**AP Chemistry Fall 2024**

Instructor: Chris Buczek Pronounced: Bew-check cbuczek@bsu.edu

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**Office Hours:**

* Monday: 1:00 p.m. – 3:00 p.m.
* Tuesday: I will be in lab from 8 – 12 and 2 – 6, thus no office hours
* Wednesday: 1:00 – 6:00 p.m.
* Thursday – 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 Prof. Buczek?”.
* Friday: 1:00 p.m. – 3:00 p.m.
* Other times are available by appointment.

 **Meeting Times:**

*Per BSU’s Office of Environmental and Health Safety, no gum, candy, drinks, or food are permitted in the lab space.*

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| --- |
| Lecture |
| 11:00 a.m. MWF |
| 12:00 p.m. MWF |

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

|  |
| --- |
| Lab |
| 2:00 – 4:00 Tuesday |
| 4:00 – 6:00 Tuesday |

**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 pass first semester and CHEM 112 to students who pass next semester.

**Textbook:** *Chemistry: The Central Science. AP Ed. 15th Ed.,* Brown, LeMay, Bursten, Murphy, Woodward, Stolzfus

*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.

**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).

As a reflection of Ball State’s commitment to respect, civil discourse, and the Beneficence Pledge, Inclusive Excellence at the Indiana Academy emerges as one of the priorities of our living and learning community. We strive to exist together respectfully and compassionately, creating an environment where every member can thrive. Unfortunately, there might be occasions when something occurs that disrupts our progress toward meeting these objectives. In this case, we encourage any member of the Academy community to file a Campus Climate Report (CCR) <https://bsu.qualtrics.com/jfe/form/SV_6mbRbL5acAntUTI>.  All reports will be taken seriously, and appropriate responses will be carried out by Academy administration.

**Email**

* I can be reached at cbuczek@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/or leave me a voicemail message (765-285-7456).
	+ Please note that if you email me after ten p.m., it is highly unlikely that I will read that email until sometime the following morning.

**Attendance:**

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. The biggest takeaway from these policies is that I want to work with you, but that work needs to be done outside of class.

**IA 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. Four or more unexcused absences in any particular class a student takes will lead to academic and residential consequences to be determined by the Office of Academic Affairs and the Office of Residential Life that may include detention, residential groundings, parent/principal conference, among others.

**Prearranged Absences:**

* 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.

**Illness/Excused Absences:**

* 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 within two class periods
* If you need more time, *you need to email me or meet with me during office hours* so we can generate a plan.

**Extended Excused Absences:**

* 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:**

To understand the definition of tardy, you need to know the expectation for the class.

* *Expectation*: when the clock shows the start time, you need to be ready for class. Your notes are out as well as other supplies (i.e. periodic tables, polyatomic ions list, calculators). Phones must be silenced and placed in your backpack. Headphones cannot be worn in class; they too must be put away.
* I will take attendance and then start class. We have limited time, and we need to take advantage of those precious minutes.
* *Definition of tardy*: you are not ready or present for class when I start talking Chemistry.
* After ten minutes, a tardy will be counted as absent.

**Sleeping in class**

* First offense = warning
* Second offense = unexcused absence.

**Bathroom Policy**

Don’t laugh, this needs to be stated.

* If you *desperately* need to use the restroom, by all means, let me know that you need to leave.
	+ If you are gone more than ten minutes, I will send a student to check to see if you are ok.
* If you are regularly desperate to use the restroom, I will notify the administration to get you the support you need.

**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.
* The grade for the assignment that was due the day of the unexcused absence, will be entered as a zero.
* Quizzes and tests will also be entered as a zero if you have an unexcused absence.
* A missed lab due to an unexcused absence cannot be made up.

**Make-up Work Policy**

* The absence must be excused
* You must schedule make-up tests and quizzes with me; ideally during my office hours.

**Late Work**

* Late work will not be accepted and will be entered as a zero in the gradebook.
* *Except*:
	+ I know that things will happen in your life that are out of your control, or are traumatic, or you simply forgot. We are human, which means our lives come with a full range of unforeseen circumstances. In the event you have an unfortunate event, here are the steps:
1. Email me as soon as possible that something in your life went sideways and you need an extension. You don’t have to share with me the details, you can if you want, but it is not necessary. I trust your judgement.
	1. Do *not* wait to share with me that things went sideways at the beginning of the class. I am singularly focused on getting class started and I cannot give you the attention you deserve.
2. In the email let me know how much of an extension you need. I will let you know we can agree on the date.
3. *Note*:
	1. If you ask for extensions frequently, we will need to meet to discuss how the Academy can assist you.
	2. I am significantly less willing to extend deadlines for exams. You will need an administrative excused absence.

