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## Syllabus: **Chem 151N - General Chemistry I**

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### Course Information

Course Prefix/Number: CHM 151N	Credit Hours: 5
Semester: Spring 2020	Course Title: General Chemistry I
Class Days/Times: Tue/Wed/Thurs: 8:15am-10:15am	Room: IWK 23

### Instructor Information:

Name: Rajneesh Verma, PhD

Phone/Voice Mail: 520-383-1114

E-mail: rverma@tocc.edu

Office location: Faculty Building, #103

Office hours: Monday: 8:30am-12:00pm,

Wednesday: 10:30am-12:00pm

### 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.

### Student Learning Outcomes:

During this course, the students will be able to

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, discussions, laboratory project and several quizzes.

### **Texts and Materials:**

The book is Chemistry 2e available online through openstax. A link is provided below

<https://openstax.org/details/books/chemistry-2e>

### **Evaluations and Grading & Assignments:**

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

**Your grade will be determined by the following:**

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. Each exam is worth 75 points and consists of both multiple choice and short answer problems

90 and above is an A  
 80 - 89 is a B  
 70 - 79 is a C  
 60 - 69 is a D  
 Under 60 is Failing

<b>Evaluation</b>	<b>Points</b>	<b>Percent of total points</b>
4 Exams, 75 points each	300	30
12 Labs, 20 points each	240	25
5 Quizzes, 40 points each	200	20
11 Homework assignment, 10 points each	110	10
Attendance	50	5
Presentation/Report: Chemistry around you /History of Chemistry	50	5
Lab exam	50	5

**Himdag Cultural Component:** Tohono O’odham traditions and cultural beliefs will be discussed as relevant course topics, and only as appropriate to the Tohono O’odham nation’s traditional standards for sharing information as determined by the Himdag committee.

**Policies and Expectations:**

**Course Policies:**

- 1) There is no extra credit work.
- 2) If a student misses class(es) because of absence(s), it is his/her responsibility to catch up and cover the material that was taught during the absence(s).
- 3) Students are expected to stay in class and work diligently throughout the whole

time. Sleeping, frequent/continued exiting (more than once) from the class during the class period will constitute one (1) absence.

- 4) No cell phone use is allowed during class. Use of cell phones during class, unless permitted by instructor, is a violation of the T-So: son. You will be given one verbal warning on your first violation and a written one on your second violation. After that administrative action(s) will be taken
- 5) Your behavior in the class will decide whether you will get a recommendation letter or not from me.
- 6) Students are expected to attend each class, arriving on time, except in the case of an excused emergency.
- 7) Students are expected to contact instructor prior to absences, coming late to class or leaving early.
- 8) Unexcused late arrivals or early departures will count against attendance record.
- 9) Class participation and preparation are essential to student success. Students must read textual material, prepare for projects, complete required research as stated on the course schedule.
- 10) Students are expected to come to class prepared for class and having done any preliminary work required as per the course schedule.
- 11) Failure to submit a project results in a grade of zero (0). An F is a better grade!
- 12) No work accepted after the last class

### **Classroom Behavior**

- 1) Visitors may be only allowed at class sessions or on field trips with instructor approval, visitor's safety and behavior are the responsibly of the student.
- 2) Possession of drugs, alcohol or firearms on college property is illegal.
- 3) Food and beverages are allowed in classrooms at discretion of the instructor.
- 4) Cellphones should be turned off during class, unless the instructor is allowing students to use their tools (calculator, internet access).
- 5) Students creating disturbances that interfere with the conduct of the class or the learning of others will be asked to leave.
- 6) Student behavior is also detailed in student handbook under Student Code of Conduct Violations

### **Make-up policy:**

Late assignments that can be made up will be accepted but will be penalized 25%. Laboratories cannot be made up except in the case of college closure. 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, or the original work of your group. While you may discuss assignments with other class members, the final written project must clearly be original. 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. If you are uncertain about proper citations ask your instructor or the librarian.

### **Course Feedback:**

All assignments will be graded and returned to the students promptly, typically within a week after the assignment is closed for handing in. 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. Quarterly grade reports will be provided to each student, either in person, by email or via the electronic system of Canvas.

### **Attendance Policy**

You are expected to arrive to class on time and be prepared to participate in each class period. Four unexcused absences may result in withdrawal and a "W" or "Y" will be recorded. You may request to be excused from class for religious observances and practices, for illness, for school or work-related travel or for personal or family emergency. If you will be absent, please notify the instructor as soon as possible (approved by Faculty Senate April 2014).

### **Incomplete Policy**

Incomplete (I) grades are not awarded automatically. The student must request an "I" from the instructor who can choose to award an Incomplete only if all three of the following conditions are met:

1. The student must be in compliance with the attendance policy.
2. The student must have unavoidable circumstance that would prohibit the student from completing the course.
3. The student must have completed over 75% of the course requirements with at least a "C" grade.

