Syllabus: CHM 2045 Chemistry 1

Summer A 2025

Welcome to Chemistry 1! Chemistry is a critical and foundational course for all degree programs at Florida Poly. In this course, you will learn fundamental topics, problem-solving techniques and theories that help explain the world as we know it. Chemistry 1 introduces mathematical concepts, units, chemical reactions, thermodynamics and chemical bonding/structure, as well as many other important topics. The course is designed to be fair but challenging.

Success in chemistry requires regular attendance and a consistent work ethic. Taking a serious and professional approach to studying and doing homework is the best way to ensure you meet the learning outcomes for the course. Be familiar with the academic policies outlined in this syllabus and see your instructor with any questions or concerns.

Course Information

- **Course Number and Title**: CHM 2045 Chemistry 1
- **Credit Hours:** 3 credit hours
- **Academic Term:** Summer A 2025

Instructor Information

- **Instructor:** Dr. Tracy Olin
- **Email:** tolin@floridapoly.edu
- **Office Location:** BARC 2262
- **Office Hours:** TR 2:55 – 3:55 PM or by appointment

Course Delivery and Course Description

- **Delivery Mode**: This course will be held in-person at the room and time given below.
- **Meeting time:** Tue and Thurs 9:00 am – 12:10 pm BARC 1123

- **Course Website:** Official Canvas Course Site
- **Official Catalog Course Description**: This course is designed for students pursuing careers in the sciences or who need a more rigorous presentation of chemical concepts than is offered in an introductory course. Students will engage in problem solving and critical thinking while applying chemical concepts. Topics will include the principles of chemistry including atomic theory, electronic and molecular structure, measurement, stoichiometry, bonding, periodicity, thermochemistry, nomenclature, solutions, and the properties of gases.
    - **Course Pre-Requisites:** N/A
    - **Course Co-Requisites**: CHM 2045L – Chemistry 1 Laboratory

- **Communication/Computation Skills Requirement (6A-10.030)**: No

- **Textbook and Required Materials:**
  - Brown, T.E.; LeMay, H.E.; Bursten, B.E.; Murphy, C.; Woodward, P.; Stoltzfus, M.E. Chemistry: The Central Science (15th edition); Pearson: New York, NY. ISBN: 9780137542970 (recommended)
  - Chemistry requires a Texas Instruments TI-30 series calculator (or a very similar-must be approved by instructor). No other type of calculator is allowed on exams. It is advised that you obtain this calculator and become familiar with it prior to the first exam. It is also strongly recommended that you bring it to class daily, as there may be in-class work that requires the use of a calculator.
  - Access to the course Canvas LMS website. Course resources will be posted here, including any course announcements, changes in the syllabus, etc. The Homework will also be through the Canvas website.
  - Access to the University Email System.

- **Communication**: Florida Polytechnic University email is the official method of communication for the University. Students are required to check their email frequently. The subject of your emails must start with "CHM 2045 Section X" followed by the topic. Failure to provide the correct subject, may result in ignoring the email or delayed response. Any email received from an address other than the one with the floridapoly.edu domain will not be replied to. Emails will typically be answered within 24-48 hours, Monday-Friday.

Course Objectives and Outcomes

- **Course Objective:** To build a solid foundation of chemistry concepts and problem-solving skills that can also be applied to other STEM courses, as well as upper-level chemistry courses.

- **Course Learning Outcomes:**
  - Know and be able to understand unit conversions and dimensional analysis in problem solving.
  - Be able to apply significant figure rules in all calculations.
  - Demonstrate the understanding of the fundamental properties and naming of atoms, molecules and compounds.
  - Differentiate between different chemical reactions, as well as understand and apply appropriate stoichiometric calculations to relate quantities in reactions.
  - Appreciate the unique behavior of ideal gases and be able to analyze problems involving gases and determine which gas laws to apply in solving problems.
  - Understand the laws of thermodynamics as related to thermochemical concepts, such as enthalpy, calorimetry and finding the heat of reactions.
  - Communicate the fundamental theories in quantum mechanics and how they relate to the electronic properties of atoms.
  - Describe and understand the periodic trends and properties of atoms.
  - Demonstrate an understanding of chemical bonding concepts and theories, chemical nomenclature, and molecular geometry.

