

# SCIN131

**STUDENT WARNING:** This course syllabus is from a previous semester archive and serves only as a preparatory reference. Please use this syllabus as a reference only until the professor opens the classroom and you have access to the updated course syllabus. Please do NOT purchase any books or start any work based on this syllabus; this syllabus may NOT be the one that your individual instructor uses for a course that has not yet started. If you need to verify course textbooks, please refer to the online course description through your student portal. This syllabus is proprietary material of APUS.

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## Course Summary

**Course :** SCIN131 **Title :** Introduction to Chemistry with Lab

**Length of Course :** 8

**Prerequisites :** N/A **Credit Hours :** 4

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## 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. The chemistry lab is designed for students to learn how to make qualitative and quantitative observations about physical and chemical phenomena, to make calculations, and to test their own reasoning. Students will acquire skills in laboratory techniques and thought processes through interactive virtual laboratories designed to help reinforce and build upon the concepts presented in the lecture portion of the class.

### 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.

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## 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.

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## Outline

### Week 1: Lesson 1: Essential Ideas, Measurement and Problem Solving

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Learning Outcomes

CO-1; CO-2

Required Readings

#### Syllabus

**OpenStax Text:** Chapter 1

#### Lab 1 Thinkwell Videos:

15.1.1 [CIA Demonstration: Laboratory Safety](#)

1.2.1 [CIA Demonstration: Differences in Density Due to Temperature](#)

Assignments

Lesson 1 – Read, Watch Video Examples

Introductions Forum\*

Introductions Forum – Replies\*

Lab 1\*

Introductory Quiz (EC)\*

Lesson Quiz 1\*

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

## Recommended Optional Reading

Karukstis, K. K., & Van Hecke, G. R. (2003). *Chemistry Connections* (2nd ed., Complementary Science).

Retrieved from: <http://ebookcentral.proquest.com.ezproxy1.apus.edu/lib/apus/reader.action?docID=305534>

## Recommended Media

Robinson, W. R. *et al.* (2016) *OpenStax Chemistry: Atoms First*, 1st edition. Rice University.

Giesbrecht, H. (2012) *Professor Heath's Chemistry Channel*, Online Video Channel.

<https://www.youtube.com/user/theprofessorheath>. YouTube

## Week 2: Lesson 2: Atoms and Elements; and Energy Basics

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### Learning Outcomes

CO-3; CO-4

### Required Readings

**OpenStax Text:** Chapters 2, 3.6, & 9.1

### Lab 2 Thinkwell Videos:

15.1.8 [CIA Demonstration: Weighing on an Analytical Balance](#)

15.1.4 [CIA Demonstration: Distillation](#)

### Assignments

Lesson 2 – Read, Watch Video Examples

Forum 2 – Initial Post - **due by Wednesday, 11:55 pm EST**

Forum 2 – Replies\*

Lab 2\*

Lesson Quiz 2\*

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

## Recommended Optional Reading

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## Week 3: Lesson 3: Molecules and Compounds; Solutions

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### Learning Outcomes

CO-5; CO-6

Required Readings

**OpenStax Text:** Chapters 3.7, 4.3, & 6.3-6.4

**Lab 3 Thinkwell Videos:**

3.2.4 [CIA Demonstration: Self-Inflating Hydrogen Balloons](#)

15.1.5 [CIA Demonstration: Pipetting](#)

Assignments

Lesson 3 – Read, Watch Video Examples

Forum 3 – Initial Post - **due by Wednesday, 11:55 pm EST**

Forum 3 – Replies\*

Lab 3\*

Lesson Quiz 3\*

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

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**Week 4: Lesson 4: Chemical Composition; Chemical Reactions**

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Learning Outcomes

CO-7

Required Readings

**OpenStax Text:** Chapters 6.1-6.2, 7.1-7.2, & 11.2

**Lab 4 Thinkwell Videos:**

15.1.3 [CIA Demonstration: Chromatography](#)

8.1.1 [CIA Demonstration: Conductivity Apparatus-Ionic versus Covalent Bonds](#)

