



# CHEM 1411 – General Chemistry I – Face-to-Face

Course Syllabus: Spring 2020

*“Northeast Texas Community College exists to provide personal, dynamic learning experiences empowering students to succeed.”*

**Instructor: Dr. Mary Hearron**

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| Office Hours | Monday      | Tuesday   | Wednesday                | Thursday                | Friday | Online                       |
|--------------|-------------|-----------|--------------------------|-------------------------|--------|------------------------------|
|              | 11:30-12:20 | 1:30-5:00 | 11:30-12:20<br>1:30-5:00 | 9:30-10:30<br>1:30-5:00 | None   | Anytime<br>via NTCC<br>email |

***This syllabus serves as the documentation for all course policies and requirements, assignments, and instructor/student responsibilities.***

*Information relative to the delivery of the content contained in this syllabus is subject to change. Should that happen, the student will be notified.*

## Course Description:

Fundamental principles of chemistry for majors in the sciences, health sciences, and engineering. Topics include measurements, fundamental properties of matter, states of matter, chemical reactions, chemical stoichiometry, periodicity of elemental properties, atomic structure, chemical bonding, molecular structure, solutions, properties of gases, and introductions to thermodynamics, quantum mechanics, and descriptive chemistry. 3 hours lecture and 3 hours laboratory each week.

**Prerequisite(s):** MATH 1314, equivalent, or above.

Successful completion (final grade of C or better) of CHEM 1411 will allow the student to continue on to CHEM 1412.

## Required Textbooks & Materials:

**Inclusive Access:** We have negotiated with the Publisher to obtain a discounted price for your lecture course materials. Your eBook and Mastering Chemistry Access Code are included with your tuition and will be available through Blackboard on the first class day. The materials are required for your class and essential in your success. If you also determine that you would like a print copy of your text in addition to your exclusive access loose-leaf copies will be available in the College Store at a discounted price. You may opt out of purchasing your materials from the College Store through the Census Date for the course. If you choose to opt out you will be responsible for purchasing your Mastering Chemistry Access Code from another vendor. You will receive a refund for the Inclusive Access if you opt out.

***Chemistry Structure and Properties***, 2<sup>nd</sup> Edition, Tro.  
Pearson ISBN 9780134528229 Copyright 18 (inclusive access)

**Required for purchase at the NTCC bookstore:**

***General Chemistry I Lab Manual***, 1<sup>st</sup> Edition, Murphy.  
NTCC Publisher Copyright 17

### **Lab Safety Glasses/Goggles:**

Approved safety glasses are available in the college store, and many safety glasses and safety goggles are also available from online retailers. **Always check with your instructor before purchasing eye protection from somewhere other than the college store.**

### **Scientific Calculator:**

A scientific calculator is required for this course. A model TI-30Xa or TI-36 XPro is recommended. You will NOT be allowed to use a graphing calculator, programmable calculator, or cell-phone calculator during any exam in this course.

### **Core Curriculum Purpose and Objectives:**

Through the core curriculum, students will gain a foundation of knowledge of human cultures and the physical and natural world; develop principles of personal and social responsibility for living in a diverse world; and advance intellectual and practical skills that are essential for all learning.

Courses in the foundation area of **life and physical sciences** focus on describing, explaining, and predicting natural phenomena using the scientific method. Courses involve the understanding of interactions among natural phenomena and the implications of scientific principles on the physical world and on human experiences.

### **College Student Learning Outcomes:**

#### Critical Thinking Skills

CT1. Students will demonstrate the ability to 1) analyze complex issues, 2) synthesize information, and 3) evaluate the logic, validity, and relevance of data.

#### Communication Skills

CS1. Students will effectively develop, interpret and express ideas through written communication.

#### Empirical and Quantitative Skills

EQS1. Students will manipulate numerical data or observable facts by organizing and converting relevant information into mathematical or empirical form.

EQS2. Students will analyze numerical data or observable facts by processing information with correct calculations, explicit notations, and appropriate technology.

#### Team Work

TW2. Students will work with others to support and accomplish a shared goal.

