Syllabus: *CHM 151IN – General* Chemistry I

Course Information	
Course Prefix/Number: CHM 151IN	Credit Hours: 5
Semester: Spring 2018	Course Title: General Chemistry I
Class Days/Times: **MWTH, 3:45 - 5:45 pm**	Room: I:Wemta Ki 5 (Science Lab)

Instructor Information:	Phone (message only) : 623-6175
Name: Lucinda Begay	E-mail: lbegay@tocc.edu
	Office location: N/A
	Office hours: Appointments before or after class

Course Description:
This integrated lecture-lab course is designed to develop a basic understanding of the central principles of chemistry that are useful to explain and predict the properties of chemical substances based on their atomic and molecular structure. Topics covered include atomic structure, chemical bonding, reaction stoichiometry, behavior of gases, and reactions in solutions, and thermochemistry. Additionally, students will be introduced to modern laboratory techniques and participate in experimental activities that promote the development of basic and advanced science-process skills. The course is designed for students who require a strong foundation in general chemistry, such as science and engineering majors, pre-medical and pre-pharmacy students.

Course Objectives:

During this course, the students will….
1. Convert between SI (metric) units.
2. Name a chemical compound when supplied with the formula and write the formula when supplied
3. Identify trends in periodic properties of the elements on the periodic table.
4. Write and balance molecular, ionic and net ionic chemical equations
5. Convert among atoms, moles, grams, and molarity / volume of one substance to atoms, moles, grams, and molarity / volume of the same or a different substance.
6. Determine oxidizing agent, reducing agents, reduced species, oxidized species, and oxidation number of participating elements in reactions and compounds.

7. Predict solubility and dissociation of substances in water and the effects that the solubility and dissociation has on the solution.
8. Predict ideal gas behavior under differing conditions of pressure, temperature, volume, and quantity of gas.
9. Calculate energy values from thermochemical data.
10. Predict the behavior and properties of electrons and photons and their interactions.
11. Predict the structure and electrical properties of molecular compounds

Course Structure:
This course is an integrated lab/lecture course where the labs are integrated into the regular class periods. This course consists of three units. Each unit consists of PowerPoint lectures, assigned reading, films, in-class activities, chemical thinking research report, discussions, laboratory project and several quizzes.

Course Assessment:

Course assessment consists of exams, quizzes, discussions, short written assignments, informal in-class assessments, and laboratory reports. Study guides will be available to help you prepare for exams. In accordance with my teaching philosophy in which I believe student learning occurs primarily through hands-on, real world application of course materials, exams usually comprise 50% or less of the final grade (although they are still an important aspect of course assessment and your grade). In order to facilitate on-going faculty-student feedback and provide formative assessment, many class projects are divided into smaller intermediate steps such as topic choice, project proposals, and rough drafts. Student-to-student assessments are also included in this course though peer review of group participation and written assignments. 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 and final course evaluation.

Texts and Materials:
Chemistry: The Central Science, Brown, LeMay, Bursten, Murphy and Woodward, Stoltsfus, 14th edition. : Scientific calculator to use for homework assignments and exams. A lab notebook is recommended.

Evaluation and Grading & Assignments:

Exams: There are 4 exams during the course of the semester. 3 regular semester unit exams are in-class and you are allowed 1ea. 8.5 x 11 sheet of reference notes. The 4th exam, the Final, is cumulative and is required. The final may not be dropped for purposes of grading. Each exam is worth 100 points and consists of both multiple choice and short answer problems. Of the 3 semester exams the lowest can be replaced by taking the Make-up exam during finals week. This means that if you do not do well on one of the 3 regular semester exams or if you cannot take one then it can be made up at the end of the semester.

Quizzes: 10 quizzes will be given with each worth 5 pts each (worth a total of 50 pts total)

Homework: 10 homework assignments will be given, 1 for each chapter with chapter 3 and 4 combined. Each worth 20 points (200 pts total). These will correspond to the chapters and material on each of the exams.

Evaluation:	**Points:**	**Percent of Total Points:**
Exams	400 (4 @ 100 pts)	40%
Labs-10 @ 25 pts	250 pts	25%
10 Quizzes & 10 Homework Assignments	250 pts	25%
Lab Exam	50 pts	5%
Final Research Project—Culture Chemical Thinking Report	50 pts	5%
TOTAL	1000	100

***Himdag* Cultural Component:**

Course will explore existing elements, materials and environmental issues where this applies to culture chemical thinking to continue improving or restoring components of Himdag. Students will also formulate a personal ethic regarding the use of chemical thinking in science teaching and research, incorporating perspectives from Western science and TOCC Core values.