- **Alignment with Program Outcomes**:
  - This course supports General Education competency for scientific reasoning. Program Learning Outcomes and General Education Competencies may be found in the Academic Catalog (http://catalog.floridapoly.edu/). Additionally, outcomes may be aligned with level of difficulty per Bloom's taxonomy (see University's Institutional Effectiveness Manual for Academic programs).

Course Learning Outcome	**Learning Level** (e.g. Bloom's, Anderson/ Krathwohl; Rogers Hatfield (ABET Assessment Example)	**Program Learning Outcome (ABET, GenEd, Other)**
Learning and exploring chemistry via critical thinking based on Socio-Chemistry (problem-oriented approach to chemistry teaching)	Understand Categorizing Predicting Compare and contrast	1-a
Exploring chemistry as engineering based on mathematical approach and applications	Apply Implementing	1-e, 1-k
Ability explore chemistry in application aspects for example, Redox chemistry, Thermal energy changes involved, etc.	Analyze Differentiating Classifying Identifying	2-c, 2-k
Ability to discuss chemistry, understanding of theories in the manner of a problem solving approach	Evaluate Predict Judging	3-g, 4-f, and 5-d
Applying knowledge of lectures in laboratory experiments	Create Hypothesizing Coordinating	6-b, 7-i
Introducing analytical aspects in lectures to understand examples	Application	6-k
Motivating students for upper-level courses, advanced training, and growing up as a scientist		5-d, 7-i

Course Schedule

Tentative Weekly Schedule:

Day	Topics	Chapter/Sections
May 13	Syllabus, **Concepts of matter**: Basic definitions, measurements and units, uncertainty and significant figures. Problem-Solving-Dimensional analysis	Ch 1.1-1.3, 1.5-1.7
May 15	**Atoms and Elements**: Atomic theories, structure of atom, atomic symbols, isotopes, average atomic mass, the periodic table. **Molecules and Compounds**: ions and Ionic formulas, polyatomic ions, naming compounds.	Ch 2.1-2.8 **HW #1 due 5/18**
May 20	**Chemical Reactions and Chemical Quantities**: Balancing chemical equations, types of chemical reactions, formula weights, the mole concept, molar mass, percent composition, empirical formulas. **Stoichiometry**: Limiting reactant and reaction yields.	3.1-3.7 **HW #2 due 5/21**
May 22	**Introduction to Aqueous Reactions:** precipitation reactions, solubility rules, net ionic equations, Acid-Base reactions, neutralization, titrations, oxidation-reduction reactions, activity series. **Exam 1 is May 22nd at the beginning of class**	4.1-4.4
May 27	**Aqueous solutions**: Conductivity, molarity and solution concentrations, dilution, titrations. **Properties of gases:** gas laws, ideal gas law, gas mixtures/partial pressures, Kinetic-Molecular theory, diffusion	4.5-4.6, 10.1-10.5 **HW #3 due 5/28**
May 29	**Thermochemistry**: Energy, heat transfers, quantifying Heat and Work, Enthalpy, heat capacity/specific heat, calorimetry-measuring ΔH_{rxn}, Hess's law, Standard Enthalpies of Formation.	5.1-5.8 **HW #4 due 6/1**
June 3	**The Quantum Mechanical Model of the Atom:** EM radiation, frequency and wavelength, Photoelectric effect, Atomic emission, line spectra, Bohr model **Exam 2 is June 3rd at the beginning of class**	6.1-6.3
June 5	Uncertainty principle, atomic orbitals, electronic structure of atoms, quantum numbers and electron configurations **Periodic Properties of the Elements**: effective nuclear charge	6.4-6.9, 7.1-7.2 **HW #5 due 6/8**
June 10	**Periodic trends:** atomic size, ionization energy and electron affinity, electronegativity, **Chemical Bonding I** -The Lewis Model: The octet rule, Lewis symbols, Ionic bonding, covalent bonding, electronegativity.	7.3-7.4, 8.1-8.5 **HW #6 due 6/11**
June 12	Bond polarity, Lewis structures, formal charge, resonance structures, octet exceptions, bond energies and bond lengths VSPER model-effect of lone pairs **Exam 3 is June 12th at the beginning of class**	8.6-8.8, 9.1-9.2
June 17	Molecular polarity, **Chemical Bonding II:** covalent bonding/orbital overlap, hybrid orbitals, Hybridization, MO theory and molecular orbitals (if time permits)	9.3-9.8 **HW #7 due 6/18**
June 19	**FINAL EXAM 9 am – 11 am in BARC 1123**	