### **Course Student Learning Outcomes:** Students will...

1. Define the fundamental properties of matter; and classify matter, compounds, and chemical reactions.
2. Determine the basic nuclear and electronic structure of atoms, with a basic understanding of quantum mechanics.
3. Identify trends in chemical and physical properties of the elements using the Periodic Table.
4. Describe the bonding in and the shape of simple molecules and ions.
5. Convert units of measure and demonstrate dimensional analysis skills, and solve stoichiometric problems.
6. Write chemical formulas, and use the rules of nomenclature to name chemical compounds.
7. Define the types and characteristics of chemical reactions, write and balance equations.
8. Use the gas laws and basics of the Kinetic Molecular Theory to solve gas problems.
9. Determine the role of energy in physical changes and chemical reactions.
10. Use basic apparatus, apply experimental methodologies used in the chemistry laboratory, and demonstrate safe and proper handling of laboratory equipment and chemicals.

11. Make careful and accurate experimental observations, relate physical observations and measurements to theoretical principles, and record experimental work completely and accurately in laboratory notebooks and communicate experimental results clearly in written reports.
12. Conduct basic laboratory experiments with proper laboratory techniques.
13. Design fundamental experiments involving principles of chemistry, and interpret laboratory results and experimental data, and reach logical conclusions.

#### Evaluation/Grading Policy:

|                         |           |
|-------------------------|-----------|
| Regular Exams           | 40%       |
| Laboratory              | 30%       |
| Final Exam              | 15%       |
| Assignments*            | 10%       |
| <u>SI Participation</u> | <u>5%</u> |
| Total                   | 100%      |

\* Assignments are anything assigned by the instructor including quizzes, Mastering Chemistry work, etc.

#### Exams:

Five regular exams will be given during the lecture period on the following dates:

|        |                        |
|--------|------------------------|
| Exam 1 | Wednesday, February 5  |
| Exam 2 | Wednesday, February 27 |
| Exam 3 | Monday, March 30       |
| Exam 4 | Wednesday, April 22    |
| Exam 5 | Wednesday, May 6       |

Exam dates are subject to change, if circumstances dictate it. Ample notice will be given verbally during class, in such instances. Under some rare circumstances students may take exams in advance; this will be decided on a case-by-case basis in advance of the exam date. **There will be no make-up exams for missed exams without authorization before the exam date.**

#### **Guidelines for exams in this course:**

- Students are only allowed to bring pencils, erasers, and scientific calculators into the testing room. Programmable calculators, graphing calculators, cell-phone calculators, smart watches or any other type of electronic devices are not allowed. Sharing calculators will not be permitted.
- Bags, purses, etc. are not allowed at the student tables and should be stowed at the front of the room.
- Students will be provided with scratch paper and a formula sheet for each exam. Other papers or notes will not be permitted during the exam.
- Students that leave the testing room during the exam must turn in the exam to be graded and cannot return to the exam room until the testing period is over.
- At the instructor's discretion, students may be assigned seats during an exam period.
- A student found in violation of any of these guidelines during an exam period will earn a grade of zero on that exam.

## Minimum Technology Requirements: The following items must be brought to every lecture session

- Scientific Calculator - TI-36x Pro and TI-30Xa are recommended – also required for every lab session

## Required Computer Literacy Skills:

- Web browsing skills for working with the online homework system
- Ability to use Blackboard for access to course information
- Competent and professional emailing skills

## Course Structure and Overview:

- Lecture Sessions: Monday & Wednesday 9:30-10:50 AM  
Students are required to complete online READ assignments in Mastering Chemistry before coming to class to prepare for that day's activity. Students are expected to take notes and practice problem-solving during class independently and in groups as assigned. Additionally, students are expected to work on assignments, read and studying a minimum of 3 hours outside of class for every 1 hour of class time. Students are expected to attend SI Tutoring sessions regularly, approximately 3-4 hours per week.

A quiz will be given during most lectures. Students who are absent from class will earn a zero on the quiz, and makeup quizzes will not be given.

All exams in this course are administered during the lecture sessions. Students will have 80 minutes to complete an exam. Exams consist of multiple-choice questions, short answer or essay questions, and calculation problems.

- Laboratory Sessions: Monday 1:30-4:20 PM  
There will be 12-13 experiments performed during the laboratory periods over the course of the term. Any experiments not completed and turned in will receive a grade of zero. It is the responsibility of the student to arrive to lab prepared for the correct scheduled experiment.

