**AP Chemistry Spring 2024**

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. – 5:30 p.m.
* Thursday: 12:30 p.m. – 2:00 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. |
| 8:00 a.m. MWT | 4:00 – 6:00 p.m. |

**Email**

* I can be reached at 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.

**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 qual33333itative 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*.

**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:   $z-\left(100-y\right)=new score $
	+ 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 on Canvas. The grades for the quizzes will be entered by the time of the unit exam.

* Work in study groups to answer these
* You have three attempts
* If you miss a quiz, you have 24 hours to request an extension with a valid reason. Extensions will only be granted thrice in a semester.
* Extensions will *not* be granted after the unit exam.

**Student Accommodation Policy**

* Students possessing an educational 504 or IEP should contact the instructor as soon as possible to arrange for any accommodations that may be needed. Likewise, if you feel that you could benefit from an educational 504 or IEP, feel free to contract the instructor to this regard.

**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).
* *I truly believe in this policy, and endeavor to go above and beyond in our classroom setting. If you see any behavior that goes against the above policy (even if it’s mine!), please bring it to my attention (or have someone you trust do so if you are hesitant). Alternatively, you can find the Bias-Incident form at academy.bsu.edu/forms to report the incident directly to your DEI Coordinator.*

**Attendance/Tardies/Excused Absences**

## Class attendance is **mandatory**

## You have made a commitment toward academic achievement by attending the Academy – both attendance and integrity are essential components to that success.

* + - It is also important that your brain be here as well as your body. Students who fall asleep in class (I’m not \*that\* boring!) will receive an ‘absent’ mark from the instructor, depending on circumstances. Make sure you avoid this by getting enough sleep the night before!

## 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.

* + Missing homework, quizzes and/or tests during an excused absence must be made up as soon as possible. It is the student’s responsibility to make arrangements with the teacher.
	+ 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 help you catch up.
* **Tardy** is defined as arriving after class has started. After ten minutes, a tardy will be counted as absent.

**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.
	+ - An unexcused absence on the day of a lab or test will result in an **automatic** **zero** for that lab or test.

**Mask Policy**

There is currently no campus wide mask-mandate, but if the CDC declares another health-emergency, and BSU puts a mask-mandate in place, this policy may change. If and when masks are required by BSU campus, the Indiana Academy will then follow the same procedure.

**In case of extreme COVID-19, break glass for online policy**

* As it is possible that we may have to re-face pandemic conditions this year, there may be periods when some (or all) of us return to masks and/or are moved to online learning due to necessity or mandate. All of the below rules apply during e-learning, but some information may be useful:

Zoom Link: can be found under the Helpful Stuff module

* Lectures: Classes will be provided on Canvas with the same frequency and schedule of the normal school year. It is your responsibility to view these videos w/o 24hours of their posting. It is vitally important to watch them \*in order\*.
* Homework: Homework can easily be scanned or photographed and emailed to me on the due-date required.
* Laboratory: Labs will be designed to be done either in a discussion format on Zoom, or with common equipment found in standard homes. Any documentation (journals, reports, etc) expected can be returned to me using the same procedure as HW.
* Testing: Tests will be “given” and “collected” at very specific times (TBA). Future circumstances may require different methods, but currently the procedure is as follows:
* The test will be released on Canvas at a very specific day/time that will be announced several days in advance.
* You will have a set amount to time to complete your exam (will be announced on test day, and is tied to the length of that particular test).
* Returning your test to me will be as simple as scanning or photographing your exam and emailing it back to me before the given time has expired.
* 504/IEP accommodations (see below) will be honored.

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

* Cells phones are *not* to be used in class.
	+ Emergency calls may be taken in the hallway.
	+ No game-playing, movie-watching, e-mail, or IM’ing allowed in class -- doing so will result in a recorded absence for that day.
	+ 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.
* Laptops/iPads, if available, should be brought to class during laboratory sessions. This is so you can record, graph, and analyze your data in real-time, both to save you time AND to catch errors as they happen!
* A TI-84 calculator (or equivalent) will be helpful for this class.

**LLM and other AI Fair-Use Policy**

* Basic AI tools (spell-check, word-count, grammar, etc.) that assist with correcting errors and gathering information about your own work is not only accepted, but also encouraged!
* More advanced AI tools such as LLMs (ChatGPT, LLaMa, Phi-1, etc.) that generate information or code may be used as a starting point for research or creative projects, but generated material should not (for several reasons!) be turned in as your own work. Using these LLMs can be very useful in helping you create a project and/or learn complex topics, but diligence is required to:
* \*Completely\* verify that all information provided by the LLM is accurate (this is a major problem, especially in the sciences!). Remember that these models pull non-vetted information from the internet, which will include non-expert, and sometimes malicious, sources.
	+ **You (and your grades) are responsible for any and all errors gathered in this manner.**
* Resist turning in LLM produced material as your own work. The point of being at the Academy is to use provided information as a spring-board for your own intellect and creativity. Using these tools to help you gather ideas, or to find alternate ways to express your ideas, is both welcomed and encouraged. But make sure that you are not falling for temptation to use likely-erroneous data or logic that LLMs often provide. In other words, treat LLM generated material as you would other **non-expert** sources of material.
	+ **Presenting AI-generated material as your own will count as plagiarism, and will be dealt with accordingly (see Academic Dishonesty Policy, below)**

**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.

**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 |

***Note: you have one week from the time you receive a graded paper to contest the grade. It is your grade, and I welcome the discussion.***

**Lecture Schedule Semester 2**

**Complete 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 #1*

**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 #2*

**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 #3*

**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*