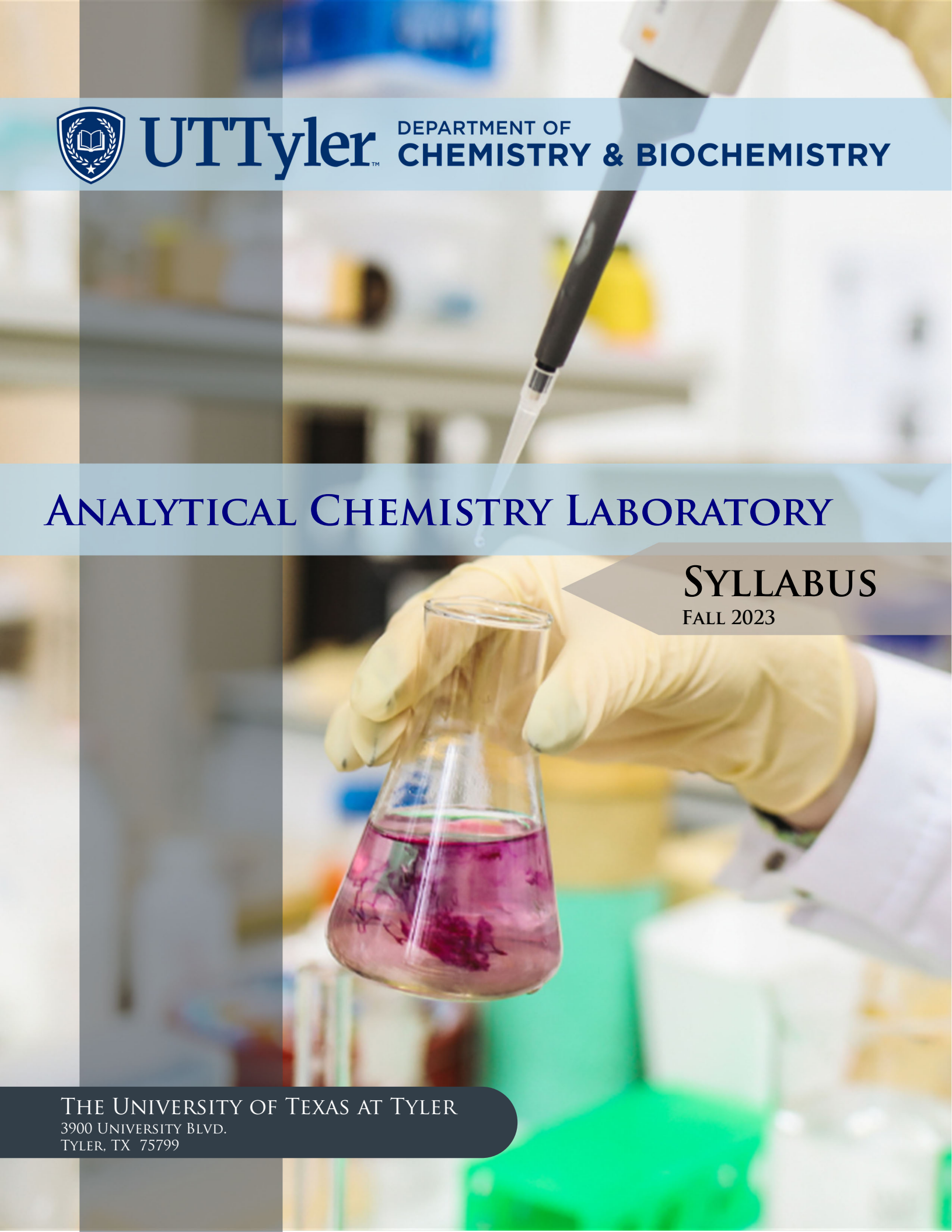

UTTyler DEPARTMENT OF CHEMISTRY & BIOCHEMISTRY

Analytical Chemistry Laboratory

Syllabus

Fall 2023

The University of Texas at Tyler
3900 University Blvd.
Tyler, TX 75799

Table of Contents

Meeting Times and Dates

Semester runs from Aug 21 to Dec 8

Sec.	Time	Room	Instructor
001	Mon 1:00 PM—5:00 PM	RBS 4014	Mr. Jason DiStefano
002	Mon 5:30 AM—9:30 PM	RBS 4014	Mr. Jason DiStefano

Chemistry is like Kung Fu. A bunch of fancy techniques that takes patience, energy, hard work, practice, and time to see results.