**Cell phones/Computers/Tablets**

Pursuant to Indiana Code 20-26-5-40.7, The Indiana Academy for Science, Mathematics and Humanities prohibits student use of wireless communication devices for non-instructional purposes in the classroom. As such, any and all portable wireless devices, that have the capability to provide voice, messaging, or other data communication between two or more parties, must only be used for academic purposes directly tied to the classroom activity or related educational task. Exceptions to this wireless device policy are eligible through academic accommodations, individualized education programs, or with instructor approval permitting the use of a wireless device for justification related to health, safety, and/or well-being.

The improper use of a wireless device in an active classroom setting is subject to disciplinary action including but not limited to; a verbal warning, temporary seizure of said device by a school official, an unexcused absence for the class in question, written communication to parent/guardian, among other elevated consequences for repeated improper use.

**What does this mean for you?**

* Cells phones
	+ are not to be used in class.
	+ be put on silent, airplane mode, or turned off.
	+ cannot be used as calculators.
* 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 as stated in the policy above.
* Occasionally you will need your computer for a lab – you will be given notice when you will need a lab for class.
* Headphones
	+ May not be worn during class. There may be exceptions to this policy for which a rationale cannot be provided due to privacy issues.

**Calculators**

* A TI-84 calculator (or equivalent) will be helpful for this class

**Grades**

**Grade Scale**

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| --- | --- |
| 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 |
| 5% | AP Quizzes |
| 5% | Element and Polyatomic Ion Quizzes |
| 10% | Homework |
| 15% | Final Exam |
| 100% | Total |

**Exams**

The first semester will have five exams plus one final exam\*. The second semester will have four exam plus one final. The exams will cover more than one chapter.  You will be able to use a calculator, a periodic table, and the AP formula sheet*.* A study guide will be provided for each exam and will be uploaded to Canvas. Each exam is cumulative. The second semester exams will cover material from the first semester.

\*There is a chance we will have four exams this semester and five next semester. We will see how we do. 😊

**Laboratory**

            Many of the labs that you will do in class are inquiry-based labs.  *Labs make up 15% 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.

*Laboratory dress code*

 Failure to comply with the dress code will result in an unexcused absence as you will not be permitted to participate in the lab. If you have to leave to retrieve appropriate clothing, you will be counted as tardy for the lab. You will have 20 minutes to accomplish this task. If it takes longer than 20 minutes, it will be an unexcused absence. Do not wear your good clothes to the lab.

* Long pants
* Closed-toe shoes
* Long sleeves are preferred, but regular t-shirts are ok. Make sure the sleeves are not dangly.
* No halter tops, tank tops, or any clothing that exposes any part of your abdomen. For safety reasons, you need to be covered.
* Long hair must be tied back and up. You need to eliminate any chance your hair could become part of the lab experiment.
* Goggles must be always worn during the experiment. I have goggles you can use or you are welcome to purchase goggles from Amazon. They are around $10.00.
* Lab aprons must be always worn during the experiment. I have aprons you can use or you are you are welcome to purchase aprons or lab coats from Amazon.

**AP Quizzes**

At the end of each unit section, there will be a unit section quiz. These are called quizzes, but they can be thought of as formative homework assignments. The goal of these quizzes is to help you speak Chemistrian like College Board speaks Chemistrian, and to reinforce the learning objectives as outlined by the College Board’s AP Chemistry Course and Exam Description Guide.

* Work in study groups to answer these
* You have three attempts
* If you miss a quiz, see the late work policy above.

**Polyatomic Ion and Element Symbol Quiz**

Every **Friday** 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 approximately five minutes to complete this quiz.

* If you have accommodations and would like to use them for the quiz, you *must* send an email to Mrs. Drumm or Mrs. Wright, *and include me on the cc line*, to schedule the quiz.
	+ This must be scheduled *prior* to the day of the 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

*Grading:*

* 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.

**Homework**

 Homework is graded on completion and is due the day it is indicated on the At a Glance paper for each unit. The solution manual for all homework problems can be found on Canvas in a module labeled “Solution Manuals.” It is a violation of copyright law to download or redistribute these materials. They are there for you as a coach, so please USE the solutions to check your work as you go through the problems.

Things to keep in mind:

* I will randomly select problems and assignments to grade. Corrections will not be allowed.
* If you turn in a random set of problems with the correct title, you will earn a zero. Corrections will not be allowed.
* If you turn in a partially completed assignment, you will earn an incomplete which equals 50% whether or not you did most of the assignment. It is still incomplete. Corrections will not be allowed.
* Please see the late work policy above.

**Final Exam:**

You will have a two-hour comprehensive final exam each semester. Second semester final exam *includes* topics from the first semester.

