**AP Chemistry 2022 - 2023**

Instructor: Chris Norton ccnorton@bsu.edu

Office info:  EL 008B 765-285-7456

**Office Hours:**

* MWF: 11:30 p.m. – 2:00 p.m.
* W: 3:00 p.m. – 6:00 p.m.
* Tuesday – most of the time I will be here all day; however, my availability will vary. I will always send you an email letting you know when I am here. I will title the email “Where is Norton?”.
* Other times are available by appointment.

**Meeting Times:**

*Note: You must attend your scheduled class and lab times unless* ***prior*** *arrangements are made.*

|  |  |
| --- | --- |
| Lecture | Lab -Thursdays |
| 2:00 p.m. MWF | 8:00 – 10:00 a.m. |

**Introduction**

This course is an **introductory** course to chemistry which will cover many different topics in chemistry.  Most of the chapters in this course, excluding chapters one through six, could be turned into a full course of their own!  General Chemistry examines the concepts of the structure of matter, the states of matter, chemical bonding and reaction types, stoichiometry, equilibrium, acid-base theory, kinetics, thermodynamics, oxidation-reduction, and an introduction to organic chemistry. The course emphasizes chemical calculations and the mathematical formulation of principles. Laboratory work emphasizes both qualitative and quantitative experiences and introduces the use of technology in the lab.

\* Ball State University offers 4 college credit hours in CHEM 111 to students who complete this course.

**Textbook**

*World of Chemistry, 3rd Edition, Zumdahl and Zumdahl*

**Philosophy**

Learning is NOT a spectator sport.  The ultimate responsibility for success in learning lies with you, the student.  Learning is a process by which a person seeks to make sense out of the world.  The view of the world or any part of it, held by a person is as individual as fingerprints.  The only way we are able to share knowledge is by verbal and written communication.  The quality of the communication depends on the quality of the language used.  A teacher is a facilitator for learning.  The teacher structures experiences which provide the maximum probability that students can make sense out of the material presented.

**Role of the Teacher**

My responsibility is to present experiences that will assist you to make sense out of chemistry.  These experiences can be altered, based on your input, to improve your chances of being successful.  It is imperative that communications are two ways so that we can remain informed about how you view the concepts we are studying.

It is also my responsibility to design tests, quizzes, and lab assessments that fairly evaluate the level of your success.  You have the right to know where you stand at all times during the semester and to ask when you do not understand why you were evaluated in a particular manner.

**Your Role**

You are in control of your success in chemistry.  To some extent your success will be a function of your background, but the major factor in your success will be the quality and quantity of time and effort you put into your studies.  You must keep in mind that 1) your principal job at this stage in your life is to be a student; and 2) chemistry is not the only course you are taking.  You must balance your time such that you maximize success in all courses.  I will provide several vehicles to assist you.  You must elect to use them.

Before you get too far into the semester, you need to *sincerely evaluate your outside commitments and other courses to determine if you have the time needed to put into this course*.

**Academic Integrity**

Academic integrity is essential to the mission of the Academy.  All students deserve a healthy learning environment and evaluations that are based on their honest independent efforts.  A clear sense of academic honesty and responsibility is fundamental to good scholarship and learning.

You are encouraged to *form study groups and to problem-solve together*.  The normal expectation is that the work on exams is your own and that homework, take-home quizzes, and lab reports, while discussed with other students, is of your own creation.  Academic dishonesty will not be tolerated.  Please refer to the student handbook.

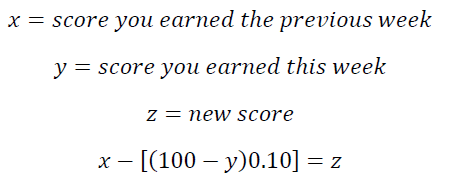
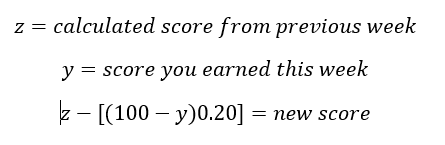
Examples of dishonesty include sharing your work with another student either electronically or on paper (including labs!), using another student’s work to complete your work, and copying answers from the Internet or from the solution manual.  You may use resources to help complete your work; you may not directly use another’s work.

**Late Work**

* Late work will not be accepted.

