

CHEM180

Course Summary

Course : CHEM180 **Title :** Introduction to Chemistry
Length of Course : 8 **Faculty :**
Prerequisites : N/A **Credit Hours :** 3

Description

Course Description:

This course introduces students to the principles of basic chemistry, the terminology, methodology and worldview of chemistry, and the practical application to everyday living. Topics are both descriptive and mathematical and include acids and bases, atomic structure, chemical equations and reactions, chemical language and nomenclature, gases, molecular structure, solution chemistry, chemical mathematics, organic chemistry, and biochemistry. Students will discuss the process of the scientific method and also demonstrate science information literacy skills through source selection and creation of a narrated presentation.

Course Scope:

This course is designed to teach the principles of basic chemistry and basic chemistry laboratory principles to students who are nonscientists. It will introduce inorganic and organic chemical theory, terminology, nomenclature, problem solving, and methodology, and provide a prospectus of a universal view of chemistry and its practical applications to everyday living. We will become familiar with the scientific method, and attain knowledge of chemical concepts, chemical laboratory techniques and chemical problem solving.

Objectives

The successful student will fulfill the following learning objectives, and upon completion of this course, should be able to:

CO-1 Identify the principles, history, and terminology of general chemistry. Relate the process of scientific inquiry to the historical development of chemical knowledge.

CO-2 Apply concepts of scientific measurement and problem solving strategies to questions in chemistry, including using proper SI units, significant figures, and unit conversions by dimension analysis.

CO-3 Distinguish between matter and energy. Categorize the states of matter and describe their distinguishing characteristics and the phase changes between them.

CO-4 Classify elements according to their location in the periodic table; predict periodic trends of selected properties of atoms; write the electron configuration of atoms and ions.

CO-5 Compare and contrast elements, compounds, and types of mixtures (solutions). Identify the names and formulas of elements, ions, isotopes, ionic and molecular compounds and acids and bases.

CO-6 Define pH value and the pH scale and identify acidic and basic solutions.

CO-7 Apply of the Law of Conservation of Mass and Molar Mass to balance chemical equations and solve up to four step stoichiometry calculations.

CO-8 Depict chemical bonding using Lewis structures and determine the shape and polarity of a simple a compound from its formula.

CO-9 Describe and apply the ideal gas law.

CO-10 Define and provide examples of the types intermolecular forces in terms of strength and mode of action.

Outline

Week 1: Lesson 1: ESSENTIAL IDEAS, MEASUREMENTS, AND PROBLEM SOLVING

Learning Outcomes

CO-1; CO-2

Required Readings

CHEM180 COURSE PROJECT GUIDE

Syllabus

OpenStax Text:

- Chapter 1

Lessons Material

Assignments

Academic Honor Pledge*

Week 1 Discussion – *Topic: Introduce Yourself and Molecule/Substance Choice Submissions*

Initial Post Due: Sunday by 11:55 p.m. ET (please try to post earlier)

Replies Due: Sunday by 11:55 p.m. ET

Week 1 Lesson Quiz*

*Due on or before Sunday by 11:55 pm ET. Please note time zone requirement.

Recommended Optional Reading

Karukstis, K. K., & Van Hecke, G. R. (2003). *Chemistry Connections* (2nd ed., Complementary Science). Retrieved from: [APUS Online Library](#)

The Blue Book: [IUPAC Nomenclature of Organic Chemistry](#)

Recommended Media

Neth E.J. *et al.* (2016) [OpenStax Chemistry: Atoms First](#), 1st edition. University of Connecticut/OpenStax College.

Giesbrecht, H. (2012) [Professor Heath's Chemistry Channel](#), Online Video Channel. YouTube

Week 2: Lesson 2: ATOMS AND ELEMENTS; PERIODIC TABLE AND ENERGY BASICS

Learning Outcomes

CO-3; CO-4

Required

Readings

OpenStax Text:

- Chapter 2,
- Chapter 3.6,
- Chapter 9.1

Lessons Material

Assignments

Discussion 2 – Topic: *Evaluating Resources*

Initial Posting Due: Thursday by 11:55pm ET

Replies Due: Sunday by 11:55pm ET

Week 2 Lesson Quiz*

*Due on or before Sunday by 11:55 pm ET. Please note time zone requirement.