Students are expected to adhere to the guidelines set forth in the "Commitment to Laboratory Safety Pledge" and in the safety video. In addition, students must wear long pants covering their ankles (leggings are unacceptable), closed shoes (no exposed skin or sock), and shirts that cover their shoulders. Approved safety glasses/goggles are always required in the lab. Students who wear corrective-vision glasses must have elastic-strap safety goggles that cover the entire glasses and seal against the forehead. Long hair should be pulled back. Failure to follow laboratory safety protocols could result in injury to yourself or others and will result in reduction of your laboratory grade. Students not dressed appropriately for lab will be asked to leave and will earn a grade of zero on that experiment.

- Laboratory Evaluation/Grading Policy  
*The laboratory portion of the course counts towards 25% of your overall course grade.*

|   |            |
|---|------------|
| Regular Experiments                     | 75%        |
| Lab Practical                           | 15%        |
| <u>Behavior, Safety, &amp; Teamwork</u> | <u>10%</u> |
| Total                                   | 100%       |

Pre-laboratory Assignments accompany each experiment in the lab manual and must be completed prior to the laboratory period. **Pre-laboratory Assignments are due at the beginning of the laboratory period.** Students not turning in a complete Pre-laboratory Assignment will not be allowed to participate in that experiment and will receive a grade of zero on that experiment. Unless otherwise stated, Regular Experiment reports are due at the end of the laboratory period.

Questions in the lab manual that require written explanations must be answered in complete, thoughtful sentences. Failure to do so will result in loss of points.

Calculations in the lab report must show all the steps necessary to generate the answers provided, including proper use of units and significant figures. Failure to do so will result in loss of points.

**Lab reports that are sloppy and/or illegible will not be graded;** although, some points may be earned for completing the experiment. Lab reports must be completed neatly in pencil. Errors must be completely erased. Lab reports written in pen and lab reports with scratched-out or scribbled-out writing will not be accepted and will earn zero points.

**Copying answers on any work will not be tolerated.** Pre-laboratory Assignments and Lab Reports that appear to have answers copied from other students or internet sources or that appear to not be the student's own work will earn a grade of zero.

**Students who leave lab early without permission from the instructor and their lab partner(s) will incur a point reduction. Keep in mind that teamwork is 10% of your lab grade!**

**You are expected to attend all laboratory periods.** Failing to attend lab will earn you zero points for that experiment. "I have to work" is not an acceptable excuse for missing a laboratory period.

#### **Communication:**

- NTCC email is the official form of communication used by the college. Email communications from non-NTCC email addresses run the risk of being marked as spam and may not be answered.
- Course announcements that occur outside of lecture and lab sessions will be announced via Blackboard's announcement feature. These will be cc'd to students via NTCC email.
- Students are expected to check Blackboard and their NTCC email accounts regularly.
- All grading policies and due dates for online homework assignments are listed in the online homework system.

#### **Institutional/Course Policy:**

- **Students should expect to be working on assignments outside of class on their own time throughout the entire duration of this course.** For each hour that you spend in class, plan to spend a minimum of three hours out of class studying, reading the book, working on homework problems, etc.

- Attendance  
You are expected to attend all classes. Chemistry is too hard to learn on your own.
- Online Homework  
This course uses the Mastering Chemistry online homework system. Details about registering in Mastering Chemistry will be discussed on the first day of class. Assignments and due dates will be listed in the Mastering Chemistry system. Access to a computer with the internet is required for this course.
- Supplemental Instruction  
Supplemental Instruction (SI; aka tutoring) is required for this course. Many hours of FREE SI tutoring are available each week. SI Tutors are chemistry majors that have earned high grades in this course. Students are expected to attend approximately 3 hours of SI tutoring each week during the semester. Students will earn one point per half-hour of tutoring and are required to earn 100 points. Students can earn up to a maximum of 110 points for SI Tutoring, and this grade is worth 5% of the overall course grade. Details will be provided during the first day of class. The SI tutoring sessions are available at the following times and locations:  

Mon/Wed - 1100am-1230pm - MS 104  
 Mon/Tues - 300-630pm - MS 106  
 Thursday - 200-630pm - MS 106
- Electronic Devices  
Use of cell phones, head phones or earbuds is prohibited during class and lab time. Students using these devices for unapproved purposes will be dismissed from lecture or lab and will earn a grade of zero on material for that period.
- Withdrawal Date (Drop Date)  
**Thursday, April 9** is the last day to withdraw from the course with a grade of “W”. Students who withdraw from the lecture must also withdraw from the lab. If you stop attending class and fail to officially withdraw, expect to earn a grade of “F” in the course.

