

**Texas A&M University Central Texas  
BIOL 4470 Cell Biology**

**INSTRUCTOR AND CONTACT INFORMATION**

**Instructor: Mr. Dalton Cross**

**Office: 419 Warrior Hall**

**Phone: 254-479-7855**

**Email: [dalton.cross@tamuct.edu](mailto:dalton.cross@tamuct.edu), [dcross7x21@mac.com](mailto:dcross7x21@mac.com)**

**Office Hours: Monday:**

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.

**Course Calendar**

<b>Time/Day:</b>	Lecture: TR 1:30 – 2:45	Laboratory: R 10:00 – 1:00
<b>Where:</b>	Lecture: 312 Warrior Hall	Laboratory: 410 Warrior Hall

**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>] 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:**

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.

**Course Objective:**

**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. 2014. Essential Cell Biology 4th ed. Garland Science. ISBN: 978-0-8153-4454-4.

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

**Other Readings:** I feel that it is important for you to explore cutting edge research in Cell Biology; therefore, I may assign additional papers from primary literature from time to time.

**WEEKLY COURSE OUTLINE AND CALENDAR (*subject to change*)**

<b>Week</b>	<b>Topic</b>	<b>Reading</b>	<b>Lab Exercise</b>
1/15	Cells and chemical components of cells	Ch 1, 2	Safety & Microscopy
1/22	Energy, catalysis, and biosynthesis	Ch 3	Enzyme Activity
1/29	Protein structure and function	Ch 4	Protein Standard Curve
2/5	<b>EXAM I</b> / DNA and chromosomes	Ch 5	DNA, RNA, and protein of bacteria
2/12	DNA replication, repair, and recombination/ Protein synthesis	Ch 6, 7	Qualitative analysis of biomolecules
2/19	Protein synthesis/ Gene expression	Ch 7, 8	Regulation of gene express. by lac operon
2/26	Gene evolution	Ch 9	Extraction and quantification of nucleic acids, pt. 1
3/5	<b>EXAM II</b> / Recombinant DNA Technology	Ch 10	Extraction and quantification of nucleic acids, pt. 2
3/12	Spring Break – no classes or labs this week		
3/19	Membrane structure and transport	Ch 11,12	Membrane transport
3/26	How cells obtain energy from food	Ch 13	Transformation of <i>E. coli</i>
4/2	Energy generation in mitochondria and chloroplasts	Ch 14	Chloroplast isolation
4/9	<b>EXAM III</b> / Intracellular compartments and transport	Ch 15	Hill reaction
4/16	Cell Signaling	Ch 16	Phagocytosis/exocytosis
4/23	Cytoskeleton/ The cell division cycle	Ch 17,18	Mitosis/Meiosis

4/30	The cell division cycle/ Sexual reproduction	Ch 18,19	TBA
5/7	Sexual reproduction and power of genetics/ <b>Final Exam</b>	Ch 19,20	No lab

## COURSE REQUIREMENTS

### Course Requirements:

Three lecture exams	35%	Laboratory reports	15%
Final Comprehensive Exam	25%	Participation	5%
Research paper	20%		

### Grading Criteria Rubric and Conversion

#### 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** 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\*\***

## COURSE AND UNIVERSITY PROCEDURES AND 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.

**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 Blackboard website. I will distribute instructions on how to do this. **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.** 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.

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.

### Laboratory Courses Info

1. Attendance policy
  - (b) A maximum of 3 absences will be allowed; additional absences in lab will result in an "F" for the entire course, regardless of excuse.
2. Laboratory Safety training
  - (a) 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!
3. Laboratory Coats
  - (a) 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. Due to the nature of chemicals used in Heritage Hall, lab coats will be provided for these laboratories.

**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 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.

**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.

**Disability Support and Access Services.** 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 an education that is barrier-free. The Office of Disability Support and Access is responsible for ensuring that students with a disability enjoy equal access to the University's programs, services and activities. Some aspects of this course or the way the course is taught may present barriers to learning due to a disability. If you feel this is the case, please contact Disability Support and Access at (254) 501-5831 in Warrior Hall, Ste. 212. Please visit their website <http://www.tamuct.edu/departments/disabilitysupport/index.php> for more information. Any information you provide is private and confidential and will be treated as such.

