

CHEM 1350: *Chemistry in Action!* Spring 2020 Syllabus

Instructor Contact Information and Office

Instructor Contact Information

Section 001

Dr. Shaun D. Black

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Best method of contact is e-mail.



Office Hours

In general, it has been my policy to be available for help any time I am at the university.

Black: M, W 10:00 AM—12:00 PM
T 11:00 AM—12:00 PM
or by appointment

Course Website

Additional information, including the tentative course schedule, can be found at the course *Canvas* website located at <https://uttyler.instructure.com/courses/17200> (*Chemistry in Action!*)

Prerequisites

CHEM 1350, *Chemistry in Action*, is a Core Curriculum Course in the Life and Physical Sciences or STEM areas at the University of Texas at Tyler, and, thus, has no prerequisites. However, any background in mathematics or science will help you.

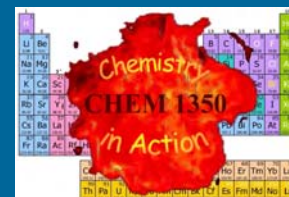
Course Description

Chemistry in Action! is exactly that! This is a course that uses exciting, interactive chemical demonstrations to teach the important chemical principles behind many important aspects of the world around us. Example topics include the chemistry of fire, explosives, special effects, food, water, transportation, energy, medicine, *etc.* This is a

course designed for non-science majors and is taught as a “flipped classroom” experience.



***Chemistry in Action*
and fun are synonymous**

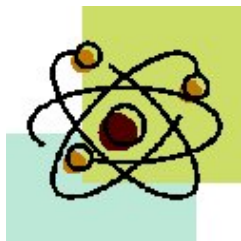


Section Day/Time
001 R 1:30-4:15 PM
RBS 3022



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Chemistry is Everywhere (from the American Chemical Society)

Everything you hear, see, smell, taste, and touch involves chemistry and chemicals (matter). And hearing, seeing, tasting, and touching all involve intricate series of chemical reactions and interactions in your body. With such an enormous range of topics, it is essential to know about chemistry at some level in order to understand the world around us.

In more formal terms, chemistry is the study of matter and the changes it can undergo. Chemists sometimes refer to matter as 'stuff', and indeed so it is. Matter is anything that has mass and occupies space. Which is to say, anything you can touch or hold. Common usage might have us believe that 'chemicals' are just those substances in laboratories or something that is not a natural substance. Far from it, chemists believe that everything is made of chemicals.

Although there are countless types of matter all around us, this complexity is composed of various combinations of some 100 chemical elements. The names of some of these elements will be familiar to almost everyone. Elements such as hydrogen, chlorine, silver, and copper are part of our everyday knowledge. Far fewer people have heard of selenium or rubidium or hassium.

Nevertheless, all matter is composed of various combinations of these basic elements. The wonder of chemistry is that when these basic particles are combined, they make something new and unique. Consider the element sodium. It is a soft, silvery metal. It reacts violently with water, giving off hydrogen gas and enough heat to make the hydrogen explode. Nasty 'stuff'. Also consider chlorine, a green gas when at room temperature. It is very caustic and choking, and is nasty enough that it was used as a horrible chemical gas weapon in the last century. So what kind of horrible mess is produced when sodium and chlorine are combined? Nothing more than sodium chloride, common table salt. Table salt does not explode in water or choke us; rather, it is a common additive for foods we eat everyday.

And so it is with chemistry, understanding the basic properties of matter and learning how to predict and explain how they change when they react to form new substances is what chemistry and chemists are all about.

Chemistry is not limited to beakers and laboratories. It is all around us, and the better we know chemistry, the better we know our world.

...the better we know chemistry, the better we know our world.

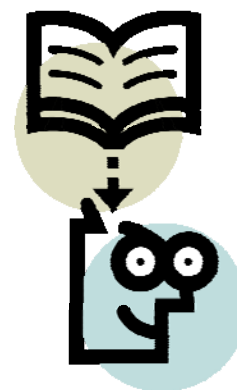
Student Learning Outcomes

By the end of the course, students should be able to:

1. Demonstrate critical and creative thinking skills by predicting and explaining the behavior and interactions of chemical species using the scientific method. (Critical Thinking and Empirical and Quantitative Skills)
2. Collect, manipulate, and analyze quantitative and qualitative data to make informed conclusions about chemical problems. (Empirical and Quantitative Skills)
3. Describe and communicate the Periodic Table and basic electronic structure, bonding, and reactivity of atoms, ions, and molecules. (Critical Thinking, Communication, Empirical and Quantitative Skills)
4. Work as a part of a team to identify and communicate the importance of basic chemical principles to a specific aspect of the physical world, including: food, water, energy, medicine, transportation, *etc.* (Teamwork, Empirical and Quantitative Skills, and Communication)
5. Identify important current topics in the news which have a significant chemistry component, explain the fundamental chemistry behind them. (Critical Thinking and Communication)
6. To gain an enjoyment of chemistry and the reality of chemistry in our daily lives. (Communication)

Attendance

Since *Chemistry in Action!* meets only once per week and has only one section this semester, it is essential that you endeavor to attend **every** session. Unexcused absences will result in a grade of zero for any work missed. Only students with OFFICIAL excused absences will be allowed to receive a grade for work missed during the absence. It is the student's responsibility to see the instructor promptly to make up any work missed during an absence.



