CHEM 1106
Chemistry Experiments That Matter
Spring 2020

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Office hrs: WF 10:00 – 11:00 a.m.
TTh 1:00 – 2:00 p.m. or by appointment.

TA name(s) _____ email: _____

Required Materials

CHEM 1106, Experimental General Chemistry II Basics, Kendall Hunt Publishing - available at area bookstores.
Chemical Splash Laboratory Safety Goggles ($8, cash or credit) - available from ACS.
Valumax Lab Coat ($7, cash only) – available from ACS

The last day to drop this course is Wednesday, April 22nd.
Note: if you drop from the lecture course, you will automatically be dropped from the lab.

Important Places

General Chemistry Office – Chemistry 109
Drop off excused absence forms

Equipment Stock Room – Chemistry 117
Equipment and replacement glassware for the General Chemistry Labs.

Chemical Stock Room – Chemistry 208
Stockroom personnel supply reagents.

Course Overview

This course is the laboratory companion to CHEM 1306, a survey of basic chemical concepts, properties, and reactions. Laboratory activity topics include: laboratory safety, transfer and measurement of chemicals, using physical properties to identify compounds, chemical reactions, solution preparation, pH, titrations, and redox reactions. CHEM 1106 fulfills 1 credit hour of the 2 SCH Texas Tech University science laboratory graduation requirement. The co-requisite course, CHEM 1306 fulfills 3 SCH of the 6 SCH core curriculum requirement in life and physical sciences.

College-Level Competency Statement

The objective of the study of the life and physical sciences component of a core curriculum is to enable the student to understand, construct, and evaluate relationships in the life and physical sciences, and to enable the student to understand the bases for building and testing theories. The life and physical sciences investigate the phenomena of the physical world.

Email

If you have an in-depth chemistry/calculation question, it is best to meet with your TA or Prof. Telesford in-person. These types of questions are difficult to interpret and answer via email. Emails that are sent after 5 PM, may not get answered until the following day. **Emails are professional correspondence.**

1. Most of your professors at the college level should be addressed as "Professor" or "Dr." not by their first name or Mr. or Ms., unless they request to be addressed in that way. Your TA will instruct you as to how they would prefer to be addressed.
2. Emails sent to university email addresses are a permanent document of communication. Therefore, be sure that your emails are polite, professional and well-prepared before you send them. You should not feel comfortable saying anything in email that you would not verbally say to the recipient, in-person.
3. Use complete words and sentences. Remember that email is a professional correspondence and as such you should avoid using slang or communicate as if it were an Instant Message, text message or Snapchat.
4. Read this syllabus. Most of your questions can be answered by reading the course syllabus.

Methods of Outcome Assessment and Grading

The student will be assessed in the course by completing the required instructional activities as outlined below.

GRADING

Syllabus Quiz (Online)	10 pts.	10 points
Pre-Lab Quiz (Online)	10 × 10 pts.	110 points
Lab Data and Report	10 × 50 pts.	550 points
Post-Lab Questions	10 × 15 pts	165 points
Student Assessment	50 pts.	50 points
Final Exam (Online)	150 pts.	150 points
Total		960 points

A = 89.00 – 100%, B = 78.00 – 88.99%, C = 67.00 – 77.99%, D = 56.00– 66.99%, F = 0- 55.99%.

There is no grading curve. Make sure to check your scores on Blackboard. You have either 3 days from when the grade is posted on Blackboard or up until the day of the final, **April 29th**, whichever comes first, to dispute the grade. Save all of your graded work until after you have received your course grade from the Registrar.