— Jason DiStefano

Instructor Contact Information

Instructor of Record	Office	Office Hours	Email	Phone
Mr. Jason DiStefano Lecturer of Chemistry	RBS 3006	Tues 10:00 am—12:00 pm Wed 2:00 pm—3:00 pm Tues 10:00 am—12:00 pm	jdistefano@uttyler.edu	903.566.7185
Dr. Tanya Shtoyko Professor of Chemistry	RBS 3003	Monday-Friday 11:15 am—12:15 pm	tshtoyko@uttyler.edu	903.565.5641

Course Description

Chemistry is an experimental science. Chemical knowledge has resulted from experimental observations and studies made by thousands of scientists over many centuries. In this course, students will examine, test, and establish for themselves advanced principles in standard quantitative methods of analysis. This course will expand the student's fundamental techniques in chemical analysis, and scientific recordkeeping, writing, and communication. The course will also apply theories and concepts learned from the lecture to solve real-world problems.

Prerequisite: *Credit for General Chemistry II lecture and lab (CHEM 1312 and 1112). Credit for or concurrent enrollment in Analytical Chemistry (CHEM 3310).*

Course Overview

Chemistry is the study of matter and its' interactions. Analytical chemistry is one of the five main branches of chemistry. Analytical chemistry is a broad field and plays a role in all areas of chemistry. Currently, analytical chemistry is often combined with the other disciplines to create interdisciplinary areas of interest, such as bioanalytical and organometallic chemistry. From a broad perspective, analytical chemistry is responsible for characterizing the composition of matter and/or chemical systems. Analytical chemists develop methods of characterization to analyze chemical systems both qualitatively and quantitatively. Because of its strong and apparent overlap into all branches of chemistry, analytical chemistry can be simplified to the application of chemical knowledge. Analytical chemists also push the boundaries of chemical analysis to extend and improve the ability of all chemists. They increasingly develop methods to measure and characterize smaller samples, on more complex systems, within shorter timeframes, and lower detection limits. This branch of chemistry is responsible for many of the tools, methods, and instrumentation currently used today. In this course, students will develop fundamental skills and techniques that are quintessential for analytical chemists.

Student Learning Outcomes (Core Objective Assessed):

- Students will develop analytical techniques that are commonly used in established methods of analysis. (critical thinking, empirical and quantitative, communication, and teamwork skills)
- Students will investigate and apply the principles upon which many chemical analyses are based. (critical thinking, empirical and quantitative skills)
- Students will make scientific observations and assess their importance and significance. (critical thinking, communication, empirical, quantitative, and teamwork skills).
- Students will collect and manage data in a scientific notebook in order to express their results in a precise and reliable quantitative form on laboratory reports. (empirical and quantitative, and communication skills)
- Students will apply statistical analysis to draw logical conclusions about the applicability and validity of observed data. (critical thinking skills)
- Students will use collected data to calculate physical or chemical quantities germane to the experiment being performed. (empirical and quantitative skills)
- Students will develop teamwork skills that include not only the efficient acquisition of experimental data, but also the awareness of safety in the laboratory setting. (Teamwork)

In addition to the core objectives being assessed students will also be expected to:

- Use more advanced apparatus and apply experimental methodologies in the chemistry laboratory setting.
- Demonstrate safe and proper handling of laboratory equipment and chemicals.