Canvas

Our *Canvas* site will serve as an important means of communication during the course, especially between class meetings when additional materials, announcements, *etc.* of interest may be posted by your instructor. Periodic discussions may also be of importance. Be sure to look for the *PowerPoint* Guide for each session that your instructor will post in *Modules* shortly after each meeting. Thus, it would be wise to check *Canvas* periodically each week. The *Canvas* mobile app is a useful way to keep up-to-date when you are on-the-go. Surf to the App Store on your mobile phone and search for 'Canvas'. Install the app and you're ready to go!



Students Rights and Responsibilities

UT Tyler Honor Code

Every member of the UT Tyler community joins together to embrace: Honor and integrity that will not allow me to lie, cheat, or steal, nor to accept the actions of those who do.

Students Rights and Responsibilities

To know and understand the policies that affect your rights and responsibilities as a student at UT Tyler, please follow this link: <http://www.uttyler.edu/wellness/rightsresponsibilities.php>



Campus Carry

We respect the right and privacy of students 21 and over who are duly licensed to carry concealed weapons in this class. 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>

UT Tyler a Tobacco-Free University

All forms of tobacco will not be permitted on the UT Tyler main campus, branch campuses, and any property owned by UT Tyler. This applies to all members of the University community, including students, faculty, staff, University affiliates, contractors, and visitors.

Forms of tobacco not permitted include cigarettes, cigars, pipes, water pipes (hookah), bidis, kreteks, electronic cigarettes, smokeless tobacco, snuff, chewing tobacco, and all other tobacco products. There are several cessation programs available to students looking to quit smoking, including counseling, quitlines, and group support. For more information on cessation programs please visit www.uttyler.edu/tobacco-free.

Grade Replacement/Forgiveness and Census Date Policies

Students repeating a course for grade forgiveness (grade replacement) must file a Grade Replacement Contract with the Enrollment Services Center (ADM 230) on or before the Census Date of the semester in which the course will be repeated. Grade Replacement Contracts are available in the Enrollment Services Center or at <http://www.uttyler.edu/registrar>. Each semester's Census Date can be found on the Contract itself, on the Academic Calendar, or in the information pamphlets published each semester by the Office of the Registrar.

Failure to file a Grade Replacement Contract will result in both the original and repeated grade being used to calculate your overall grade point average. Undergraduates are eligible to exercise grade replacement for only three course repeats during their career at UT Tyler; graduates are eligible for two grade replacements. Full policy details are printed on each Grade Replacement Contract. The Census Date is the deadline for many forms and enrollment actions of which students need to be aware. These include:

- Submitting Grade Replacement Contracts, Transient Forms, requests to withhold directory information, approvals for taking courses as Audit, Pass/Fail or Credit/No Credit.
- Receiving 100% refunds for partial withdrawals. (There is no refund for these after the Census Date)
- Schedule adjustments (section changes, adding a new class, dropping without a "W" grade)
- Being reinstated or re-enrolled in classes after being dropped for non-payment
- Completing the process for tuition exemptions or waivers through Financial Aid

Students Rights and Responsibilities *continued*

State-Mandated Course Drop Policy

Texas law prohibits a student who began college for the first time in Fall 2007 or thereafter from dropping more than six courses during their entire undergraduate career. This includes courses dropped at another 2-year or 4-year Texas public college or university. For purposes of this rule, a dropped course is any course that is dropped after the census date (See Academic Calendar for the specific date).

Exceptions to the 6-drop rule may be found in the catalog. Petitions for exemptions must be submitted to the Enrollment Services Center and must be accompanied by documentation of the extenuating circumstance. Please contact the Enrollment Services Center if you have any questions.

Disability/Accessibility Services

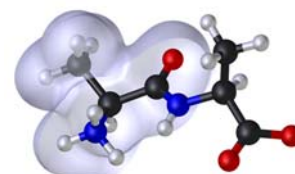
In accordance with Section 504 of the Rehabilitation Act, Americans with Disabilities Act (ADA) and the ADA Amendments Act (ADAAA) the University of Texas at Tyler offers accommodations to students with learning, physical and/or psychological disabilities. If you have a disability, including a non-visible diagnosis such as a learning disorder, chronic illness, TBI, PTSD, ADHD, or you have a history of modifications or accommodations in a previous educational environment, you are encouraged to visit <https://hood.accessiblelearning.com/UTTyler> and fill out the New Student application. The Student Accessibility and Resources (SAR) office will contact you when your application has been submitted and an appointment with Cynthia Lowery, Assistant Director of Student Services/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.