Course Expected Learning Outcomes and Methods for Assessment

Upon successful completion of this course, students will:

1. Be able to determine the common physical properties of a substance, and to calculate its density.
2. Observe the effects of temperature and concentration on diffusion. Identify reaction products and investigate thermodynamics of some basic chemical reactions.
3. Examine physical and chemical properties of hydrocarbons.
4. Use various chemical tests to detect fats, proteins, and carbohydrates in foods.
5. Examine the effects of temperature, concentration, and inhibitors on an enzyme-catalyzed reaction.
6. Be able to extract protein from milk.
7. Understand and synthesize an ester.
8. Perform quantitative analysis of a chemical substance using Beer's law.
9. Identify a food dye using chromatography and spectroscopy.
10. Understand the functions of enzymes in biochemical reactions.

Each learning outcome is represented in an individual laboratory exercise. Methods of assessment for each will be similar: completion of pre- and post-lab questions, collection of lab data, lab report, and the final exam.

Description of Assessment and Grade Determination

Syllabus Quiz and Pre-Lab Questions

Complete the syllabus quiz and pre-lab questions on Blackboard (online). It is recommended that you do NOT use a tablet or mobile device to complete any assignment on Blackboard. The syllabus quiz is due **Tuesday, February 11th at 12:00 pm.** The pre-lab quizzes for each experiment are available for 7 days and are due 1 hour before the start of your lab class, no exceptions. You are to ignore the pre-lab questions for each experiment in the laboratory manual as they will not be graded.

Lab Data and Reports

Data is reported in the tables provided in the manual, and then analyzed as described in the manual with the details of calculations being shown. You are required to do your own work when preparing these reports. If the experiment called for working with a partner, you and your partner will, of course, have identical data. **However, the rest of the write- up needs to be your own work. Students who turn in duplicate work will receive grades of 0 – no exceptions. Lab data and reports are due at the beginning of the next lab period.** All students are required to write, on your Lab Data and Reports, the name of your lab partner(s) for each experiment completed. Lab data and reports are due at the beginning of the next lab period.

A completed lab report consists of:

1. Filled-in data sheet from lab manual
2. Detailed calculations
3. Data analysis and results

Post-lab Questions

There is a set of post-laboratory questions for each experiment in the laboratory manual. Remove the page with these questions from the lab manual, answer the questions, and turn the sheet in at the start of your next laboratory session.

Late Lab Data, Reports and Post-lab Question

Lab Data, Reports and Post-Lab Questions are due at the beginning of the next lab class after the completion of an experiment. A penalty of **20% per day** is assessed for late Lab Data, Reports and Post-Lab Questions. If you plan on submitting late lab data, please do so to Chem 109; you must notify your TA by email within one day after submission. **NO** credit will be given after 1 week after the completion of an experiment. Graded reports should be returned the next lab class after submission.

Student Assessment

Each student will be evaluated on the quality of their work throughout the course. This evaluation will be worth a total of 50 points, and is divided as follows: 20 points possible awarded by your TA, 20 points possible awarded by the lab partner(s) of the student and 10 points possible awarded to yourself. A student assessment rubric will be provided on the last day of class. Scores will be adapted based on: participation/effort, being prepared for lab, cleaning up after lab, being punctual, following the safety rules and your overall conduct in the lab.

Final Exam

There will be a comprehensive final exam online that involves material from all experiments done throughout the semester.

The following Learning Outcomes, from the Texas Higher Education Coordinating Board and from Texas Tech University, must be included in all Life and Physical Science classes in the Core.

Coordinating Board Objective 1. Critical Thinking Skills: to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information
Critical thinking involves synthesizing and evaluating information before forming an opinion or reaching a conclusion on an issue. The pre- and post-lab questions measure this skill via presentation of data that requires analysis before answering questions. Proper execution of experiments requires an understanding of the line of inquiry being pursued. Data collected during the laboratory experiments must be analyzed, evaluated, and synthesized into a lab report. Assessment of this objective will also occur via the final exam where students will need to evaluate data and synthesize information from various experiments.

Coordinating Board Objective 2. Communication Skills: to include effective development, interpretation and expression of ideas through written, oral and visual communication
Pre-lab information will be given via online instruction, requiring students to use visual cues to prepare for their experiments. Oral communication with both individual lab partners and other small groups within the section is vital to success in the lab. Written communication skills will be developed and assessed via the many required lab reports, which make up the majority of the assessment in this class.