Materials Required for Lab Work:

Laboratory Notebook: Each student must purchase and maintain a bound laboratory notebook in which to generate a *permanent* record of experimental observations, notes, calculations, etc. The lab record book you purchase must provide:

- a label for your name and contact information (phone, email, or other), course prefix (CHEM), course and section number (*e.g.* 3111.001), semester, and the instructor's name;
- a table of contents page
- pages consecutively *pre-numbered*;
- *preprinted* page headings for entering title, date, name, and *specific* lab section (e.g., CHEM 3111.001); and
- a *perforated*, carbonless duplicate for each page.

Lab Manual: The experiments and procedures will come from a variety of sources. Students are provided with a lab procedure through Canvas for each experiment.

Scientific Calculator

Analytical Chemistry Lecture Textbook: This item may not be essential during class, but may be needed for reference purposes to complete laboratory assignments.

Computer Access: with Microsoft Excel, PowerPoint, Word, Zoom, and LoggerPro (free for students through course).

Personal Protect Equipment (PPE):

1. **Splash-Proof Goggles** must be worn in the laboratory whenever you or your neighbors are performing experiments. (Time during your initial lab period will be allotted for purchasing goggles from your American Chemical Society Student Affiliates on campus to ensure that you will be prepared to comply with this requirement.) **Warning**: students will not be admitted into the lab without splash-proof goggles!
2. **Appropriate clothing** suitable for laboratory work must be worn by students. **Warning**: students will not be allowed to work in the lab without an effective coverage from chest to toes! (**This means *no open-toed shoes* or extensive areas of exposed skin on your torso!**) If you do not meet these requirements, you cannot work in the lab until the requirements are met.

Laboratory Requirements:

Students who perform unauthorized experiments or who remove chemicals or equipment from the lab may be dropped from the course or have their grades lowered.

Arrive on time and be prepared for each laboratory session. The laboratory experiments are such that the average student can complete the work during the assigned time. This can be accomplished only if a reasonable amount of study and preparation has been done before coming to the laboratory. Plan what is to be done in each experiment before coming to the lab. It will save time and will aid in avoiding serious mistakes.

Students are responsible for laboratory equipment furnished by the Department of Chemistry & Biochemistry and students may be required to purchase any missing or damaged equipment.

The grading of experiments will be based on the evaluations of each student's laboratory performance, experimental results, and the quality of their laboratory reports (*i.e.*, analyses and presentations of results.)

Students will be responsible for maintaining cleanliness in the desk areas. Students will be responsible to maintain a clean work area during each lab session Students will be required to clean/sanitize their area of responsibility which may include cleaning/sanitation of shelves, sinks, hoods, reagent tables, and glassware/equipment. Students who neglect their clean-up responsibilities will have their grades significantly lowered for that day's work. Therefore, it is important that students have their clean-up duties approved by the lab instructor before leaving lab.

Students are required to turn in a lab report for each experiment. Your instructor will explain what is expected in the lab reports.

Safety Policy

Read, comprehend, and follow the laboratory safety guidelines at all times. These rules include, but are not limited to:

Safety goggles must be worn in the laboratory at all times. Students who do not have safety goggles will not be admitted into the laboratory.

You will not be allowed in the lab with open-toed shoes or any clothing exposing extensive areas of your skin to the risks of burns or chemical splashes. Please come to class each day wearing long pants or skirt, an appropriate shirt and closed toe shoes. There is not sufficient time for you to return home to change clothes and we have NO opportunity to make-up missed labs.

Do not consume *anything* by mouth in the lab, including gum and smokeless tobacco! There is no eating in the lab space.

Do not perform unauthorized experiments or remove chemicals or equipment.

Note: we take safety infractions very seriously. Depending on the seriousness of such infractions, you may lose points on your lab work habits grade, be dismissed and receive a zero on any work missed, or even be dropped from the course.

Attendance Policy

Lab attendance is essential. ***One*** make up lab is allowed (for ***one*** excused absence only).