### **Student Responsibilities/Expectations:**

Like all colleges, Northeast Texas Community College strives to be a “community of scholars.” Please remember that you and all the students in this class are pursuing very important goals in your lives. As human beings and as scholars, I expect every student to be courteous and considerate toward other students throughout the lecture and laboratory portions of this course.

As your instructor, I will attend all classes on time and prepared to teach what you are expected to learn each day. I will make a conscientious effort each class period to teach to the best of my ability and to provide you with clear, well-organized explanations of class material. I care deeply about your learning experience and your success in this course. However, that ultimate success does depend largely on you. Your success can be maximized, and your potential achieved by making a commitment to meet the following classroom expectations:

- Attend ALL classes – physically and mentally. Wherever you are, be all there.
- Be on time for class. Attitude is not everything, but it is very important. Remain in class for the entire instructional period.
- A good student acts like a good student; Be an active learner – participate in class. Be attentive, answer questions, and ask questions.
- Read ahead. This will help make the next lecture much more effective.
- All cellular phones and laptop computers must be turned off during class time.

- f) Realize that I do not GIVE grades. You EARN grades based upon your performance. That performance will be enhanced by participating in class, laboratory and tutoring sessions so that your mastery of the content successful.
- g) Be respectful of yourself, your classmates, the SI tutors and your instructors.
- h) Learning is hard work, but it is also invigorating and fun. Work hard and have fun doing so.

This course covers a lot of material and moves rapidly, so do not fall behind. If you do not understand Chapter 1, you will probably not understand Chapter 2 either, because the material for this course is cumulative.

**The only way to learn chemistry is through practice.** You must be willing to spend time working problems from the textbook to be successful. If you are having problems with a topic, it may even be necessary to work problems from the textbook that are not assigned.

At the first sign of trouble you should seek help immediately. I am happy to help you with any of your chemistry coursework. However, if you wait too long to seek help, there is a point where there is nothing I can do to help you.

Work with a classmate on the homework, but do not just copy answers that you do not understand. There is a difference between working together and cheating. If it feels like cheating, then it is cheating. Assignments that appear to be copies of each other will earn grades of zero. Students caught in the act of cheating will earn a zero on that assignment, lab, or exam and may earn a grade of “F” in the course for such actions. Students with multiple instances academic dishonesty will earn a grade of “F” in this course.

#### **NTCC Academic Honesty/Ethics Statement:**

NTCC upholds the highest standards of academic integrity. The college expects all students to engage in their academic pursuits in an honest manner that is beyond reproach using their intellect and resources designated as allowable by the course instructor. Students are responsible for addressing questions about allowable resources with the course instructor. Academic dishonesty such as cheating, plagiarism, and collusion is unacceptable and may result in disciplinary action. This course will follow the NTCC Academic Honesty and Academic Ethics policies stated in the Student Handbook. Refer to the student handbook for more information on these subjects.

#### **ADA Statement:**

It is the policy of NTCC to provide reasonable accommodations for qualified individuals who are students with disabilities. This College will adhere to all applicable federal, state, and local laws, regulations, and guidelines with respect to providing reasonable accommodations as required to afford equal educational opportunity. It is the student's responsibility to request accommodations. An appointment can be made with the Academic Advisor/Coordinator of Special Populations located in Student Services and can be reached at 903-434-8264. For more information and to obtain a copy of the Request for Accommodations, please refer to the special populations page on the NTCC website.

#### **Family Educational Rights and Privacy Act (FERPA):**

The Family Educational Rights and Privacy Act (FERPA) is a federal law that protects the privacy of student education records. The law applies to all schools that receive funds under an applicable program of the U.S. Department of Education. FERPA gives parents certain rights with respect to their children's educational records. These rights transfer to the student when he or she attends a school beyond the high school level. Students to whom the rights have transferred are considered “eligible students.” In essence, a parent has no legal right to obtain information

concerning the child's college records without the written consent of the student. In compliance with FERPA, information classified as "directory information" may be released to the general public without the written consent of the student unless the student makes a request in writing. Directory information is defined as: the student's name, permanent address and/or local address, telephone listing, dates of attendance, most recent previous education institution attended, other information including major, field of study, degrees, awards received, and participation in officially recognized activities/sports.