Student Absence due to Religious Observance

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

Student Absence for University-Sponsored Events and Activities

Revised 01/18



Course Grade

Your course grade will be determined as follows.

| | |
|----------------------|------------|
| Quizzes (13) | 91% |
| Group Project | 7% |
| ChemToy2 | 2% |

Your instructor may also consider attitude, improvement, and the quality of your notebook as further bases for your grade.



Quizzes are an important part of your grade! Take them seriously from day one.

Required Materials

Success in *Chemistry in Action!* will require:

- ◇ Faithful attendance and your good attitude
- ◇ Loose leaf 8.5 x 11" notebook
- ◇ Calculator
- ◇ Laptop computer or tablet
- ◇ Access to the Internet
- ◇ Safety goggles
- ◇ Lab coat (optional)

Notebooks

Students are required to keep a record of all concepts, information, demonstrations, experiments, and discussions which you participate in during this semester in *Chemistry in Action!* in your notebook. These notebooks will be examined periodically for clarity and thoroughness.

The proper format for experiment write-ups in your notebook will be:

1. Title of the Experiment, Team Name, Your Name, Date
2. Purpose: *Why are we doing the experiment? What do we hope to accomplish?*
3. Procedure: *How are you going to accomplish this experiment?*
4. Results: *What observations did you make? What did you discover?*
5. Conclusions: *Summarize your findings and tell what it all means. What can you conclude about your data (experimental results)?*

Quizzes

A 10 minute quiz will be given at the end of each session of *Chemistry in Action*. The quiz will cover important concepts and practice of the demonstrations, experiments, discussions, videos, *etc.* covered that day. The format will be "short answer" and "fill-in-the-blank" type questions.

These quizzes are vitally important to demonstrate your understanding of key concepts and principles learned during each session. You should take them seriously and plan to do well through good observation and active participation. Quizzes are *individual*, not group.

Group Project

The *Interesting Chemical Questions Project* will be accomplished by your team. An *Interesting Chemical Question* will be chosen, and the team will present the question, answer, and some interesting commentary in the form of a single-slide *PowerPoint* presentation near the beginning of one *Chemistry in Action!* session during the semester.

A separate handout on the *Interesting Chemical Questions Project* will be distributed and discussed at the first session of our course.

A presentation schedule will be available after selection and assignment of questions to groups.

Regrading Policy

Even though we will be very fair and careful in the grading of your quizzes and project, errors are still possible. Any question concerning the grading of a quiz or your project should be addressed with your professor within two class days after the item was returned to

you. You can see your professor after class, during our office hours, or any other time you find him available; please have the suspect item in hand. All scores will be considered final one week after originally being returned to you.

LAST DAY TO DROP ANY OR ALL CLASSES

March 30, 2020

Courses may be dropped online through Campus Connect until 4 P.M. on the last day of online (early) registration. After that time, all drops and/or withdrawals must be completed through the Registrar's Office, either in person, by FAX, or by mail. Faxed or mailed drop/withdrawal requests must include the students name, student ID number, course(s) to be

dropped, date, student's signature, contact phone number and copy of a photo ID (driver's license, student ID, etc.). Requests should be mailed to UT Tyler Registrar's Office, 3900 University Blvd, Tyler, TX 75799 or faxed to (903)565-5705. Students are advised to meet with their instructor and/or academic advisor prior to dropping any classes. Dropping or withdrawing from classes may affect financial aid eligibility, veteran's benefits, athletic eligibility, or international student status.

No Tolerance Cheating Policy

Please keep the highest standards of academic conduct in all your work, quizzes, and project.

Cheating of any sort should be avoided as it only hurts *you* and your fellow classmates.

Departmental Cell-phone policy:

Cell phones, smart watches, and any similar electronic devices must be turned off and put away during exams. If they observed out

in a visually accessible place (*i.e.* between legs, on the floor, *etc.*), it will be assumed that they are being used to cheat; your exam will taken away, you will receive a zero score (0 points) for the test, and you will be referred to the Office of Judicial Affairs.

Consider committing to heart our UT Tyler honor code:

*I embrace honor and integrity.
Therefore, I choose not to lie,
cheat, or steal, nor to accept the
actions of those who do.*



CENSUS DAY

Jan 27, 2020

SPRING BREAK

March 9, 2020



Safety First, Last, and Always

Demonstrations and experiments are potentially dangerous and must be undertaken with the greatest caution and safety principles. It is a very good idea to pay close attention to all safety rules, for one very good reason: **the penalties are only too real.** Disobeying safety rules is not at all like flouting many other rules. *You can get seriously hurt.*

We will be discussing general safety consideration the very first day, and will provide you with detailed safety information for every experiment we do during *Chemistry in Action!*

Above all, a *Safety Attitude* is essential; with this attitude you will care for your welfare and that of your teammates and classmates effectively. Good safety means a good course and a lot of fun!