An unexcused absence results in a grade of zero for any lab work or exam missed.

Normally, an excused absence includes medical emergencies, a death in your family or required travel for a UT Tyler's event (*e.g.*, athletic team travel). All supporting documentation should be presented to the lab instructor.

Students who anticipate being absent from class due to a religious observance are *required* to inform their instructors of such absences as soon as possible (at least one week before the religious holiday).

Students who anticipate being absent from class due to a required travel for a UT Tyler's event (e.g., athletic team travel) are *required* to inform their instructor(s) of such absences at least one week before the absence.

Course Grading

The grading of all assignments are up to the instructor; however the average weighting for the assignments will be uniform across all lab sections (see below). The overall course grade will tentatively be based on the 90/80/70/60 percentage scale, but it may be adjusted based upon the instructor's judgment of the overall class performance.

Laboratory Notebook:

Maintaining detailed records of your laboratory work is vital for producing quality scientific reports or publications. A scientific investigator cannot prove their work is valid without a properly maintained notebook. By far, this record is one of the most important aspects of experimentation or research, and therefore will be an important part of your overall grade in this course. Your laboratory instructor will guide you in maintaining a laboratory notebook over the course of the class.

The grades for this course will be weighted as follows:

20%	Laboratory Notebook
50%	Laboratory Reports
10%	Experimental Plans
20%	Team Challenge
100%	Total

Laboratory Reports:

There will be two types of reports that you will be required to complete—formal reports and summary reports.

Formal laboratory reports will be completed and submitted electronically via Canvas. All formal reports must be typed and should follow ACS style guidelines. Copies of the notebook pages pertaining to the report's experiment are also required for each formal report. It is important that you can properly write, format and communicate a scientific document effectively. Each experiment is different, therefore, the formal report and the items required within may change for each experiment. Each formal report must include a detailed introduction of the experiment, experimental procedure, data/observations and/or results collected during the experiment, and a conclusion. To accomplish this, you may need to generate tables and graph to properly communicate the information. Experiments will rely heavily on the use of Microsoft Word & Excel (or equivalent). Your instructor will provide you with details for each experiment.

Summary reports will be handouts with specific questions and sections for you to complete. These handouts will be made available on Canvas and you will be expected to type all responses on the form. Summary reports will also be submitted electronically via Canvas.

Experimental Plans:

"Poor planning equals poor performance." Each week, students will be required to submit an experimental plan for the lab meeting. This plan should include all details necessary to complete the upcoming experiment (or portion of experiment). This should include a summary, procedure, chemical safety and properties. More details of this assignment will be discussed in class.

Team Challenge:

While it is important to be able to communicate scientific information in writing, it is equally important to do the same orally. As a group, you and your teammates will be required to collaborate on a project that simulates the hiring of a mock analytical company. Your company will be tasked with a specific problem that will require chemical analysis. To succeed, your company must research and develop a method of analysis, perform that analysis, and report your findings back to the client. You must submit a formal written report, as well as prepare and present your report in-person as a oral presentation. More specific details for the project will be given to you by your instructor.

Dropping the Course:

The last day to withdraw from the course with an automatic grade of "W" is listed on the laboratory schedule. Before dropping the course, you should consult with your instructor to examine all of your options. Dropping this course does not obligate you to also drop the lecture course because they are two separate courses. However, dropping the lecture course may significantly hinder your progress in this course because you will be expected to learn the chemical theories and concepts on your own.