Incompletes are not a substitute for incomplete work due to frequent absences or poor academic performance. Incomplete grades that are not made up by the end of the ninth week of the following semester will be automatically changed to an F if the agreed upon work, as stipulated on the written form signed by the instructor and the student when the I grade is awarded, is not completed.

### **Instructor Withdrawals**

Students who have missed four consecutive classes (or the equivalent) not submitted any assignments nor taken any quizzes by the 45th day census report, due on [date of 45th day found in Academic Calendar on TOCC website] are assumed NOT to be participating in the class and may be withdrawn at the faculty member's discretion. [faculty members should be clear in their withdraw policy, if you do not withdraw students please note in appropriate sections].

### **Student Withdrawals**

Students may withdraw from class at any time during the first 2/3 of the semester without instructor permission and without incurring any grade penalty. Please be sure to withdraw yourself by [withdrawal deadline date found in Academic Calendar on TOCC website] if you do not expect to complete the class, otherwise you may receive an "F" grade.

### **Special Withdrawals (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.

### **Equal Access Statement/Disability Accommodations**

Tohono O'odham Community College seeks to provide reasonable accommodations for qualified individuals with disabilities. The College will comply with all applicable regulations, and guidelines with respect to providing reasonable accommodations as required to ensure an equal educational opportunity. This process includes self-identifying as a student with a disability, providing supporting documentation of their disability, and being approved for services through the Disability Resources Office (DRO). It is the student's responsibility to make known to their instructor(s) the student's specific needs within the context of each class in order to receive appropriate accommodations. We will work together in order to develop an accommodation plan specifically designed to meet the individual student's requirements.

For more information or to request academic accommodations, please contact: Anthony Osborn, TOCC Disabilities Resource Coordinator, aosborn@tocc.edu, or 520-360-5044 for additional information and assistance.

## Title IX

Tohono O'odham Community College encourages each student to have the knowledge and skills to be an active bystander who intervenes when anyone is observed or being harassed or endangered by sexual violence. Sexual discrimination and sexual violence can undermine students' academic success and quality of life on campus and beyond. We encourage students who have experienced or witnessed any form of sexual misconduct to talk about their experience and seek the support they need.

Confidential support and academic advocacy can be found with: Student Services Title IX Coordinator/Counselor, Alberta Espinoza, M.Ed. located in I-We:mta Ki: Room 18. Phone 520-383-0033 email: [aespinoza@tocc.edu](mailto:aespinoza@tocc.edu)

### **Conduct: Bias, Bullying, Discrimination and Harassment**

Tohono O'odham Community College faculty and staff are dedicated to creating a safe and supportive campus environment as a core value. Harassment based on age, class, color, culture, disability and ability, ethnicity, gender, gender identity and expression, immigration status, marital status, political ideology, race, religion/spirituality, sex, sexual orientation, and tribal sovereign status will not be tolerated.

### **Courses Outline: Course Outline:**

#### **I. Introductory Concepts** (3<sup>rd</sup> and 4<sup>th</sup> week of January, [Lab 00-02, Quiz 1, HW 1-2](#))

- 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** (1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> week of Feb, [Lab 03-05, Quiz 2, HW 3,4](#))

- 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** (4<sup>th</sup> week of Feb, 1<sup>st</sup> and 2<sup>nd</sup> week of March, [Lab 06, HW 5,6, Quiz 3, Exam 1](#))

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

**IV. Chemical Reactions and Stoichiometry** (4<sup>th</sup> week of March, 1<sup>st</sup> and 2<sup>nd</sup> week of April *Lab 07-09, HW 7,8, Quiz 4, Exam 2*)

- A. Working with Chemical Equations
- B. Stoichiometry calculations
- C. Reactions in Aqueous Solution & Chemical Kinetics
- D. Acid and Bases

**V. Introduction to Thermodynamics** (2<sup>nd</sup> and 3<sup>rd</sup> week of April, *Lab 10, 11 HW 9, 10 Quiz 5*)

- A. Chemical reaction enthalpies
- B. Thermal energy and changes in temperature

**VI. Studying the States of Matter** (4<sup>th</sup> week of April, 1<sup>st</sup> week of May, *Presentation / report, Lab12, HW 11, Exam 3, Final exam*)

- 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)
- F. Electrochemistry

**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.



**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**

**Date:**

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

Dr. Rajneesh Verma  
Tohono O’odham Community College P.O. Box 3129  
Sells, AZ 85634

- I have received my CHM 151N syllabus (including course objectives, policies, requirements and schedule) and have read and understood all the enclosed materials
- I have no objection to receiving an occasional call from the instructor at the number given with my registration materials.
- I prefer that the instructor not call or contact me by phone anytime during the semester.

My reason(s) for taking this course:

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My background in this area includes:

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

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_____	Print Name	_____	Signature
_____	Student ID Number		
_____	Telephone Number		

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

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