Course Policies

Please Note: Changes in this syllabus, assignments, exams dates, etc. may be modified as deemed appropriate. All changes will be announced in class and/or in Canvas Announcements.

Late Work/Make-up work

Make-up exams will be given only in extreme circumstances with a documented university-approved excuse. Any exceptions will be dealt with on a case-by-case basis. If you know in advance that you will miss an exam because you are participating in a college-sponsored activity, inform your instructor before the exam and provide them with documentation. See the Student Attendance Policy for more information.

Homework answer keys are posted the day after they are due, so for this reason there is no late homework accepted. The lowest homework grade will be dropped at the end of the semester, so if you happen to miss one, this will be your dropped score. You will have roughly 4-5 days to complete the homework once posted. It is strongly encouraged that students do not wait until the last possible minute to complete the assignments in case there is a technical or other issue.

Grading Scale

Grade	A	B+	B	B-	C+	C	D	F
Percentage	90%	87%	83%	80%	77%	70%	60%	< 60%
GPA	4.0	3.33	3.0	2.67	2.33	2.0	1.0	0.0

Assignment/Evaluation Methods

Assignment/Evaluation Methods:

Attendance:	5%
In-class work and participation:	5%
Homework (lowest grade dropped):	20%
Exams (three at 15% each)	45%
Final Exam	25%
Total	100%

- **Attendance:** Students in **face-to-face** courses are expected to attend all of their scheduled University classes and to satisfy all academic objectives.
    - Attendance will be taken at the beginning of each class period using A+ Attendance through Canvas. It is the student's responsibility to be sure to enter the code each lecture period. If the system is not working properly, let the professor know before or after class so your presence can be documented. Recall, attendance and participation are part of the overall grade in this course. You will lose part of the 5% attendance grade for each unexcused absence.
    - Please be sure to enter the A+ code EVERY CLASS PERIOD. If you forget to enter the code, the instructor will enter it for you once. After this, you will be counted as absent.
    - Bonus questions and/or in-class work may be given out during lecture time. If a student is absent on a day that an assignment is given, they will not be awarded any points.

- For university-approved absences (see Student Attendance Policy), it is the student's responsibility to contact the instructor promptly, or in advance when possible. Excused absences will be handled on a case-by-case basis.
- Note: Falsifying attendance for yourself or for another student is an act of academic dishonesty and is considered a violation of the university's academic integrity policy.
- Exceptions to any attendance requirements may be made on a case-by-case basis.

- **Participation:** Students are expected to participate in the classroom experience. In-class activities and group work may be done and will count towards part of your overall grade. The use of earbuds/headphones during class is specifically not allowed and students who engage in this behavior may be asked to leave the class for the day (noting exceptions for authorized accommodations). In addition, students who routinely do not bring materials to class that are required for participation, will not be given credit for class attendance and participation, and if this becomes a pattern of behavior, may be asked to leave the class for the day. Persistent problems with participation may result in a code of conduct referral.

- **Homework**: The weekly homework will be through Canvas and will be due each week on Monday by 11:59 pm (see schedule below, if there is no class on a Monday, the dure date is pushed to Tuesday). The assignments will open on the Thursday prior to when they are due. The homework due dates are given in the weekly schedule given below. Please see the "Late work" policy for more information on late homework.