**Quizzes**

Every **Wednesday** you will have a polyatomic ion and element quiz that will contain a mix of the symbols of the polyatomic ions and elements and the name of the polyatomic ions and elements.  You will have five minutes to complete this quiz

* If you miss a quiz, **you** must schedule a time with me to take the quiz no later than the following Monday or you will earn a zero on the quiz.
* If you earn between 90 – 99% you are in the “cushion zone.”
  + For example, say on the following week you earn less than 90%, your new score will be calculated per the equation to the right:
  + If your score is still in the cushion zone, and then the following week you again earn less than 90%, per the equation to the right:
  + Each successive week that your score is below 90%, the percentage will increase by 10%, until you are out of the cushion zone.
* If you earn consecutive 100’s, then each week 10% will be added.
  + If you have bonus points, and you earn less than 90% on the following quiz your score will be calculated as follows:
  + Bonus points on individual quizzes are only worth 10% of their face value after the first 10% has been added.

**AP Quizzes**

At the end of each unit section, there will be a unit section quiz.

* Work in study groups to answer these
* You have three attempts

**Inclusive Excellence Statement**

Ball State University aspires to be a university that attracts and retains a diverse faculty, staff, and student body. We are committed to ensuring that all members of the community are welcome, through valuing the various experiences and worldviews represented at Ball State and among those we serve. We promote a culture of respect and civil discourse as expressed in our [Beneficence Pledge](https://www.bsu.edu/about/beneficence) and through university resources found [[here](https://www.bsu.edu/about/beneficence)](https://www.bsu.edu/campuslife/multicultural-center).

**Email**

* I can be reached at [ccnorton@bsu.edu](mailto:ccnorton@bsu.edu)
  + It is very important to me to respond to your questions or concerns promptly; however, please note that do receive a lot of emails.  If for some reason, I do not respond within 24 hours, please resend your original email and leave me a voicemail message (765-285-7456).
  + Please note that if you email me after midnight, it is highly unlikely that I will read that email until sometime the following morning.

**Attendance/Tardies**

It is extremely important that you attend ***all*** class periods.  Missing a day can seriously put you behind in this course; however, I do understand that absences happen.  Please adhere to the following guidelines in the event you miss a class.

* If you are absent for a school scheduled event such as a field trip or a college trip, you are required to turn in your work ***prior*** to the trip *unless* alternate arrangements have been made with me *prior* to your trip.
* If you have an excused absence,
  + the work that was due on the day of your absence is expected the day you return
  + work that is due the day you return is expected the following class period
* Extended excused absences require that *you* generate a conversation with me *outside* of class so that we can work out a plan to get you caught up.
* Tardy is defined as arriving after class has started. After ten minutes, a tardy will be counted as absent.
* Sleeping in class – first offense will result in a warning; the second offense will result in an unexcused absence.

**Unexcused Absence Policy**

It is the policy of the Indiana Academy that any absence from class is unexcused, except for illness, death in the family, college or school-related activities, and extenuating circumstances. When a student is absent from a class, the instructor reports the student absence to the Faculty Attendance Coordinator in the Office of Academic Affairs. Unless the absence is excused by a school official, it is considered unexcused. The decision as to whether an absence is excused is not determined by the instructor

* No work will be accepted for an unexcused absence.

**Cell phones/Computers/Tablets/Calculators**

* Cells phones are not to be used in class.
  + Emergency calls can be taken in the hallway
  + During a test, cell phones must be put on silent, airplane mode, or turned off.
* Computers and/or tablets may be used in class for taking notes.
  + If you are using a computer/tablet during class for anything outside of the scheduled activity/lecture, you will lose the privilege to use these devices during class.
* Occasionally you will need your computer for a lab – you will be given notice when you will need a lab for class.
* A TI-84 calculator (or equivalent) will be helpful for this class

**Laboratory**

            Many of the labs that you will do in class are inquiry-based labs.  *Labs make up 20% of your overall grade.*  If you miss a lab (and it is an excused absence) then you will be required to make up the lab within six days of the missed lab; however, the due date will not change.  You will not be allowed to simply use the data from your lab partner.  Learning laboratory techniques is just as important as learning the concepts behind the labs.

* Lab work cannot not be made up for an unexcused absence.

**Exams**

There will be four exams over the semester plus one final exam.  The exams will cover more than one chapter.  You will be able to use a calculator, a formula sheet, and a polyatomic ion list.  *Exams make up 50% of your overall grade.* A study guide will be provided for each exam.