**AP Progress Checks**

 At the end of each unit, you can log into the college board website to assess your skills. You will have one attempt and it will be timed. The assessment will count as extra credit with the potential to add 2% to your exam. Choosing to not take this opportunity, will decrease your exam score by 1%.

**Lecture Schedule Semester 1**

***Unit 1***

|  |  |
| --- | --- |
| 1.1 The Mole and Molar Mass1.2 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 Spectroscopy1.7 Periodic Trends1.8 Valence Electrons and Ionic Compounds |

*Exam #1*

**Unit 2**

|  |  |
| --- | --- |
| 2.1 Types of Chemical Bonds2.2 Intramolecular Force and Potential Energy2.3 Structure of Ionic Solids2.4 Structure of Metals and Alloys | 2.5 Lewis Structures2.6 Resonance and Formal Charges2.7 VSEPR and Hybridization |

*Exam #2*

**Unit 3**

|  |  |
| --- | --- |
| 3.1 Intermolecular Forces3.2 Properties of Solids3.3 Solids, Liquids, and Gases3.4 The Ideal Gas Law3.5 Kinetic Molecular Theory3.6 Deviations from the Ideal Gas Law3.7 Solutions and Mixtures | 3.8 Representations of Solutions3.9 Separation of Solutions and Mixtures 3.10 Solubility3.11 Spectroscopy and the Electromagnetic Spectrum3.12 Properties of Photons3.13 Beer-Lambert Law |

*Exam #3*

**Unit 4**

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| --- | --- |
| 4.1 Introduction for Reactions and 4.4 Physical and Chemicals Changes4.2 Net Ionic Equations4.3 Representations of Reactions4.4 Representations of Solutions4.5 Stoichiometry | 4.5 Precipitation Stoichiometry4.7 Types of Chemical Reactions 4.8 Introduction to Acid-Base Reactions4.6 Introduction to Titration4.9 Redox Reactions |

*Exam #4*

Unit 5

|  |  |
| --- | --- |
| 5.1 Reaction Rates5.2 Introduction to Rate Law5.3 Concentration Changes over time5.4 Elementary Reactions5.5 Collision Model5.6 Reaction Energy Profile  | 5.7 Introduction to Reaction Mechanisms5.8 Reaction Mechanism and Rate Law5.9 Pre-Equilibrium Approximation5.10 Catalysts * 1. ultistep Reaction Profile
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*Exam #5*

***Final Exam***

**Lecture Schedule Semester 2**

**Unit 6**

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| --- | --- |
| 6.1 – Exothermic and Endothermic Processes – Work and Heat6.2 - Energy Diagrams 6.3 - Heat Transfer and Thermal Equilibrium6.4 - Heat Capacity and Calorimetry6.5 - Energy of Phase Changes | 6.6 - Introduction to Enthalpies of a Reaction 6.7 - Bond Enthalpies6.8 - Enthalpy of Formation6.9 - Hess’s Law |

*Exam #1*

**Unit 7**

|  |  |
| --- | --- |
| 7.1 - Introduction to Equilibrium7.2 – Direction of Reversible Reactions7.3 - Reaction Quotient and Equilibrium Constant 7.4 – Calculating the Equilibrium Constant7.5 – Magnitude of the Equilibrium Constant7.6 - **Properties of the Equilibrium Constant** | 7.7 – Calculating Equilibrium Concentrations7.8 – Representations of Equilibrium7.9 – Introduction to Le Chatelier’s Principle7.10 – Reaction Quotient and Le Chatelier’s Principle7.11 - Introduction to Solubility Equilibria7.12 - Common-Ion Effect |

*Exam #2*

**Unit 8**

|  |  |
| --- | --- |
| 8.1 - Introduction to Acids and Bases8.2 - pH and pOH of Strong Acids and Bases8.3 - Weak Acid and Base Equilibria8.4 - Acid-Base Reactions and Buffers*8.5 -* Acid-Base Titrations8.6 - Molecular Structure of Acids and Bases | 8.7 – pH and P*K*a8.8 - Properties of Buffers8.9 - Henderson-Hasselbalch Equation8.10 – Buffer Capacity8.11 – pH and Solubility |

*Exam #3*

**Unit 9**

|  |  |
| --- | --- |
| 9.1 - Introduction to Entropy9.2 - Absolute Entropy and Entropy Change9.3 - Gibbs Free Energy and Thermodynamic Favorability9.4 - Thermodynamic and Kinetic Control9.5 - Free Energy and Equilibrium | 9.6 – Free Energy of Dissolution9.7 - Coupled Reactions9.8 - Galvanic (Voltaic) and Electrolytic Cells9.9 - Cell Potential and Free Energy9.10 - Cell Potential Under Nonstandard Conditions9.11 - Electrolysis and Faraday’s Law |

*Exam #4*

***Final Exam***