

# CHEMISTRY 1003

*General, Organic and Biological Chemistry*

**4 Units (plus 1 unit CHE1003L corequisite laboratory)**

**Fall 2023**

<b>Meeting days:</b> MWF	<b>Instructor title and name:</b> Dr. Matthieu Rouffet, Professor of Chemistry and Department Chair
<b>Meeting times:</b> 8.20 am - 9.25 am	<b>Phone:</b> 619-849-3278
<b>Meeting location:</b> LSCC 204	<b>Email:</b> matthieurouffet@pointloma.edu
<b>Final Exam:</b>  12/15/2022 4.30 pm - 7 pm (Main campus)	<b>Office location:</b> Rohr Science 340  <b>Office hours:</b> Rohr Science 350  Thursday and Friday 2.15 pm until 3.45 pm  By appointment

## PLNU MISSION

### To Teach ~ To Shape ~ To Send

Point Loma Nazarene University exists to provide higher education in a vital Christian community where minds are engaged and challenged, character is modeled and formed, and service is an expression of faith. Being of Wesleyan heritage, we strive to be a learning community where grace is foundational, truth is pursued, and holiness is a way of life.

## FOUNDATIONAL EXPLORATION MISSION

PLNU provides a foundational course of study in the liberal arts informed by the life, death, and resurrection of Jesus Christ. In keeping with the Wesleyan tradition, the curriculum equips students with a broad range of knowledge and skills within and across disciplines to enrich major study, lifelong learning, and vocational service as Christ-like participants in the world's diverse societies and culture.

## COURSE DESCRIPTION

**From the PLNU Catalog:** Examination of those aspects of inorganic and organic chemistry that are pertinent to biology and chemistry. Examines the structures and metabolic reactions of biomolecules. Provides a background for nursing, family and consumer sciences and physical education majors. (Meets a general education requirement; does not count toward any Chemistry Department majors.)

Chemistry 1003 is an introductory chemistry class suitable for anyone who has never taken any chemistry classes before.

## COURSE LEARNING OUTCOMES

At the end of the course you will be able to:

1. Speak fluently in the language of chemistry, describing the composition of matter at multiple levels: from the macroscopic to the atomic level.
2. Predict the properties of atoms, molecules, ions and molecular compounds, on the basis of structure.
3. Write balanced equations to describe common types of chemical transformations, including acid-base reactions.
4. Identify the main organic functional groups, and explain how intermolecular forces influence their properties.
5. Identify major classes of biological molecules, and describe how their chemical structure facilitates their biological function.

## FOUNDATIONAL EXPLORATIONS LEARNING OUTCOMES

The following Foundational Explorations Learning Outcome (FELO) will be assessed in this class ([link to FE courses and corresponding FELOs](#)):

**FELO 1e: Quantitative Reasoning:** Students will be able to solve problems that are quantitative in nature.

## REQUIRED TEXTS AND RECOMMENDED STUDY RESOURCES

Fundamentals of General, Organic and Biological Chemistry, by McMurry, Castellion, Ballantine, Hoeger and Peterson, Pearson, 8<sup>th</sup> Edition, **2017**. (ISBN-13: 9780134665708) *Required*

Modified Mastering Chemistry: Online homework platform that comes bundled with the textbook if you purchase it through the PLNU bookstore; for more information, visit [Course Materials](#).) *Required*

The course ID is *rouffet08895*

Laboratory Experiments to Accompany General, Organic and Biological Chemistry: An Integrated Approach, 3rd Edition by Charles Anderson, David B. Macaulay, **2013**. (ISBN: 978-1-119-91825-7) *Required*.

Calculator: Texas Instruments TI-30XA or equivalent. *Required*

## COURSE CREDIT HOUR INFORMATION

In the interest of providing sufficient time to accomplish the stated Course Learning Outcomes, this class meets the PLNU credit hour policy for a 4 unit class delivered over 15 weeks. It is anticipated that students will spend a minimum of 37.5 participation hours per credit hour on their coursework. For this course, students will spend an estimated 150 total hours meeting the course learning outcomes.

## QUIZZES AND EXAMS

Online quizzes and exams will be conducted using an external tool called Gradescope, which will facilitate rapid evaluation and feedback on your work.

To enroll in the Gradescope course:

1. Navigate to the [Gradescope website](#).
2. Click on **Sign up** (at the top right), then **Student**.
3. Enter the following **Course Entry Code**: XVGNDY
4. Enter your **Name**, **PLNU Email Address**, and **PLNU Student ID**.

