

Tohono O'odham Community College



Syllabus: *CHM 080 Preparation for General Chemistry*

Course Information

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| Course Prefix/Number: CHM 080 | Credit Hours: 3 |
| Semester: Fall 2017 | Course Title: Preparation for General |
| Class Days/Times: MW 10 - 11:15 p.m. | Chemistry |
| | Room: Science Lab |

Instructor Information:

Name: Melanie Lenart, Ph.D.

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Office location: Faculty building, office 101

Office hours: By appointment

Course Description:

Fundamentals of chemistry. Includes nomenclature, atomic structure, bonding, chemical equations, moles, stoichiometry, the periodic table, conversions, problem-solving techniques and study skills.

After completion of the course students will be able to

1. Define chemistry and give examples of chemicals and chemical changes.
2. Identify and describe the steps of the scientific method.
3. Distinguish between mass and weight.
4. Distinguish between elements and compounds.
5. Distinguish between pure substances and mixtures.
6. Classify a specific mixture as being homogeneous or heterogeneous.
7. Distinguish between physical and chemical properties of substances.
8. Convert SI lengths, volumes and masses to other equivalent SI units.
9. Use dimensional analysis and conversion factors to set up and solve problems involving both SI and English quantities.
10. Use experimental data to discuss uncertainty in measurement.
11. Determine number of significant figures in data and calculations.

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12. Write numbers in scientific notation, and use these in calculations.
13. Make conversions involving density and also temperature on the Fahrenheit, Celsius and Kelvin scale.
14. Use correct spelling for the names and symbols of common elements.
15. Give formulas of the elements that exist as diatomic molecules.
16. Use periodic table to identify metals, nonmetals, and metalloids, and list general physical properties for each category.
17. Give names, symbols, relative charges and masses for the three major subatomic particles.
18. Determine the atomic number, mass number, and number of protons, neutrons and electrons for isotopes of the elements.
19. Describe the atom in terms of a nucleus containing protons and neutrons and a highly organized arrangement of electrons outside the nucleus.
20. Describe chemical change in terms of loss or gain of specific "valence" electrons from the outer boundaries of the atom.
21. Identify all periods and groups shown on the periodic table.
22. Compare sizes of atoms within families of elements.
23. List general properties and some specific uses of common elements within each group.
24. Relate column numbers in the periodic table to the number of valence electrons available for use in chemical change.
25. Draw Lewis electron dot symbols for the main group elements based on periodic table positions.
26. Use Lewis dot structures to represent the formation of the ionic bond between main group metals and the nonmetals.
27. Use Lewis dot structures to represent the formation of the covalent bond between non-metallic elements.
28. Define ionic, polar covalent and covalent bonding, including concept of electronegativity.
29. Write formula and name for common cations and anions.
30. Write a formula for a simple acid, base or salt when the name is given.
31. Name a simple acid, base or salt when the formula is given.
32. Write formula or name binary compounds of the non-metals.
33. Describe the chemical mole and Avogadro's Number.
34. Define molar mass and determine molar mass for elements and compounds.
35. Interconvert mass, moles and number of ions or atoms in any given substance.
36. Describe how to prepare solutions with molar concentrations
37. Balance a chemical equation for which all formulas are given
38. Describe on a particle and mole level the significance of a balanced equation.
- 39.** Use the balanced equation to calculate gram and mole quantities of reactants and products.

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Course Structure:

This course consists of five units. Each unit consists of PowerPoint lectures, assigned readings, homework assignments, hands-on class activity or laboratory, and exam. The final project for the course is a presentation on "Relating Chemistry to Everyday Life."

Course Assessment:

Course assessment will consist of exams and quizzes, homework, hands-on activities, and final presentation. Material will be available to help you prepare for exams. In order to facilitate on-going faculty-student feedback and provide formative assessment, there will be frequent quizzes that will be graded and returned promptly. I welcome student feedback about the course anytime. I will also provide students an opportunity to give me feedback on their course experience through an anonymous mid-course survey and final course evaluation.

Texts and Materials:

Required Textbook: "Understanding Basic Chemistry Concepts" Chris McMullen, Northwestern State University of Louisiana (2013). Other materials may be provided by the instructor.

| Evaluation: | Points: | Percent of Total Points: |
|---------------------------------------|---------|--------------------------|
| Exams and Final Presentation | 400 | 40% |
| In-Class Work and Projects/Attendance | 400 | 40% |
| Homework/Quizzes | 200 | 20% |
| TOTAL | 1,000 | 100% |

Himdag Cultural Component:

This course includes a unit on comparing water chemistry to the sacred nature of water as recognized by indigenous cultures. It also includes a unit on macro- and micro-nutrients of traditional Tohono O'odham foods. Course assessment includes an oral component through the final presentation.

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Policies and expectations-

Course Policies Requirements: (1) Attend class regularly; (2) Complete in-class and out-of-class assignments and submit to the instructor; (3) Attend all field trips; (4) Take all exams (5) Complete all class projects & presentations.

Attendance: You are expected to arrive to class on time and actively participate each class period. Quizzes and exams typically are given out at the beginning of class time. Field trips and class activities begin at the start of class and may be missed if you do not arrive to class on time. Because exams, labwork and/or other assignments potentially occur every class period, points potentially will be lost each class period missed. If you miss all or a portion of a class, then you are solely responsible for obtaining missed class material from fellow students. Complete attendance is mandatory during student project presentations; otherwise presentation points will be forfeited. Four consecutive, unexcused absences may result in withdrawal. You may request to be excused from class for religious observances and practices, for illness, for travel or for personal or family emergency. If you will be absent or have been absent, please notify the instructor as soon as possible.