    - **Homework Format:** The assignments will be on Canvas. There is only one attempt for each assignment. They will consist of a mixture of multiple-choice questions and long answer/written work questions. For the written answer questions, you will need to show your work on paper (or tablet) in an organized, clear way with appropriate units and significant figures and upload an image of this to canvas under the appropriate question on the assignment. Please only upload your files as a pdf. There is a tutorial for how to do this posted on the Canvas site. In addition, if you need assistance, just ask your instructor. If you are uncertain on what is expected at any time, please ask your instructor.

- **Exams**: There are 3 exams and a final exam in this course. The first and third exam will be 50-minute exams taken during your scheduled lecture time. The midterm (second) exam will be a 90-minute exam and taken as a common exam in the evening. The dates for the midterms will be posted on the university website. Exam dates are subject to change and you should refer to the Academic Calendar website for the most up-to-date exam schedules for midterms and finals. Exam dates will also be announced in class and on Canvas roughly one week prior to the scheduled event. Prior to each exam, a topics list, study guide, and formula sheet will be posted on Canvas.

    - **Please note:** no electronic devices, besides an approved calculator, are permitted on exams. All cell phones and smart watches/other devices should be powered off and put away so that they are inaccessible during the exam. If a student has a phone or other smart device accessible during an exam, they will be recommended for an academic integrity investigation and will receive a zero on the exam.

- **Final Exam:** The date for the final exam will be announced once scheduled by the registrar. As with other exams, an announcement will be made with all information pertinent to the final. In order to pass this class, the final exam must be taken.

Grades on Canvas

Grades will be posted to Canvas for reference only, and students should make sure they are recorded correctly. However, there is no guarantee that the percentages or projected grades provided in Canvas are correct. The instructor will calculate final percentages and will determine final grades regardless of Canvas calculations.

Grade Redemption

If a student earns a score between 50-69% on an exam, there is an option for a grade improvement plan. This plan will all students to earn points to improve their exam score. The instructor will make the announcement in class. Students may utilize this plan for only ONE midterm exam per semester (not the final).

- If you wish to dispute a score for an assignment or exam, you must describe the nature of the dispute in writing and communicate it through an email no later than one week after the due date/posting the scores of the assignment or the exam. Scores outside of this window will be considered final.

Academic Support Resources

- **Library**: Students can access the Florida Polytechnic University Library through the University website and Canvas, on and off campus. Students may direct questions to library@floridapoly.edu.
- **Tutoring and Learning Center**: The Tutoring and Learning Center (The TLC) provides tutoring to all FloridaPoly students who may need additional academic support. The TLC is staffed by students who have excelled in the courses they tutor. They offer support by reviewing concepts and materials from class, clarifying points of confusion and providing assistance with learning strategies. While the focus of TLC is to provide support to students in freshman-level courses, upper-level courses are also tutored at the Center. The TLC is located in IST 1019 (on the first floor in the center hallway of the IST building).
- **Knack Tutoring**: Students looking for additional assistance outside of the classroom are advised to consider working with a peer tutor through Knack. Florida Polytechnic University has partnered with Knack to provide students with access to verified peer tutors who have previously aced this course. To view available tutors, visit floridapoly.joinknack.com and sign in with your student account.
- **Academic Success Coaches**: All students at Florida Poly are assigned an Academic Success Coach. Your Academic Success Coach can assist you with academic success strategies. Please visit the Student Success Center on the second floor of the IST building to meet with an Academic Success Coach.
- **Writing Center**: Located on the second floor of the IST (2059/2061), the Writing Center helps students to develop their writing and presentation skills. Consultations are available in person and virtually. For more detail, visit floridapoly.edu/writing center.