Coordinating Board Objective 3. Empirical and Quantitative Skills: to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions
Chemical concepts frequently require employing mathematical formulas, calculating ratios, and computing numerical problems. Proper analysis of data is the basis for all laboratory work, and will be assessed via lab report and post-lab questions. Empirical and quantitative skills are further assessed on pre-lab assignments via mathematical problems used to introduce the student to the types of analysis that will be used in that experiment.

Coordinating Board Objective 4. Teamwork: to include the ability to consider different points of view and towork effectively with others to support a shared purpose or goal
Students will work together over the course of the semester practicing application of course material in a laboratory setting. They will frequently work in pairs, but will also need to collaborate with other members of the laboratory section in larger groups, especially for data collection. At the conclusion of the semester, they will be assessed on their teamwork contribution via a combination of self-evaluation, team evaluation, and instructor evaluation.

TTU Student Learning Objective 1. Demonstrate knowledge of the scientific method and to contrast it with other ways of understanding the world
The laboratory requires that the student understand the scientific method completely. Students are expected to make hypotheses in pre-lab assignments, perform experiments and collect data during the laboratory period, and analyze their results in lab reports and post-lab worksheets. In addition to the pre-and post-lab questions, data sheets, and lab reports, understanding of the scientific method will be assessed on the final exam.

TTU Student Learning Objective 2. Demonstrate knowledge of the tools and methods used by scientists to study the natural world
Each experiment requires a unique set of tools, and the students must be able to follow methods listed in the laboratory manual in order to successfully complete the lab. Assessment of this objective occurs via data collection sheets, post-lab questions, and laboratory reports.

TTU Student Learning Objective 3. Explain some of the major theories in the Natural Sciences
The laboratory experiments will cover some of the major concepts of chemistry, including mass percent determination, titrations, and spectrochemical analysis. This objective is assessed via lab reports, where students need to synthesize knowledge of these theories, as well as via the final exam, which will include questions that test this understanding.

TTU Student Learning Objective 4. Describe how Natural Sciences research informs societal issues, including ethics
Societal issues will be discussed in lecture. The ethics of these issues will be stressed, and knowledge of these topics will be assessed in assignments based on supplemental reading and discussion of these assignments in class and through discussion boards.

Absence Policy LIMIT 2 EXCUSED ABSENCES

Students absent from lab can make-up a maximum of two (2) experiments only if that absence is excused. To initiate the process for an excused absence, the student must submit a request for an excused absence form (available in Chemistry 109) and supporting written documentation **prior to or within 5 business days of the absence, no exceptions**. If your documents are not turned into Chem 109 within this time, you will not be allowed to make-up the lab at the end of the semester. The laboratory director, Prof. Telesford and/or InEyes Johnson (Ofgod.Johnson@ttu.edu), will review the request. If the request is not approved, a grade of zero will be recorded for the lab data and report and the post-lab questions for the missed laboratory experiment. You will be able to turn in the laboratory report from the laboratory session prior to the missed lab up to one week late without penalty.

Some guidelines for excused laboratory approval:

1. Apply within one week. Late requests will not be approved.
2. Illness: A health care provider must specifically indicate that the illness prevented you from attending school at the time of your scheduled laboratory. It is **NOT** sufficient to merely indicate that the student was seen at student health services (times & dates on note must match missed lab).
3. Funerals. Absence to attend the funeral of a deceased family member is excusable with family defined as the student's spouse, (step)parents, (step)children, (step)brothers, (step)sisters, (step)grandparents, (step)grandchildren, and great-grandparents (bring in some form of documentation i.e. program, obituary, etc).
4. If there is any uncertainty about whether or not an absence will be considered excused, prior to your absence, you should stop by the General Chemistry Office (Chemistry 109) and speak to InEyes Johnson.