Make-up policy: Missed exams can be made up within two days of the exam date. Late assignments that can be made up will be accepted but will be penalized 25%. Laboratories cannot be made up. At the instructor's discretion, extra credit opportunities and optional activities may be provided.

Academic Integrity: Violations of scholastic ethics are considered serious offenses by Tohono O'odham Community College, the Student Services Department, and by your instructor. Students may consult the TOCC Student Handbook sections on student code of conduct, on scholastic ethics and on the grade appeal procedure. Copies are available at Tohono O'odham Community College.

All work done for this class must be your own. While you may discuss assignments with other class members, the final written project must clearly be your own. You may use work from books and other materials if it is properly cited. Copying from a book without proper reference or from a person under any circumstances will result in an "F" for the assignment, and at the instructor's discretion, possibly an "F" for the course.

ADA Compliance:

Tohono O'odham Community College strives to comply with the provisions of the Americans with Disabilities Act and Section 504 of the Rehabilitation Act. If you have a learning problem, physical disability, or medical illness that requires you to have any special arrangements, please inform your instructor at the beginning of the semester so your academic performance will not suffer because of the disability or handicap.

Classroom Behavior:

- Because of insurance limitations, non-registered visitors are not allowed at class sessions or on field trips.
- Possession of drugs, alcohol or firearms on college property is illegal.
- Food and beverages are allowed in classrooms.
- Pets, pagers and other electronic devices that distract students are NOT allowed in classrooms. Telephones should be turned off during class.
- Students creating disturbances that interfere with the conduct of the class or the

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learning of others will be asked to leave.

Course Feedback:

All assignments, written papers and quizzes will be graded and returned to the students promptly, typically within a week after the assignment is due. E-mail and phone messages will be returned within two days. A student or the instructor may request a student conference at any time during the semester. A mid-semester grade report will be provided to each student by October 6th.

Instructor Withdrawals:

Students who have missed four consecutive classes, not submitted any assignments nor taken any quizzes by the 45th day census report due on October 1st, 2015 are assumed NOT to be participating in the class and will be withdrawn. Students may withdraw from class at any time during the first 2/3^{rds} of the semester without instructor permission and without incurring any grade penalty. Please be sure to withdraw yourself by October 29th, 2015, if you do not expect to complete the class; otherwise you may receive an "F" grade.

Incomplete (I) grade:

"I" grades are not awarded automatically. The student must request an "I" from the instructor who will judge the student's ability to complete the course on his or her own. Generally the student must have completed over 80% of the course requirements with at least a "C" grade. An "I" requires a written contract between the student and the instructor listing work to be completed as well as how and when the work will be done. If the work is not completed within the contract period, the "I" grade automatically reverts to an "F." "I" grades will not be re-evaluated during the final two weeks of the semester when class activities are normally at their most intense.

Special Withdrawal (Y) grade:

The "Y" grade is an administrative withdrawal given at the instructor's option when no other grade is deemed appropriate. Your instructor must file a form stating the specific rationale for awarding this grade. "Y" grades are discouraged since they often affect students negatively. Your instructor will not award a "Y" grade without a strong reason.

Final Grades: Students will receive a grade transcript from the college mailed to the address given with registration materials at the end of the semester when all grades have been recorded.

SPECIAL NOTE TO STUDENT:

For privacy and security reasons, instructors are advised **NOT** to give grades over the telephone. Grades will only be emailed with written permission from the student. Your instructor will make every attempt to follow the above procedures and schedules, but they may be changed in the event of extenuating circumstances.

Students submitting assignments through the mail or by email are advised to make copies for their own protection. If you move during the semester, please file a change of address form with the Student Services Office, and inform your instructor.

GOOD LUCK!

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Course Outline:

- A. Scientific method
- B. Classification of matter

- C. Pure Substances I: Elements
- D. Periodic table: names, symbols, types of elements

- E. Periodic property trends
- F. Atomic structure, subatomic particles

- G. Valence electrons and Lewis dot symbols
- H. Lewis dot structures

- I. SI and English units of measurement
- J. Mathematical tools for converting units

- K. Ionic bond and covalent bond
- L. Metals vs. non-metals
- M. Electronegativity and bond type

- N. Pure Substances II: Compounds
- O. Compound formation: molecules, ions

- P. Nomenclature
- Q. Names and formulas of common cations, anions
- R. Ionic and covalent bonds

- S. Naming acids, bases, salts
- T. Naming binary molecules

- U. Chemical Quantities
- V. The mole concept

- W. Mathematical tools for problem solving in chemistry

- X. Stoichiometry
- Y. The balanced equation
- Z. Equation molar and mass relationships

- AA. Optional Special Topics
 - A. Lab techniques: use of flasks, balances and other classroom appropriate activities
 - B. Applications of material to societal concerns, relationships to familiar household products, and current scientific research
 - C. Other topics as considered appropriate by the instructor

DISCLAIMER: This syllabus is designed to evolve and change throughout the semester based on class progress and interests. You will be notified of any changes as they occur.