Recommended Optional Reading

Karukstis, K. K., & Van Hecke, G. R. (2003). *Chemistry Connections* (2nd ed., Complementary Science). Retrieved from: [APUS Online Library](#)

The Blue Book: [IUPAC Nomenclature of Organic Chemistry](#)

Recommended Media

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Giesbrecht, H. (2012) [Professor Heath's Chemistry Channel](#), Online Video Channel. YouTube

Week 3: Lesson 3: MOLECULES AND COMPOUNDS; SOLUTIONS

Learning Outcomes

CO-5; CO-6

Required

Readings

OpenStax Text:

- Chapter 3.7
- Chapter 4.3
- Chapter 6.3-6.4

Lessons Material

Assignments

Assignment 1—Annotated Bibliography

Discussion 3 – *Topic: Problem Solving (Textbook Problems)*

Initial Posting Due: Thursday by 11:55pm ET

Replies Due: Sunday by 11:55pm ET

Week 3 Lesson Quiz*

Assignment #1: Annotated Bibliography*

*Due on or before Sunday by 11:55 pm ET. Please note time zone requirement.

Recommended Optional Reading

Karukstis, K. K., & Van Hecke, G. R. (2003). *Chemistry Connections* (2nd ed., Complementary Science). Retrieved from: [APUS Online Library](#)

The Blue Book: [IUPAC Nomenclature of Organic Chemistry](#)

Recommended Media

Neth E.J. *et al.* (2016) [OpenStax Chemistry: Atoms First](#), 1st edition. University of Connecticut/OpenStax College.

Giesbrecht, H. (2012) [Professor Heath's Chemistry Channel](#), Online Video Channel. YouTube

Week 4: Lesson 4: CHEMICAL COMPOSITION; CHEMICAL REACTIONS

Learning Outcomes

CO-7

Required Readings

OpenStax Text:

- Chapter 6.1-6.2
- Chapter 7.1-7.2
- Chapter 11.2

Lessons Material

Assignments

Discussion 4 – *Topic: Chemistry Connections (Using the APUS Library)*

Initial Posting Due: Thursday by 11:55pm ET

Replies Due: Sunday by 11:55pm ET

Week 4 Lesson Quiz*

*Due on or before Sunday by 11:55 pm ET. Please note time zone requirement.

Recommended Optional Reading

Karukstis, K. K., & Van Hecke, G. R. (2003). *Chemistry Connections* (2nd ed., Complementary Science). Retrieved from: [APUS Online Library](#)

The Blue Book: [IUPAC Nomenclature of Organic Chemistry](#)

Recommended Media

Neth E.J. *et al.* (2016) [OpenStax Chemistry: Atoms First](#), 1st edition. University of Connecticut/OpenStax College.

Giesbrecht, H. (2012) [Professor Heath's Chemistry Channel](#), Online Video Channel. YouTube

Week 5: Lesson 5: QUANTITIES AND ENERGY IN CHEMICAL REACTIONS

Learning Outcomes

CO-7

Required Readings

OpenStax Text:

- Chapter 7.3-7.5
- Chapter 9.3

Lessons Material

Assignments

Assignment 2: The Outline

Discussion 5 – *Topic: Problem Solving (Textbook Problems)*

Initial Posting Due: Thursday by 11:55pm ET

Replies Due: Sunday by 11:55pm ET

Week 5 Lesson Quiz*

Assignment #2: The Outline*

*Due on or before Sunday by 11:55 pm ET. Please note time zone requirement.

Recommended Optional Reading

Karukstis, K. K., & Van Hecke, G. R. (2003). *Chemistry Connections* (2nd ed., Complementary Science). Retrieved from: [APUS Online Library](#)

The Blue Book: [IUPAC Nomenclature of Organic Chemistry](#)

Recommended Media

Neth E.J. *et al.* (2016) [OpenStax Chemistry: Atoms First](#), 1st edition. University of Connecticut/ OpenStax College.

Giesbrecht, H. (2012) [Professor Heath's Chemistry Channel](#), Online Video Channel. YouTube

Week 6: Lesson 6: GASES

Learning Outcomes

CO-9

Required Readings

OpenStax Text:

- Chapter 8

Lessons Material

Assignments

Discussion 6 – *Topic: Elemental Discovery and Application*

Initial Posting Due: Thursday by 11:55pm ET

Replies Due: Sunday by 11:55pm ET

Week 6 Lesson Quiz*

*Due on or before Sunday by 11:55 pm ET. Please note time zone requirement.

Recommended Optional Reading

Karukstis, K. K., & Van Hecke, G. R. (2003). *Chemistry Connections* (2nd ed., Complementary Science). Retrieved from: [APUS Online Library](#)

The Blue Book: [IUPAC Nomenclature of Organic Chemistry](#)

Recommended Media

Neth E.J. *et al.* (2016) [OpenStax Chemistry: Atoms First](#), 1st edition. University of Connecticut/OpenStax College.