TTU Sponsored Activities or Religious Holidays:

If a TTU sponsored activity or religious holiday requires a student to miss his/her scheduled lab section, approval for an excused absence must be made **at least 5 business days prior to the scheduled lab.** Written documentation must be submitted to the General Chemistry Office (Chemistry 109) for final approval. Attending a job fair or job interview or other work related absences are generally not excused.

Students with Disabilities

Any student who, because of a disability, may require special arrangements in order to meet the course requirements should contact the instructor as soon as possible to make any necessary arrangements. Students should present appropriate verification from Student Disability Services during the instructor's office hours. Please note instructors are not allowed to provide classroom accommodations to a student until appropriate verification from Student Disability Services has been provided. For additional information, you may contact the Student Disability Services office in 335 West Hall or 806-742-2405.

Academic Integrity

ACADEMIC DISHONESTY WILL NOT BE TOLERATED IN THIS COURSE. Any form of cheating and/or plagiarism including, but not limited to, copying on lab reports, or examinations, altering exam/lab/quiz information, forging signatures, using crib notes, etc. will result in a failing grade for that assignment and/or failing the course. In accordance with Texas Tech University's Academic Dishonesty Policy, incidents of academic misconduct may also be referred to the Dean of Students Office for further disciplinary action.

Lab Accidents

Any student involved in a laboratory accident (e.g., cuts, burns, inhalation of fumes, chemical spills), inform the TA immediately and you should go to Student Health Services (Student Wellness Center) for treatment. If further treatment is necessary, you will be referred to University Medical Center (or another hospital). The university does not cover your expenses at UMC (or other hospitals) or any other medical expenses incurred. **The student and TA are required to complete an incident report form available in each lab.**

Students' Lab Drawer

Students will be assigned to a lab drawer in pairs, together you must check the contents of this drawer at the start and end of the semester. If items are missing, go to the general chemistry stockroom 117 to get the items replaced. Before leaving the lab, check that all items are in this drawer and the drawer is locked. Also, you are supposed to keep your PPE in your student lab drawer.

TEXAS TECH UNIVERSITY
DEPARTMENT OF CHEMISTRY & BIOCHEMISTRY

Undergraduate Teaching Laboratories: Safety Facts and Responsibility Form

In order to avoid personal injuries and injuries to fellow students while checking in to, checking out of, and performing experiments in your chemistry laboratory courses, please read the following information. You are expected to read, understand, and follow all the stated safety regulations and any other rule mandated by university faculty or staff throughout the course. Failure to abide by these rules can result in your dismissal from the laboratory and receiving a zero for the experiment.

1. Approved splash-proof safety goggles (NOT safety glasses) are to be worn continuously while you are in the laboratory. Safety goggles will protect your eyes against impact and splashes. These goggles are available in the book stores and through the American Chemical Society student affiliate group on campus.

   If you should get a chemical into your eyes, notify your teaching assistant immediately and wash with flowing water from the eyewash for 15-20 minutes.

2. Students, teaching assistants and other staff members are to be appropriately clothed in the laboratory at all times, including check-in and check-out. Appropriate clothing includes:

   - Clothing that protects the individual's body from the neck to the ankles down to the wrists. Short-sleeve shirts, tank tops or other clothing items that do not cover the shoulders or abdominal area are not acceptable clothing to be worn in the laboratory. You must wear attire which covers from the neck to the ankles, plus either a lab coat or a lab apron plus protective sleeves. No skin should be exposed below the neck.

   - Footwear that covers the entire foot. Open-toed and/or open-heeled shoes, including clogs and sandals, etc. are not acceptable footwear to be worn in the teaching laboratory.

   - Leggings and tights are not acceptable to be worn in the chemistry laboratory.

3. No unauthorized experiments should be performed.

4. Never use an open flame when working with organic solvents.

5. In case of fire, or accident, notify your teaching assistant at once (note location of the safety shower and eye wash stations before they are needed).