Laboratory Schedule

Day:	Experiment Schedule
Aug 21	Introduction to course, syllabus, schedule, lab notebooks & reports, lab safety, and teamwork project
Aug 28	Calibration of Volumetric Glassware
Sep 4	Labor Day — Labs will not week this week
Sep 11	Gravimetric Analysis of Sulfate—Experiment Preparation Due: Calibration of Volumetric Glassware Formal Report
Sep 18	Gravimetric Analysis of Sulfate—Analysis
Sep 25	Potentiometric Titration of a Polyprotic Acid Due: Gravimetric Analysis Summary Report
Oct 2	Analysis of Unknown Concentration via Atomic Absorption (AA) and Standard Addition Due: Potentiometric Titration Formal Report
Oct 9	Analysis of Unknown Concentration via Atomic Absorption (AA) and Standard Addition
Oct 16	Preparation of Buffers and Determination of Buffer Capacity Due: AA Standard Addition Summary Report
Oct 23	Analysis of Caffeine via HPLC Due: Buffers Summary Report
Oct 30	Analysis of Caffeine via HPLC Last day (Oct 30th) to drop or withdraw from a course with an grade of "W"
Nov 6	Team Challenges Due: HPLC of Caffeine Formal Report
Nov 13	Team Challenges
Nov 20	Thanksgiving — Labs will not meet this week
Nov 27	Team Challenges
Dec 3	Due: Team Challenges Formal Report (Sunday 11:59pm due date)
Dec 4	Final Exams — Labs will not meet this week

Note: the right to substitute or switch labs, as required by unforeseen circumstances, is reserved.
All lab procedures are provided online via Canvas.

Withdrawing from Class

Students are allowed to withdraw (drop) from a course through the University's Withdrawal Portal. Texas law prohibits students who began college for the first time in Fall 2007 or thereafter from dropping more than six courses during their entire undergraduate career. The number includes courses dropped at other 2-year or 4-year Texas public colleges and universities. Make sure to consider the impact withdrawing from any course has on your academic progress as well as the financial implications. We encourage you to consult your advisor(s) and financial aid for additional guidance. CAUTION #1: Withdrawing before census day does not mean students receive a full refund. Please see the Tuition and Fee Refund Schedule. CAUTION #2: All international students must check with the Office of International Programs before withdrawing. All international students are required to enroll full-time for fall and spring terms.

Final Exam Policy

Final examinations are administered as scheduled. If unusual circumstances require that special arrangements be made for an individual student or class, the dean of the appropriate college, after consultation with the faculty member involved, may authorize an exception to the schedule. Faculty members are required to maintain student final examination papers for a minimum of three months following the examination date.

Incomplete Grade Policy

If a student, because of extenuating circumstances, is unable to complete course requirements by the end of the semester, then the instructor may recommend an Incomplete (I) for the course. The "I" may be assigned in lieu of a grade only when all of the following conditions are met: (a) the student has been making satisfactory progress in the course; (b) the student is unable to complete all course work or final exam due to unusual circumstances that are beyond personal control and are acceptable to the instructor; and (c) the student presents these reasons prior to the time that the final grade roster is due. The semester credit hours for an Incomplete will not be used to calculate the grade point average for a student. The student and the instructor must submit an Incomplete Form detailing the work required and the time by which the work must be completed to their respective department chair or college dean for approval. The time limit established must not exceed one year. Should the student fail to complete the work for the course within the time limit, the instructor may assign zeros to the unfinished work, compute the course average for the student, and assign the appropriate grade. If a grade has not been assigned within one year, then the Incomplete will be changed to an F or to NC, if the course was initially taken under the CR/NC grading basis.

Grade Appeal Policy

UT Tyler's Grade Appeal policy requires the completion of a Grade Appeal form for this action to take place. The grade appeal begins with the instructor of the course. If a student does not agree with the decision of the instructor, the student may then move the appeal to the department chair/school director for that course. If the student is still dissatisfied with the decision of the chair/director, the appeal moves to the Dean of the College offering that course, who has the final decision. Grade appeals must be initiated within sixty (60) days from the date of receiving the final course grade. The Grade Appeal form is found on the Registrar's Form Library.