Giesbrecht, H. (2012) [Professor Heath's Chemistry Channel](#), Online Video Channel.

YouTube **Week 7: Lesson 7: ELECTRONS AND THE PERIODIC TABLE;
ACID/BASES AND pH**

Learning Outcomes

CO-5; CO-6

Required

Readings

OpenStax Text:

- Chapter 3.1; 3.4-3.5
- Chapter 14.1-14.2

Lessons Material

Assignments

Assignment 3—The Presentation

Discussion 7 – *Topic: Problem Solving (Textbook Problems)*

Initial Posting Post Due: Thursday by 11:55pm ET

Replies Due: Sunday by 11:55pm ET

Week 7 Lesson Quiz*

Assignment #3: The Presentation*

*Due on or before Sunday by 11:55 pm ET. Please note time zone requirement.

Recommended Optional Reading

Karukstis, K. K., & Van Hecke, G. R. (2003). *Chemistry Connections* (2nd ed., Complementary Science). Retrieved from: [APUS Online Library](#)

The Blue Book: [IUPAC Nomenclature of Organic Chemistry](#)

Recommended Media

Neth E.J. *et al.* (2016) [OpenStax Chemistry: Atoms First](#), 1st edition. University of Connecticut/OpenStax College.

Giesbrecht, H. (2012) [Professor Heath's Chemistry Channel](#), Online Video Channel. YouTube

**Week 8: Lesson 8: CHEMICAL BONDING; ORGANIC CHEMISTRY AND
BIOCHEMISTRY; LIQUIDS, SOLIDS, AND INTERMOLECULAR FORCES**

Learning Outcomes

CO-8; CO-10

Required Readings

OpenStax Text:

- Chapter 4.1-4.2; 4.4-4.6
- Chapter 21
- Chapter 10.1-10.5

Lessons Material

Assignments

Discussion 8 – *Topic: Share Presentations and Reflect on the Course Project*

Initial Posting Due: Thursday by 11:55pm ET

Replies Due: Sunday by 11:55pm ET

Week 8 Lesson Quiz*

*All due on or before Sunday by 11:55 pm ET. Please note time zone requirement.

Recommended Optional Reading

Karukstis, K. K., & Van Hecke, G. R. (2003). *Chemistry Connections* (2nd ed., Complementary Science). Retrieved from: [APUS Online Library](#)

The Blue Book: [IUPAC Nomenclature of Organic Chemistry](#)

Recommended Media

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Giesbrecht, H. (2012) [Professor Heath's Chemistry Channel](#), Online Video Channel. YouTube

Evaluation

Discussions

For each Lesson in this course, a Discussion topic will be posted by your instructor (*there will also be a required introductions discussion during the first week of the course.*) These take time to complete, so **please** do not procrastinate, or you will likely regret it!

You must post a thoughtful response to the topic(s), expressing critical thought and analysis, and **you must attribute sources when applicable**. For your Community points, you are required to reply to everyone who responds to your initial post.

You are then required to post a response to the post of at least **2** of your classmates as well. There will be a total of 8 discussion worth 100 points each.

Please do not plagiarize your answer (i.e.) do not copy paste directly from the internet or any other source, or you will not receive credit. There are many tools available for instructors to help catch this, so please don't try it.

****Note**:** Just asking for help, saying something very vague, or congratulatory or acknowledgement postings will not count towards adequate participation credit. They do not contribute to an understanding of the material, raise important issues regarding the material, or forward the conversation about the content.

Quizzes

Each Lesson will contain a Lesson Quiz to help you and your Professor assess your comprehension of the Lesson material. The format of the quizzes is a combination of multiple choice and short answer. The questions will come from the Lessons. They are more difficult than the practice exercises, as they require you to apply and think critically about the lesson material rather than just memorize it or copy problem solving steps. There are 8 quizzes, each worth 100 points each. You will have 2 hours to complete each quiz—after the time limit, the assessment will be submitted automatically, and you will only receive credit for what you have completed up to that time.

Please see the [Student Handbook](#) to reference the University's [grading scale](#).