6. Take special care when working with strong acids or strong bases. Contact with these materials can cause severe chemical burns. Always use gloves.

7. Do not touch hot glassware or hot hardware. Think before you act.

8. The Department of Chemistry and Biochemistry will seek medical assistance for you if you are injured in the lab. Transportation to a medical facility will be supplied for you as needed. You are responsible for all costs incurred.

9. Do not taste anything in the laboratory (this applies to food as well as chemicals. Do not use the laboratory as an eating place and do not eat or drink from laboratory glassware).

10. Never bring food or drink into the lab (this includes tobacco products and chewing gum).

11. Exercise great care in noting the odor of vapors and, whenever possible, avoid breathing vapors of any kind.

12. Always use a suction bulb when filling a pipet. Never suction by mouth!

13. Don't force glass tubing into rubber stoppers.

14. Confine long hair securely when in the laboratory.

15. When working with electrical equipment, observe caution in handling loose wires and make sure that all equipment is electrically grounded before touching it.

16. Never work alone in the laboratory.

17. There is no such thing as a "dumb" question. If you have any question, ask your lab instructor/teaching assistant.

18. If you see another student violating these rules, please notify your lab instructor/teaching assistant.

19. The use of cosmetics (including lip balm) is prohibited in the laboratory.

20. Do not use damaged, cracked, chipped, or broken glassware.

21. Waste should be properly segregated and disposed of in accordance with the University, departmental, and laboratory policies.

22. No chemical or equipment may be removed from the laboratory without specified permission and supervision of your lab instructor/teaching assistant.

SPECIAL NOTE DEALING WITH WEARING SAFETY GOGGLES IN THE CHEMISTRY INSTRUCTIONAL LABORATORY

Safety is a very serious issue. Protect your eyes at all times because unforeseen accidents do take place and eyes cannot be replaced! Students and teaching assistants must continuously wear approved safety goggles (not safety glasses) while in the chemistry laboratory. This includes the entire time spent in the laboratory during check-in and check-out!

Wearing contact lenses in a chemical laboratory can be harmful to your eyes, even with the use of goggles. Contact lenses should be replaced by prescription glasses except in rare cases where this is not possible.

Students who do not follow this requirement during any experiment will be given a score of zero (0) for the experiment and will be told to leave the laboratory.

If you are pregnant or become pregnant during this semester, it is very important to speak to Professor Telesford or LaQuetta Purkiss (Chemistry 108) so that safety concerns can be discussed.

1106 Laboratory Experiment Schedule – Spring 2020		
DATES	**EXP #**	**EXPERIMENT TITLE**
21– 24 Jan		Safety &Check-In, Mandatory*
28 – 31 Jan	2	Diffusion and Osmosis
04 – 07 Feb	3	Properties of Hydrocarbons
11– 14 Feb	4	Organic Functional Group Test
18 – 21 Feb	1	Heat Transfer and Temperature Change
25 – 28 Feb	5	Extraction of Proteins and Detection of Fats, Proteins and Carbohydrates in Foods
03 – 06 Mar	6	Enzymes
10 – 13 Mar	6	Enzymes Pt. 2
17 – 20 Mar		Spring Break
24 – 27 Mar	9	Synthesis of Aspirin
31 Mar – 3 Apr	10	Instrumental Analysis
07 – 10 Apr	11	Paper Chromatography of Food Dyes
14 – 17 Apr	12	Food Biochemistry, Clean-up, Check-out and Assessment
21 – 24 Apr	Make-up Labs*	
29 Apr	FINAL EXAM	ONLINE

VERY IMPORTANT NOTE: If you withdraw from the lecture course (CHEM 1306), you will automatically be dropped from the lab, no exceptions!

* Safety & Check-In: Students who are unable to attend must email Ofgod.Johnson@ttu.edu on or before **Friday, January 24th**.

*Make-up Labs: Please read the Absence/Make-up Lab Policy on pg. 5 of the Syllabus.