Course Outline (see schedule for specific dates):

I. Introductory Concepts
   A. The Chemist's tool bag
      1. Measurements and Significant Figures
      2. Dimensional Analysis
   B. The Scientific Method
   C. Classifying Matter and its Properties
   D. Traditional Knowledge of Chemistry

II. Atomic Structure
   A. Introducing the Atom and its component parts
   B. Developing the wave mechanical view of the atom
   C. Applying the electronic nature of the atom to:
   D. Electron configurations
   E. The Periodic Table
   F. Periodic Trends

III. Chemical Bonding
   A. Ionic and Covalent Bonding
   B. Lewis Structures and Molecular Shapes
   C. Bond Polarity and Hybridization

IV. Chemical Reactions and Stoichiometry
   A. Working with Chemical Equations
   B. Stoichiometry calculations
   C. Reactions in Aqueous Solution

V. Introduction to Thermodynamics
   A. Chemical reaction enthalpies
   B. Thermal energy and changes in temperature

VI. Studying the States of Matter
   A. Kinetic-Molecular Theory
   B. Intermolecular Forces
   C. Gas specific
      1. Modeling Gases
      2. Mixtures of gases and partial pressures
   D. Liquid specific
   E. Solutions
      1. Characteristics
      2. Concentration
      3. Colligative Properties (Optional)

VII. Illustration/Reinforcement/Extension of Above Content in Actual Laboratory Setting
   A. Development of expertise in the skills and techniques of the chemistry laboratory
      1. Pipetting
      2. Massing
      3. Titration
      4. Other
   B. Gain experience with laboratory apparatus including one or more technologically sophisticated pieces of instrumentation
   C. Explore the process of testing/verifying hypothesis through experimental design and hands-on experimentation.

CHM 151IN—Chemistry

TENTATIVE SCHEDULE SPRING 2018

BEGAY

Date	Assigned Reading	Topic	Assignments, Labs, Class Activities
1/17-1/18		Intro to Class, syllabus, chemical safety	Chemical Safety Film
1/22-1/25	Ch. 1	Matter and Measurement	Lab 1: HW1
1/29-2/1	Ch. 2	Atomic Theory	Lab 2: HW2 Quiz 1
2/5-2/8	Ch. 3-4	Chemical Reactions and Reaction Stoichiometry	Lab 3 HW (3&4) combine Quiz (2&3) combine
2/12-2/15		Review/ EXAM I	Lab 4 Tohono O'odham Culture Chemical Thinking Discussion **EXAM I**
2/19-2/22	Ch. 5	Thermochemistry	Lab 5 HW 5 Quiz 4
2/26- 3/1	Ch. 6	Intro to Quantum	Lab 6 HW 6 Quiz 5
3/5-3/8	Ch. 7	Periodic Properties	Lab 7 HW 7 Quiz 6
3/19-3/22		Review/EXAM II	Tohono O'odham Culture Chemical Thinking Discussion **EXAM II**
3/26-3/29	Ch. 8	Basics of Chemical Bonding	Lab 8 HW 8 Quiz 7
4/2-4/5	Ch. 9	Molecular Geometry/Theories of Bonding	Lab 9 HW 9 Quiz 8
4/9-4/12	Ch. 10	Gas Laws	Lab 10 HW10 Quiz 9
4/16-4/18	Ch. 11	Intermolecular Forces	Lab 11 HW 11 Quiz 10
4/23		TOCC Earth Day Lectures	Reflection on Lectures
4/25-4/26		Review/EXAM III	Tohono O'odham Culture Chemical Thinking Discussion **EXAM III**
4/30-5/2		Review/Makeup Exam, Makeup Lab	Lab Exam, Final Research Project Report: Culture Chemical Thinking
5/7		Final Exam	**EXAM IV**

(*June 14, 2010, version*)

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.

Acknowledgment of Receipt of Syllabus

Please read, sign and return the following acknowledgment to me in class, *or* return to me at the following address:

Lucinda Begay
Tohono O'odham Community College
P.O. Box 3129
Sells, AZ 85634

☐ I have received my CHM 151IN syllabus (including course objectives, policies, requirements and schedule) and have read and understood all the enclosed materials

☐ I prefer that the instructor not call or contact me by phone anytime during the semester.

My reason(s) for taking this course:

_____

_____

_____

My background in this area includes:

_____

_____

_____

☐ I would like to be contacted by the instructor regarding the following concerns:

_____

_____

_____

_____

_____ _____
Print Name Clearly Here Sign Name Here

_____ _____
Student ID Number Telephone Number

_____ _____
Current Mailing Address/City/State/Zip E-mail Address