**Tutoring.** Tutoring is available to all TAMUCT students, both on-campus and online. Subjects tutored include Accounting, Finance, Statistics, Mathematics, and Writing, and APA formatting. Tutors are available at the Tutoring Center in Warrior Hall, Room 111. For tutor schedules and contact information, please visit <http://www.tamuct.edu/departments/academicsupport/tutoring-services.php>. If you have questions, need to schedule a tutoring session, or if you are interested in becoming a tutor, contact Academic Support Programs at 254-501-5830/5836 or by emailing [c.garza@tamuct.edu](mailto:c.garza@tamuct.edu).

Chat live with a tutor 24/7 for almost any subject on your computer! Tutor.com is an online tutoring platform that enables TAMUCT students to log-in and receive FREE online tutoring and writing support. This tool provides tutoring in Mathematics, Writing, Career Writing, Chemistry, Physics, Biology, Spanish, Calculus, and Statistics. To access Tutor.com, log into your Blackboard account and click "Online Tutoring."

**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 72,000 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 TAMUCT 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 twenty-four 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 TAMUCT 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 homepage: <http://www.tamuct.edu/departments/library/index.php>

#### Important University Dates:

March 19, 2018	Spring Semester Admissions Application Opens
October 22, 2018	Advising Begins for Spring Semester
October 22, 2018	Class Schedule Published For Spring Semester
November 1, 2018	Deadline for Scholarship Applications for the Spring Semester
November 5, 2018	Registration Opens for Spring Semester
November 15, 2018	Priority Deadline for International Student Spring Admissions Applications
December 3, 2018	Priority Deadline for Spring VA Certification Request
January 2, 2019	Priority Deadline for Spring Admissions applications
January 10, 2019	Convocation
January 11, 2019	Deadline for Tuition and Fee Payments (16- & First 8-Week Classes)
January 14, 2019	Add, Drop, and Late Registration Begins for 16- and First 8-Week. \$25 fee assessed for late registrants.
January 14, 2019	Classes Begin for Spring Semester
January 16, 2019	Deadline for Add, Drop, and Late Registration for 16- and First 8-Week Classes
January 21, 2019	Martin L. King Jr. Day (University Closed)
January 22, 2019	Deadline to Drop First 8-Week Classes with No Record
January 30, 2019	Deadline to Drop 16-Week Classes with No Record
February 22, 2019	Student End of Course Survey Opens (First 8-Week Classes)
February 22, 2019	Deadline to Drop First 8-Week Classes with a Quit (Q) or Withdraw (W)
March 1, 2019	Deadline for Graduation Application for Spring Ceremony Participation

March 1, 2019	Deadline for Teacher Education and Professional Certification Applications (i.e. Principal, Reading Specialist, etc.)
March 8, 2019	Classes End for First 8-Week Session
March 8, 2019	Deadline for Spring Admissions Applications
March 10, 2019	Student End of Course Survey Closes (First 8-Week Classes)
March 11, 2019	Spring Break – No Class (University Open)
March 11, 2019	Deadline for Faculty Submission of First 8-Week Final Class Grades (due by 3pm)
March 13, 2019	Spring Break – No Class (University Open)
March 14, 2019	Spring Break – No Class (University Open)
March 15, 2019	Deadline for Tuition and Fee Payments (Second 8-Week Classes)
March 15, 2019	Deadline for Clinical Teaching Applications
March 15, 2019	Spring Break – No Class (University Open)
March 18, 2019	Add, Drop, and Late Registration Begins for Second 8-Week Classes. \$25 fee assessed for late registrants.
March 18, 2019	Classes Begin for Second 8-Week Session
March 20, 2019	Deadline for Add, Drop, and Late Registration for Second 8-Week Classes
March 25, 2019	Deadline to Drop Second 8-Week Classes with No Record
April 1, 2019	Deadline for GRE/GMAT Scores to Office of Graduate Studies
April 5, 2019	Deadline to Drop 16-Week Classes with a Quit (Q) or Withdraw (W)
April 12, 2019	Deadline for Final Committee-Edited Theses with Committee Approval Signatures to Office of Graduate Studies for Spring Semester
April 26, 2019	Student End of Course Survey Opens (16- and Second 8-Week Classes)
April 26, 2019	Deadline to Drop Second 8-Week Classes with a Quit (Q) or Withdraw (W)
May 10, 2019	Deadline for Applications for \$1,000 Tuition Rebate for Spring Graduation (5pm)
May 10, 2019	Deadline for Degree Conferral Applications to the Registrar's Office. \$20 Late Application Fee.
May 10, 2019	Deadline to Withdraw from the University for 16- and Second 8-Week Classes