Grading:

Name	Grade %
Discussions	16.00 %
Introduction Discussion	2.00 % 2.00 % 2.00 %
Week 2 Discussion	2.00 % 2.00 % 2.00 %
Week 3 Discussion	2.00 %
Week 4 Discussion	2.00 %
Week 5 Discussion	
Week 6 Discussion	
Week 7 Discussion	
Week 8 Discussion	
Quizzes	56.00 %
Week 1 Lesson Quiz	8.00 %
Week 2 Lesson Quiz	8.00 %
Week 3 Lesson Quiz	8.00 %
Week 4 Lesson Quiz	8.00 %
Week 5 Lesson Quiz	8.00 %
Week 6 Lesson Quiz	8.00 %
Week 7 Lesson Quiz	8.00 %
Week 8 Lesson Quiz	8.00 %
Course Project: Prep	14.00 %
Assignment #1: Annotated	7.00 %
Bibliography	
Assignment #2: The Outline	7.00 %
Course Project	14.00 %
Assignment #3: The Presentation	14.00 %

Materials

Book Title: Chemistry: Atoms First - e-book available online, link provided inside the classroom in the Content section **Author:** No Author Specified **Publication Info:**

ISBN: N/A

Book Title: Various resources from the APUS Library & the Open Web are used. Please visit [eReserve](#) to locate the course.* **Author:**

Publication Info:

ISBN: ERESERVE NOTE

Required Technology

- See the Technology Requirements section of the undergraduate catalog for the minimum hardware and software requirements.
 - [Microsoft Office 365](#) is available to APUS students for free. To sign up, visit. If you have questions about accessing the software, please contact Classroom support at classroomsupport@apus.edu.
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Course Guidelines

Citation and Reference Style

- Attention Please: Students will follow the APA Format as the sole citation and reference style used in written work submitted as part of coursework to the University. Assignments completed in a narrative essay or composition format must follow the citation style cited in the APA Format.

Tutoring

- [Tutor.com](#) offers online homework help and learning resources by connecting students to certified tutors for one-on-one help. AMU and APU students are eligible for 10 free hours* of tutoring provided by APUS. Tutors are available 24/7 unless otherwise noted. Tutor.com also has a SkillCenter Resource Library offering educational resources, worksheets, videos, websites and career help. Accessing these resources does not count against tutoring hours and is also available 24/7. Please visit the APUS Library and search for 'Tutor' to create an account.

Late Work

The University encourages all work to be completed according to the course schedule. The University Late Work Policy can be found in the Student Handbook [here](#).

Turn It In. Faculty may require assignments be submitted to Turnitin.com.

Turnitin.com will analyze a paper and report instances of potential plagiarism for the student to edit before submitting it for a grade. In some cases professors may require students to use Turnitin.com. This is automatically processed through the Assignments area of the course.

Academic Dishonesty

- Academic Dishonesty incorporates more than plagiarism, which is using the work of others without citation. Academic dishonesty includes any use of content purchased or retrieved from web services such as CourseHero.com. Additionally, allowing your work to be placed on such web services is academic dishonesty, as it is enabling the dishonesty of others. The copy and pasting of content from any web page, without citation as a direct quote, is academic dishonesty. When in doubt, do not copy/paste, and always cite.

Submission Guidelines

- Some assignments may have very specific requirements for formatting (such as font, margins, etc) and submission file type (such as .docx, .pdf, etc) See the assignment instructions for details. In general, standard file types such as those associated with Microsoft Office are preferred, unless otherwise specified.

Disclaimer Statement

- Course content may vary from the outline to meet the needs of this particular group.

Communicating on the Discussion

- Discussions are the heart of the interaction in this course. The more engaged and lively the exchanges, the more interesting and fun the course will be. Only substantive comments will receive credit. Although there is a final posting time after which the instructor will grade comments, it is not sufficient to wait until the last day to contribute your comments/questions on the discussion. The purpose of the discussions is to actively participate in an on-going discussion about the assigned content.
- “Substantive” means comments that contribute something new and hopefully important to the discussion. Thus a message that simply says “I agree” is not substantive. A substantive comment contributes a new idea or perspective, a good follow-up question to a point made, offers a response to a question, provides an example or illustration of a key point, points out an inconsistency in an argument, etc.
- As a class, if we run into conflicting view points, we must respect each individual's own opinion. Hateful and hurtful comments towards other individuals, students, groups, peoples, and/or societies will not be tolerated.

University Policies

[Student Handbook](#)

- [Drop/Withdrawal policy](#)
- [Extension Requests](#)
- [Academic Probation](#)
- [Appeals](#)
- [Disability Accommodations](#)

The mission of American Public University System is to provide high quality higher education with emphasis on educating the nation's military and public service communities by offering respected, relevant, accessible, affordable, and student-focused online programs that prepare students for service and leadership in a diverse, global society.