**Tentative Course Timeline (\*note\* instructor reserves the right to adjust this timeline at any point in the term):**

| WEEK | DATE   | LECTURE ASSIGNMENT   | LAB (M 1:30 PM)                             |
|------|--------|--|---|
| 1    | Jan 20 | MLK Holiday  | <i>No lab</i>                               |
|      | Jan 22 | Syllabus, Scientific Method, Classifying Matter 1.2-1.3                            |   |
| 2    | Jan 27 | Units, Sig Figs, Dimensional Analysis, Density E.2-E.9                             | <i>Intro to Lab; Check In; Lab 1 Safety</i> |
|      | Jan 29 | Atomic Theory & Laws, Parts of Atom 1.4-1.8  |   |
| 3    | Feb 3  | Molar Mass, Convert Mass/Moles/Atoms 1.9-1.10                                      | <i>Lab 2 Measurement</i>                    |
|      | Feb 5  | <b>Test 1</b> (Chps. E & 1)  |   |
| 4    | Feb 10 | Quantum Mechanics History & Quantum Numbers 2.1-2.5                                | <i>Lab 3 Identification of Unknown</i>      |
|      | Feb 12 | Atomic Orbitals; Spin QN; Hund's Rule; Electron Configurations 2.6, 3.2-3.4        |   |
| 5    | Feb 17 | Anomalous Configurations; Ion Formation; Periodic Trends 3.5-3.9                   | <i>Lab 4 Periodicity of Solubility</i>      |
|      | Feb 19 | Compounds Intro; Lewis Dots; Ionic Bonding; Ionic Formulas & Names 4.2-4.6         |   |
| 6    | Feb 24 | Covalent Bonds, Molecular Formulas & Names 4.7-4.8                                 | <i>Lab 5 Formula of a Hydrate</i>           |
|      | Feb 26 | <b>Test 2</b> (Chps. 2, 3, 4)  |   |
| 7    | Mar 2  | Formula Mass/Moles for compounds 4.9   | <i>Lab 6 Empirical Formula</i>              |
|      | Mar 4  | Composition, Determining Chemical Formulas 4.10-4.12                               |   |
| 8    | Mar 9  | Electronegativity, Polar Bonds, Lewis Structures, Formal Charge, Resonance 5.2-5.6 | <i>Lab 7 Molecular Geometry</i>             |
|      | Mar 11 | VSEPR Theory 5.7-5.10  |   |



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## SPRING BREAK

March 16-20

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|----|---------------|--|--|
|    | Mar 23        | Valence Bond Theory, MO Theory 6.2-6.5   |  |
| 9  | Mar 25        | Chemical Equations 7.2-7.3   | <i>Lab 8 Chemical Rx</i>                 |
| 10 | Mar 30        | <b>Test 3</b> (Chps. 4, 5 & 6)   | <i>Lab 9 Synthesis of Salicylic Acid</i> |
|    | Apr 1         | Stoichiometry, Limiting Reactant, Percent Yield 7.4-7.5                        |  |
| 11 | Apr 6         | Molarity/Dilution; Solution Stoichiometry 8.2-8.3                              | <i>Lab 11 Beer's Law</i>                 |
|    | Apr 8         | Electrolytes & Precipitation Reactions, Net Ionic Equations 8.4-8.6            |  |
| 12 | Apr 13        | Acid-Base Reactions 8.7-8.8  | <i>Lab 10 Titration</i>                  |
|    | Apr 15        | Thermo I (Energy, Work, Enthalpy) 9.2-9.5                                      |  |
| 13 | Apr 20        | Thermo II (Calorimetry, Standard State) 9.5-9.7                                | <i>Lab 12 Ionic Rx</i>                   |
|    | Apr 22        | <b>Test 4</b> (Chps. 7 & 8)  |  |
| 14 | Apr 27        | Thermo III (Hess's Law, Enthalpy Changes, Combustion, Lattice Energy) 9.8-9.11 | <i>Lab practical</i>                     |
|    | Apr 29        | Gases I (Gases, Pressure, Ideal Gas Law) 10.2-10.6                             |  |
| 15 | May 4         | Gases II (Partial Pressures, Stoichiometry, Real Gases) 10.7-10.11             | <i>Lab 13 Hess's Law &amp; check-out</i> |
|    | May 6         | <b>Test 5</b> (Chps. 9 & 10)   |  |
| 16 | <b>May 13</b> | <b>FINAL EXAM</b>  | <b>11:00 AM</b>                          |

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