May 10, 2019	Spring Semester Ends
May 11, 2019	Commencement Ceremony Bell County Expo Center 7:00 p.m.
May 12, 2019	Student End of Course Survey Closes (16- and Second 8-Week Classes)
May 14, 2019	Deadline for Faculty Submission of 16-Week and Second 8-Week Final Class Grades (due by 3pm)
May 14, 2019	Deadline for Thesis to Clear Thesis Office for Spring Semester

## 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>].

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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](mailto:helpdesk@tamu.edu)

Phone: (254) 519-5466

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

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

BIO 4470 - Cell Biology

# Syllabus Contract

**Directions:**

- First, read the syllabus.
- Second, read the statement below to confirm your personal reading and understanding of the contents of the syllabus.
- Third, provide confirmation by printing the document and providing your signature and date of completion in the space provided below.
- Last, submit this contract to me. Note that your grade for the first assignment will **not** be calculated until this contract is received.

***I have received a copy of the syllabus. I have read and understand the policies of this course as stated in the syllabus.***

***Print Name*** \_\_\_\_\_

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Signature

Date

## Bio 4470 Cell Biology 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):

1. Double spaced lines (except for literature cited, which should be single spaced)
2. 1 inch margins (check this, most defaults are 1.5; you can change it in page setup)
3. Times New Roman font, size 12
4. No space between paragraphs
5. No page breaks between sections
6. No cover pages or binders!

### Citations:

#### Citing within the text of your paper:

1. One author: *Smith (1999) reported ....*
2. Two authors: *Smith and Jones (2003) observed ....*
3. More than 2 authors: *Smith et al. (1990) examined...*
4. 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*, 2<sup>nd</sup> 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:

1. 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.
2. 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...
3. 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.
4. 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.
5. Do not use contractions in formal writing.
6. Scientific writing is formal communication. Do not use conversational language, colloquialisms or slang.
7. PROOFREAD, PROOFREAD, PROOFREAD!
8. Some frequently misused/mispelled words (spell check will not catch most of these):
  - a. **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".
  - b. **it's/its** "It's" is the conjunction "it is". "Its" is the possessive form
  - c. **their/there/they're** I assume this is just carelessness, proofread your paper.
  - d. **between/among** Between refers to two things, while among refers to more than two.
  - e. **fewer/less** Use "fewer" if you can count the items, "less" if you can't. (less water, but fewer boats)
  - f. **amount/number** Use 'amount' if you can't count them, "number" if you can. (The amount of sand and the number of rocks)
  - g. **oftentimes** Drop the "times"; it's redundant.
  - h. **different from / different than** Different from is correct; different than is not.
  - i. **than/then** "than" refers to a comparison – proofread your paper for mix-ups
  - j. **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

<b>Topic Approval (5%)</b>	_____	<b>Due January 25, 2018</b>
<b>First Paper Outline (5%)</b>	_____	<b>Due February 8, 2018</b>
<b>Annotated outline (15%)</b> (includes citations)	_____	<b>Due February 22, 2018</b>
<b>First Submission (25%)</b> (Note: this is not a “rough” draft! You are expected to have a full paper submitted)	_____	<b>Due March 22, 2018</b>
<b>Final Submission (50%)</b>	_____	<b>Due April 26, 2018</b>

**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%)**

\_\_\_\_\_