Civility and Collegiality

Faculty and students come to the university for the same reason, which is to participate in a highly professional educational environment. To that end, both students and faculty are expected to treat each other with mutual regard and civility. Communication, written, oral and behavioral, between faculty and students must remain respectful. Within and outside of the classroom, students must refrain from derogatory comments toward the faculty member and their fellow students, and faculty as well must refrain from derogatory comments toward their students. Faculty and students should address each other

with respect, in accordance with the wishes of the faculty and the students: for example, no one should be addressed by their last name alone.

Faculty from the outset of a course can and should specify what constitutes activities and behavior that take away from, that diminish, the educational environment. An individual student's distracting behavior impedes the education of fellow students, which itself is a form of disrespect. Civility and collegiality also include respecting each other's time: for example, neither students nor faculty should arrive late to class (unless unforeseen, pressing circumstances prevail); faculty should be present at the posted office hours; and students and faculty should be punctual when meeting times are scheduled. In more general terms, collegiality means respecting the right of both faculty and students to participate fully and fairly in the educational enterprise.

Reasonable Accommodations

The University is committed to ensuring equal access to all educational opportunities. The University, through the Office of Disability Services (ODS), facilitates reasonable accommodations for students with disabilities and documented eligibility. It is the student's responsibility to self-identify as a student with disabilities and register with ODS to request accommodations.
If you have already registered with ODS, please ensure that you have requested an accommodation letter for this course through the ODS student portal and communicate with your instructor about your approved accommodations as soon as possible. Arrangements for testing accommodations must be made in advance. Accommodations are not retroactive.
If you are not registered with ODS but believe you have a temporary health condition or permanent disability requiring an accommodation, please contact ODS as soon as possible.

The Office of Disability Services (ODS):
DisabilityServices@floridapoly.edu
(863) 874-8770
The Access Point
ODS website: www.floridapoly.edy/disability

Accommodations for Religious Observances, Practices and Beliefs

The University will reasonably accommodate the religious observances, practices, and beliefs of individuals in regard to admissions, class attendance, and the scheduling of examinations and work assignments. (See University Policy.)

Title IX

Florida Polytechnic University is committed to ensuring a safe, productive learning environment on our campus that prohibits sex discrimination and sexual misconduct, including sexual harassment, sexual assault, dating violence, domestic violence and stalking. Resources are available if you or someone you know needs assistance. Any faculty or staff member you speak to is required to report the incident to the Title IX Coordinator. Please know, however, that your information will be kept private to the greatest extent possible. You will not be required to share your experience. If you want to speak to someone who is permitted to keep your disclosure confidential, please seek assistance from the Florida Polytechnic University Ombuds Office, BayCare's Student Assistance Program, 1-800-878-5470 and locally within the community at Peace River Center, 863-413-2707 (24-hour hotline) or 863-413-2708 to schedule an appointment. The Title IX Coordinator is available for any questions to discussion resources and options available.

Academic Integrity

The faculty and administration take academic integrity very seriously. Violations of academic integrity regulation include actions such as cheating, plagiarism, use of unauthorized resources (including but not limited to use of Artificial Intelligence tools), illegal use of intellectual property, and inappropriately aiding other students. Such actions undermine the central mission of the university and negatively impact the value of your Florida Poly degree. Suspected violations will be fully investigated, possibly resulting in an academic integrity hearing and sanctions against the accused student if found in violation. Sanctions range from receiving a zero on the exam or assignment, to expulsion from the university. Repeat offenders are subject to more severe sanctions and penalties.

Recording Lectures

Students may, without prior notice, record video or audio of a class lecture for a class in which the student is enrolled for their own personal educational use. Recordings may not be used as a substitute for class participation or class attendance. Recordings may not be published or shared in any way, either intentionally or accidently, without the written consent of the faculty member. Failure to adhere to these requirements is a violation of state law (subject to civil penalty) and the student code of conduct (subject to disciplinary action).

Recording class activities other than class lectures, including but not limited to lab sessions, student presentations (whether individually or part of a group), class discussion (except when incidental to and incorporated within a class lecture), and invited guest speakers is ***prohibited****.*