Blatantly, or repeatedly violating safety rules will result in immediate expulsion from the course.

You will need safety goggles for each session; approved goggles will be available at a reasonable cost through the Department of Chemistry and Biochemistry



CHEM 1350: *Chemistry in Action!*

Major Topics During the Course

| | |
|-----------|---|
| 1/16/2020 | 1. Introductions, <i>All About You!</i>, Course Overview, Safety Information, Group Formation, <i>Interesting Chemical Questions Project</i>, Demo, Quiz 1 |
| 1/23/2020 | 2. The Power of Hydrogen 1: Demo, videos, Hydrogen Detonation Experiment, Hidden Colors Experiment, Scientific Method, Observation Competition, Density Detective Experiment, Nature of Color, Electromagnetic Spectrum, Parts of the Atom, Periodic Table, Quiz 2 (<i>ChemToy2</i>) |
| 1/30/2020 | 3. The Power of Hydrogen 2: Demo, videos, Hydrogen Detonation Experiment 2, Chemical Reactions, Combustion Reactions, Stability, Periodic Table (Group I), States of Matter and Demo, Plasma Ball Demo, Explosives, Chemistry of Star Formation, Quiz 3 (Return <i>ChemToy2</i>) |
| 2/6/2020 | 4. Energy, Bonding, and Photochemistry: Demos, Plasma Ball Competition, Explosives Demo, The Covalent Bond, Periodic Table (Groups and Bonding), Molecular Modeling Experiment, Cryogenics Demo, Superconductivity, Tour of UT Tyler NMR Facility, Chemiluminescence, Quiz 4 |
| 2/13/2020 | 5. Rocketry, Spaceflight, and Petrochemistry: Demo, Photosynthesis Experiment, Solar Energy Up Close Experiment, 3-2-1 Blastoff Experiment, Make-your-own Rocket Experiment, Spaceflight, Petrochemistry Introduction, Quiz 5 |
| 2/20/2020 | 6. Aqueous Solutions, Solubility, and Concentration: Demos, Petrochemistry, Peculiarity of Water, Water Competition, Heat Capacity of Water Demo, Solubility Experiment, Concentration (Mass%), Dimensional Analysis, Quiz 6 |
| 2/27/2020 | 7. Acidity and pH: Demos, Periodic Table (Alkaline Earth Elements), the Power of Water, The Mole, Mole Competition, Rainbow of Colors Demo, pH problem, pH of Common Items Experiment, Useful Statistics, Accuracy v.s. Precision, Quiz 7 |
| 3/5/2020 | 8. Chemical Kinetics and Clock Reactions: Demos, Periodic Table (Transition Metals), Clock Reaction Demos, Riboflavin Photochemical Kinetics Demo, Chemistry of Catalysis, Enzyme Kinetics Experiment, Effect of pH on Enzyme Reactions, Catalytic Converters, Quiz 8 |
| 3/12/2020 | Spring Break (entire week) |
| 3/19/2020 | 9. Pollution and the Environment: Demo, Periodic Table (Lanthanoids), complete Enzyme Kinetics Experiment, Absorbance and Beers Law, Pollution Demo, pollution research, Pesticides, detergents, Quiz 9 |
| 3/26/2020 | 10. Polymers and Plastics: Demo, Periodic Table (Groups 3a, 4a), plastics research, Plastics Experiments, Addition Plastic Experiment, Synthesis of Nylon 66 Demo, Cyanoacrylate Tug-a-War Competition, Quiz 10 |
| 4/2/2020 | 11. Biochemistry, Disease, and Drugs: Demos, Periodic Table (Group 5a), Hydrophobic Effect Demo, Biochemistry Research, major classes of biochemical molecules, Build the Alpha Helix, Quiz 11 |
| 4/9/2020 | 12. Culinary Chemistry: Demo, Periodic Table (Calcogens), Drug Experiment, Iron in Cereal Experiment, Potato or Tortilla Chip Experiment, Liquid Nitrogen Ice Cream, Quiz 12 |
| 4/16/2020 | 13. Forensic Chemistry: Demo, Periodic Table (Halogens), Inks Experiment, Blood Typing Experiment, Fingerprinting Experiment, Who-done-it? Competition, Quiz 13 |
| 4/23/2020 | 14. Chemical Instrumentation: Demo, Periodic Table (Actinoids), Chemical Instrumentation Competition, NMR Experiment, uv/visible Spectroscopy Experiment, Infrared (IR) Spectroscopy Experiment with Caffeine, Final Competition |