Assignments

Lesson 4 – Read, Watch Video Examples

Forum 4 – Initial Post - **due by Wednesday, 11:55 pm EST**

Forum 4 – Replies\*

Lab 4\*

Lesson Quiz 4\*

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

Recommended Optional Reading

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## **Week 5: Lesson 5: Quantities in Chemical Reactions**

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Learning Outcomes

CO-7

Required Readings

**OpenStax Text:** Chapters 7.3-7.5 & 9.3

**Lab 5 Thinkwell Videos:**

15.1.6 [CIA Demonstration: Dilutions](#)

5.1.6 [CIA Demonstration: The Potato Cannon](#)

Assignments

Lesson 5 – Read, Watch Video Examples

Forum 5 – Initial Post - **due by Wednesday, 11:55 pm EST**

Forum 5 – Replies\*

Lab 5\*

Lesson Quiz 5\*

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

Recommended Optional Reading

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Recommended Media

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## Week 6: Lesson 6: Gases

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Learning Outcomes

CO-9

Required Readings

**OpenStax Text:** Chapter 8

**Lab 6 Thinkwell Videos:**

15.1.7 [CIA Demonstration: Titrations](#)

11.2.2 [CIA Demonstration: Natural Acid-Base Indicators](#)

Assignments

Lesson 6 – Read, Watch Video Examples

Forum 6 – Initial Post - **due by Wednesday, 11:55 pm EST**

Forum 6 – Replies\*

Lab 6\*

Lesson Quiz 6\*

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

Recommended Optional Reading

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Retrieved from: <http://ebookcentral.proquest.com.ezproxy1.apus.edu/lib/apus/reader.action?docID=305534>

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## Week 7: Lesson 7: Solutions and pH; Electrons and the Periodic Table

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Learning Outcomes

CO-5; CO-6

Required Readings

**OpenStax Text:** Chapters 3 & 14.1-14.2

**Lab 7 Thinkwell Videos:**

13.3.2 [CIA Demonstration: The Synthesis of Nylon](#)

## 15.1.2 [CIA Demonstration: Recrystallization](#)

### Assignments

Lesson 7 – Read, Watch Video Examples

Forum 7 – Initial Post - **due by Wednesday, 11:55 pm EST**

Forum 7 – Replies\*

Lab 7\*

Lesson Quiz 7\*

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

### Recommended Optional Reading

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## **Week 8: Lesson 8: Chemical Bonding; Organic Chemistry and Biochemistry; Liquids, Solids, and Intermolecular Forces**

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### Learning Outcomes

CO-8; CO-10

### Required Readings

**OpenStax Text:** Chapters 4, 10.1-10.3, & 21

### **Organic and Biochemistry Thinkwell Videos:**

13.1.1 [Alkanes](#)

13.1.2 [Alkenes and Alkynes](#)

13.1.3 [Isomers](#)

13.1.4 [Aromatic Hydrocarbons](#)

13.2.1 [Alcohols, Ethers, and Amines](#)

13.2.2 [Carbonyl-Containing Functional Groups](#)

13.3.1 [Organic Polymers](#)

6.1.1 [Energy, Calories, and Nutrition](#)

14.1.1 [Proteins](#)

14.1.2 [Nucleic Acids](#)

14.1.3 [Carbohydrates](#)

14.1.4 [Lipids](#)

Assignments

Lesson 8 – Read, Watch Video Examples

Forum 8 – Initial Post - **due by Wednesday, 11:55 pm EST**

Forum 8 – Replies\*

Lesson Quiz 8\*

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

Recommended Optional Reading

Karukstis, K. K., & Van Hecke, G. R. (2003). *Chemistry Connections* (2nd ed., Complementary Science).

Retrieved from: <http://ebookcentral.proquest.com.ezproxy1.apus.edu/lib/apus/reader.action?docID=305534>

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## Evaluation

Four kinds of graded assessments/activities will be assigned to enhance your understanding of chemistry principles. Participation in all the activities is essential for developing problem solving skills and concepts presented in the course. Your course grade is based on your performance on the following activities:

### Discussion Forums

For each Lesson in this course, a Discussion Forums topic will be posted by your instructor (*there will also be a required introductions discussion forum 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 forums 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 25-question quiz to help you and your Professor assess your comprehension of the Lesson material. The format of the quizzes is multiple choice. 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 1 hour to complete each quiz—after 1 hour, the assessment will be submitted automatically and you will only receive credit for what you have completed up to that time.