**Grade Weights**

**Grade Scale**

|  |  |
| --- | --- |
| Percentage | Letter Grade |
| ≥ 93 | A |
| 90 - 92 | A- |
| 87 - 89 | B+ |
| 83 – 86 | B |
| 80 – 82 | B- |
| 79 – 77 | C+ |
| 70 - 76 | C |
| 65 - 69 | C- |
| <64 | D\* |

|  |  |
| --- | --- |
| Weight | Description |
| 50% | Exams |
| 15% | Laboratory |
| 10% | Quizzes |
| 10% | Homework |
| 15% | Final Exam |
| 100% | Total |

**Lecture Schedule Semester 1**

**Unit 4**

* 4.1 Introduction for Reactions and 4.4 Physical and Chemicals Changes
* 4.2 Net Ionic Equations
* 4.3 Representations of Reactions
* 1.1 The Mole and Molar Mass
* 4.5 Stoichiometry
* 4.5 Precipitation Stoichiometry
* 4.7 Types of Chemical Reactions
* 4.8 Introduction to Acid-Base Reactions
* 4.6 Introduction to Titration
* 4.9 Redox Reactions

*Exam #1*

***Unit 1***

* 1.2 Mass Spectroscopy of Elements
* 1.3 Elemental Composition of Pure Substances
* 1.4 Composition of Mixtures
* 1.5 Atomic Structure and Electron Configurations
* 1.6 Photoelectron Emission Spectroscopy
* 1.7 Periodic Trends
* 1.8 Valence Electrons and Ionic Compounds

*Exam #2*

**Unit 2**

* 2.1 Types of Chemical Bonds
* 2.2 Intramolecular Force and Potential Energy
* 2.3 Structure of Ionic Solids
* 2.5 Lewis Structures
* 2.6 Resonance and Formal Charges
* 2.7 VSEPR and Bond Hybridization

*Exam #3*

**Unit 3**

* 3.1 Intermolecular Forces
* 3.3 Solids, Liquids, and Gases
* 3.4 The Ideal Gas Law
* 3.5 Kinetic Molecular Theory
* 3.6 Deviations from the Ideal Gas Law
* 3.7 Solutions and Mixtures
* 3.9 Separation of Solutions and Mixtures
* 3.10 Solubility
* 3.11 Spectroscopy and the Electromagnetic Spectrum
* 3.13 Beer-Lambert Law
* *Note: 3.12 The photoelectric Effect was Covered earlier in the semester during lab*

*Exam #4*

Start Unit 5

* 5.1 Reaction Rates
* 5.2 Introduction to Rate Law
* 5.3 Concentration Changes over time
* 5.5 Collision Model
* 5.5 Collision Model and 5.6 Reaction Energy Profile and 5.11 Multistep Reaction Profile
* 5.7 Introduction to Reaction Mechanisms and 5.8 Reaction Mechanism and Rate Law
* 5.10 Catalysts

*Exam #5*

*Final Exam*

**Lecture Schedule Semester 2**

**Unit 6**

* 6.1 – Exothermic and Endothermic Processes – Work and Heat
* 6.2 - Energy Diagrams and AP 6.3 - 6.3 - Heat Transfer and Thermal Equilibrium
* 6.4 - Heat Capacity and Calorimetry
* 6.5 - Energy of Phase Changes
* 6.6 - Introduction to Enthalpies of a Reaction and 6.7 - Bond Enthalpies
* 6.8 - Enthalpy of Formation
* 6.9 - Hess’s Law

*Exam #1*

**Unit 7**

* 7.1 - Introduction to Equilibrium
* 7.2 – Direction of Reversible Reactions
* 7.3 - Reaction Quotient and Equilibrium Constant
* 7.4 - Reaction Quotient and Equilibrium Constant
* 7.5 – Magnitude of the Equilibrium Constant
* 7.6 - **Properties of the Equilibrium Constant**
* 7.7 – Calculating Equilibrium Constants
* 7.9 - Le Chatelier’s Principle
* 7.11 - Introduction to Solubility Equilibria (Chapter 16)
* 7.12 - Common-Ion Effect

*Exam #2*

**Unit 8**

* *8.1 -* Introduction to Acids and Bases
* 8.2 - pH and pOH of Strong Acids and Bases
* 8.3 - Weak Acid and Base Equilibria
* 8.4 - Acid-Base Reactions and Buffers
* *8.5 -* Acid-Base Titrations
* 8.6 - Molecular Structure of Acids and Bases
* 8.7 – pH and P*K*a
* 8.8 Properties of Buffer
* Henderson-Hasselbalch Equation
* 8.9 – Buffer Capacity

*Exam #3*

**Unit 9**

* 9.1 Introduction to Entropy
* 9.2 Absolute Entropy and Entropy Change
* 9.3 Gibbs Free Energy and Thermodynamic Favorability
* 9.4 Thermodynamic and Kinetic Control
* 9.5 Free Energy and Equilibrium
* 9.6 Coupled Reactions
* 9.7 Galvanic (Voltaic) and Electrolytic Cells
* 9.8 Cell Potential and Free Energy
* 9.9 Cell Potential Under Nonstandard Conditions
* 9.10 Electrolysis and Faraday’s Law

*Exam #4*

*Final Exam*