methods (15 max) _____
Design is clearly stated and replicable
Only essential information is included
Mathematical analysis is stated

Results (30 max) _____
Important trends in the data are reported
Data are presented using appropriate tables/figures
Only facts are presented, interpretation saved for discussion
Mathematical analysis of data appropriate

Discussion (30 max) _____
Trends in data are interpreted correctly
Trends are related back to theory or topic of study
Logical and original explanations are given for aberrant data
Student shows an understanding of data importance

Spelling and Grammar (-10 max) _____

Late Penalty (-) _____

Total Grade _____

Term Paper

Assignment: Write a 8-10 page paper on one of the topics listed below (topics may not be duplicated – to be determined on a first come, first served basis).

General: Remember that the audience for this paper is a college educated biologist, so very simple terms need not be defined. However, proper use of citations is expected, please see below for instructions.

I expect you to proof read your papers for any of spelling and grammar mistakes as I will take off points for this (feel free to take advantage of the wonderful people at the TAMUCT writing center for this, be sure to make an appointment first).

****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!****

Research: I expect that you will research your topic using the library, the internet, your textbook and, especially, professional journals. Use a variety of sources, not just the internet (I will take off points if more than 40% of your sources are from the internet). Be very careful when reading information that is not from a peer-reviewed source (i.e. not professional journals) because many groups/people tend to post information that serves their particular agenda and is not necessarily scientifically correct (I have seen several of these). I expect that if you use one of these sources, you will check the validity of their facts.

Be sure to introduce and define your topic broadly first, then give more detail and examples to demonstrate your points. You should also end with a summary section that neatly ties the paper together. Tables, figures and pictures are to be on separate pages at the end of the paper (after references); they are not to be inserted in the pages of text

Text Format guidelines (I will be strict about this):

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!

Citations:

Citing within the text of your paper:

One author: Smith (1999) reported

Two authors: Smith and Jones (2003) observed

More than 2 authors: Smith et al. (1990) examined...

Stating a fact: Trees have leaves (Jones 1997).

Example of citing within text:

Induction of the lens was first studied in detail by Spemann (1938). Recent studies have revealed the interactions among eye cells after the initial determination of the eye (Chang and Harris, 1998), as well as some of the molecules involved in eye cell determination (Chow et al., 1999). The data have revealed similarities between the genes used in the development of the eyes in both fruit flies and vertebrates (Perron and Harris, 1999).

Literature Cited guidelines:

1. Book example: Author. Year. Title. Publisher.

Townsend, C. R., M. Begon, and J. L. Harper. 2003. *Essentials of Ecology*, 2nd Ed. Blackwell Publishing, Oxford.

2. Journal article: Author. Year. Title. Journal title. Volume. Pages.

O'Neil, R. J. and R. N. Wiedenmann. 1987. Adaptations of arthropod predators to agricultural systems. *Florida Entomologist* 70: 40–48.

3. Internet example: Author. Year. Title. HTTP address.

Maddison, D. 2001. The Tree of life web project page. <http://tolweb.org/tree/>

Other miscellaneous:

The following hints will improve your writing:

Avoid long run-on sentences. We are trying to write concisely and clearly. Don't use twelve letter words when simpler ones will do just fine.

Genus and species names in Latin are always italicized or underlined. Only the first letter of the genus is capitalized. Ex. *Homo sapiens*, *Danaus plexippus*, etc...

Write numbers as numerals when they are associated with measurement units (2 km), spell them out only for numbers < 10 (e.g. five hamsters; 20 geese). Always spell out a number if it is the first word of a sentence.

DON'T use quotes. Follow the advice of Ralph Waldo Emerson, who said, "I hate quotations. Tell me what you know." Instead, paraphrase the author and cite him/her. Quotes interrupt the flow of your text.

Do not use contractions in formal writing.

Scientific writing is formal communication. Do not use conversational language, colloquialisms or slang.

PROOFREAD, PROOFREAD, PROOFREAD!

Some frequently misused/misspelled words (spell check will not catch most of these):

affect/effect "Effect" is a noun (usually). "Affect" is always a verb. "The effect of their misuse will be that your grade will be affected by subtracting five points".

it's/its "It's" is the conjunction "it is". "Its" is the possessive form

their/there/they're I assume this is just carelessness, proofread your paper.

between/among Between refers to two things, while among refers to more than two.

fewer/less Use "fewer" if you can count the items, "less" if you can't. (less water, but fewer boats)

amount/number Use "amount" if you can't count them, "number" if you can. (The amount of sand and the number of rocks)

oftentimes Drop the "times"; it's redundant.

different from / different than Different from is correct; different than is not.

than/then "than" refers to a comparison – proofread your paper for mix-ups

The word data is plural and the word datum is singular

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

Evolution and biology of cancer cells
Therapeutic cloning
Reproductive cloning
Advances in cell mediated drug delivery
Stem Cell Biology
Stem Cell medical therapies
Autophagy
Cellular nanotechnology
Regulation of cell growth, size and shape
GMO's (Genetically Modified Organisms)
Glia Cells
Cardiac Cell Function and Heart disease
Synthetic Cells
CRISPR gene editor
Cell Signaling

Term Paper Grading Rubric

Topic Approval (5%)	_____	Due January 27, 2020
First Paper Outline (5%)	_____	Due February 13, 2020
Annotated outline (15%) (includes citations)	_____	Due February 28, 2020
First Submission (25%) (Note: this is not a “rough” draft! You are expected to have a full paper submitted)	_____	Due March 27, 2020
Final Submission (50%)	_____	Due April 24, 2020

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, 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 (5%) _____
Includes correct font, font size, margins, page spacing, etc...

References (10%) _____
Cited correctly in text and Literature Cited section, from diverse sources

Spelling/Grammar (5%) _____