The Introductory Quiz is an Extra Credit quiz that counts for a maximum of one percentage point towards your overall grade.

## Laboratory Exercises

Each Lesson will also be accompanied by a Laboratory Exercise that will not only introduce you to common laboratory techniques and concepts, but will also reinforce the content presented in the text and homework. Labs will thus give you an opportunity to apply what you have learned in the chapters in a real situation, and thus use the course content as hands-on tools for problem solving. There are 7 lab exercises, each worth 100 points.

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

## Grading:

| Name                     | Grade % |
|--------------------------|---------|
| Forums                   | 20.00 % |
| Introduction Forum       | 2.50 %  |
| Week 2 Forum             | 2.50 %  |
| Week 3 Forum             | 2.50 %  |
| Week 4 Forum             | 2.50 %  |
| Week 5 Forum             | 2.50 %  |
| Week 6 Forum             | 2.50 %  |
| Week 7 Forum             | 2.50 %  |
| Week 8 Forum             | 2.50 %  |
| Quizzes                  | 50.00 % |
| Lesson 01 - Week 01 Quiz | 6.25 %  |
| Lesson 02 - Week 02 Quiz | 6.25 %  |
| Lesson 03 - Week 03 Quiz | 6.25 %  |
| Lesson 04 - Week 04 Quiz | 6.25 %  |
| Lesson 05 - Week 05 Quiz | 6.25 %  |
| Lesson 06 - Week 06 Quiz | 6.25 %  |
| Lesson 07 - Week 07 Quiz | 6.25 %  |
| Lesson 08 - Week 08 Quiz | 6.25 %  |
| Lab Exercises            | 30.00 % |
| Lab 1 Assignment         | 4.29 %  |
| Lab 2 Assignment         | 4.29 %  |
| Lab 3 Assignment         | 4.29 %  |
| Lab 4 Assignment         | 4.29 %  |
| Lab 5 Assignment         | 4.29 %  |
| Lab 6 Assignment         | 4.29 %  |
| Lab 7 Assignment         | 4.29 %  |
| Extra Credit             | 1.00 %  |
| Introductory Quiz        | 1.00 %  |

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## Materials

**Book Title:** Introductory Chemistry, 5th ed. - The VitalSource e-book will be provided via the APUS Bookstore

**Author:** Tro, Nivaldo J

**Publication Info:** Pearson

**ISBN:** 9780321933546

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**Book Title:** You must validate your cart to get access to your VitalSource e-book(s). If needed, instructions are available here - <http://apus.libguides.com/bookstore/undergraduate>

**Author:** N/A

**Publication Info:** N/A

**ISBN:** N/A

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**Book Title:** Thinkwell Chemistry Online Materials - Thinkwell will send a user name and password to your primary email address. Instructions provided inside the classroom.

**Author:** Harman, et al

**Publication Info:** Thinkwell

**ISBN:** THINKWELL-CHEM

### Required Technology

- You must validate your cart to get access to your VitalSource e-book(s). If needed, instructions are available here - <http://apus.libguides.com/bookstore/undergraduate>
  - 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 <http://products.office.com/en-us/student>. If you have questions about accessing the software, please contact Classroom support at [classroomsupport@apus.edu](mailto: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](http://www.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 Assignments

- Students are expected to submit classroom assignments by the posted due date and to complete the course according to the published class schedule. The due date for each assignment is listed under each Assignment.
- Generally speaking, late work may result in a deduction up to 15% of the grade for each day late, not to exceed 5 days.
- As a working adult I know your time is limited and often out of your control. Faculty may be more flexible if they know ahead of time of any potential late assignments.

## 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 Forum

- Forums 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 forum. The purpose of the forums 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.

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## 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.

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