Disability/Accessibility Services

In accordance with Section 504 of the Rehabilitation Act, Americans with Disabilities Act (ADA) and the ADA Amendments Act (ADAAA), The University of Texas at Tyler offers accommodations to students with learning, physical and/or psychological disabilities. If a student has a disability, including a non-visible diagnosis such as a learning disorder, chronic illness, TBI, PTSD, ADHD, or a history of modifications or accommodations in a previous educational environment, the student is encouraged to visit https://hood.accessiblelearning.com/UTTyler and fill out the New Student application. The Student Accessibility and Resources (SAR) office will contact the student when the application has been submitted and schedule an appointment with the Assistant Director Student Accessibility and Resources/ADA Coordinator. For more information, including filling out an application for services, please visit the SAR webpage at http://www.uttyler.edu/disabilityservices, the SAR office located in the University Center, # 3150 or call 903.566.7079."

Military Affiliated Students

UT Tyler honors the service and sacrifices of our military-affiliated students. If you are a student who is a veteran, on active duty, in the reserves or National Guard, or a military spouse or dependent, please stay in contact with your faculty member if any aspect of your present or prior service or family situation makes it difficult for you to fulfill the requirements of a course or creates disruption in your academic progress. It is important to make your faculty member aware of any complications as far in advance as possible. Your faculty member is willing to work with you and, if needed, put you in contact with university staff who are trained to assist you. Campus resources for military-affiliated students are in the Military and Veterans Success Center (MVSC). The MVSC can be reached at MVSC@uttyler.edu or via phone at 903.565.5972.

Academic Honesty and Academic Misconduct

The UT Tyler community comes together to pledge that "Honor and integrity will not allow me to lie, cheat, or steal, nor to accept the actions of those who do." Therefore, we enforce the Student Conduct and Discipline policy in the Student Manual Of Operating Procedures (Section 8).

University Policies& Important Information

FERPA

UT Tyler follows the Family Educational Rights and Privacy Act (FERPA) as noted in University Policy 5.2.3. The course instructor will follow all requirements in protecting your confidential information.

Recording of Class Sessions

Class sessions may be recorded by the instructor for use by students enrolled in the course. Recordings that contain personally identifiable information or other information subject to FERPA shall not be shared with individuals not enrolled in the course unless appropriate consent is obtained from all relevant students. Class recordings are reserved only for the use of students enrolled in the course and only for educational purposes. Course recordings should not be shared outside of the course in any form without express permission.

Absence for Official University Events or Activities

All courses follow the practices related to approved absences as noted by the Student Manual of Operating Procedures (Sec. 1 -501).

Absence for Religious Holidays

Students who anticipate being absent from class due to a religious holiday are requested to inform the instructor by the second class meeting of the semester.

Campus Carry

We respect the right and privacy of students who are duly licensed to carry concealed weapons in all courses. License holders are expected to behave responsibly and keep a handgun secure and concealed. More information is available at

http://www.uttyler.edu/about/campus-carry/index.php.

Resources to assist you in the course

- UT Tyler Student Accessibility and Resource (SAR) Office (provides needed accommodations to students with document needs related to access and learning)
- UT Tyler Writing Center
- The Mathematics Learning Center
- UT Tyler PASS Tutoring Center
- UT Tyler Supplemental Instruction
- Upswing (24/7 online tutoring) - covers nearly all undergraduate course areas
- Robert Muntz Library and Library Liaison
- Digital Support Toolkit (For supported courses only. Students are automatically enrolled in the toolkit for supported courses)
- LIB 422 -- Computer Lab where students can take a proctored exam
- The Career Success Center
- UT Tyler Testing Center
- Office of Research & Scholarship Design and Data Analysis Lab

Resources available to UT Tyler Students

- UT Tyler Counseling Center (available to all students)
- TAO Online Support Center (online self-help modules related to mental & emotional health)
- Military and Veterans Success Center (supports for our military-affiliated students)
- UT Tyler Patriot Food Pantry
- UT Tyler Financial Aid and Scholarships
- UT Tyler Registrar's Office
- Office of International Programs
- Title IX Reporting
- Patriots Engage (available to all students. Get engaged at UT Tyler.)