## COURSE SCHEDULE AND ASSIGNMENTS

Note: This schedule is subject to change. Any substantial changes (i.e. changes to anything other than *Details* or *Readings*) will be announced on the *Announcements* page in Canvas, and modified here in the *Syllabus*. Up-to-date reading assignments will also be listed in each Week Overview.

Course schedule

WEEK	DAY	DETAILS	READING/NOTES
1	M 8/28	<ul style="list-style-type: none"> <li>• Course Introduction</li> </ul>	<ul style="list-style-type: none"> <li>• Syllabus</li> </ul>
	W 8/30	<ul style="list-style-type: none"> <li>• States of matter</li> <li>• Classification of Matter</li> </ul>	<ul style="list-style-type: none"> <li>• §1.2</li> <li>• §1.3-1.5</li> </ul>
	F 9/1	<ul style="list-style-type: none"> <li>• Scientific measurements</li> <li>• Unit conversions &amp; density</li> </ul>	<ul style="list-style-type: none"> <li>• §1.6-1.9</li> <li>• §1.10, 1.12</li> </ul>
	Week 1 Assignment Due		
2	M 9/4	<i>Labor Day - No class</i>	
	W 9/6	<ul style="list-style-type: none"> <li>• Solving unit conversion problems</li> <li>• Atoms and subatomic particles</li> </ul>	<ul style="list-style-type: none"> <li>• §1.6-1.9, §1.10, 1.12</li> <li>• §2.1-2.2</li> </ul>
	F 9/8	<ul style="list-style-type: none"> <li>• Isotopes &amp; atomic mass</li> <li>• The periodic table</li> </ul>	<ul style="list-style-type: none"> <li>• §2.3</li> <li>• §2.4, 2.5</li> </ul>
	Week 2 Assignment Due		
3	M 9/11	<ul style="list-style-type: none"> <li>• <b>Quiz 1</b></li> <li>• Atomic structure</li> </ul>	<ul style="list-style-type: none"> <li>• Chapters 1-2.3</li> <li>• §2.6-2.9</li> </ul>
	W 9/13	<ul style="list-style-type: none"> <li>• Ionic Compounds</li> <li>• Covalent bonds</li> </ul>	<ul style="list-style-type: none"> <li>• Chapter 3</li> <li>• §4.1-4.4</li> </ul>

	F 9/15	<ul style="list-style-type: none"> <li>Drawing Lewis dot structures</li> </ul>	<ul style="list-style-type: none"> <li>§4.6, 4.7</li> </ul>
		Week 3 Assignment Due	
4	M 9/18	<ul style="list-style-type: none"> <li>VSEPR and molecular shape</li> <li>Electronegativity and polarity</li> </ul>	<ul style="list-style-type: none"> <li>§4.8</li> <li>§4.9, 4.10</li> </ul>
	W 9/20	<ul style="list-style-type: none"> <li>Practice drawing molecules: Lewis structures and VSEPR</li> </ul>	<ul style="list-style-type: none"> <li>Chapter 4</li> </ul>
	F 9/22	Catch up day	TBD
		Week 4 Assignment Due	
5	M 9/25	<b>Exam 1</b>	<ul style="list-style-type: none"> <li>Chapters 1-4</li> </ul>
	W 9/27	<ul style="list-style-type: none"> <li>Balancing chemical equations</li> <li>Types of chemical reactions</li> </ul>	<ul style="list-style-type: none"> <li>§5.1, 5.2</li> <li>§5.3, 5.4</li> </ul>
	F 9/29	<ul style="list-style-type: none"> <li>Oxidation &amp; reduction reactions</li> </ul>	<ul style="list-style-type: none"> <li>§5.5, 5.6</li> </ul>
		Week 5 Assignment Due	
6	M 10/2	<ul style="list-style-type: none"> <li>Moles and molecular weight</li> <li>Solving mass-to-mass conversion problems</li> </ul>	<ul style="list-style-type: none"> <li>§6.1-6.4</li> </ul>
	W 10/4	<ul style="list-style-type: none"> <li>Reaction energy diagrams</li> <li>Equilibria</li> </ul>	<ul style="list-style-type: none"> <li>§7.1, 7.5, 7.6</li> <li>§7.7-7.9</li> </ul>
	F 10/6	<ul style="list-style-type: none"> <li>Solutions &amp; solubility</li> <li>Calculating concentration</li> </ul>	<ul style="list-style-type: none"> <li>§9.1-9.3</li> <li>§9.6</li> </ul>
		Week 6 Assignment Due	
7	M 10/9	<ul style="list-style-type: none"> <li><b>Quiz 2</b></li> <li>Dilutions</li> </ul>	<ul style="list-style-type: none"> <li>Chapters 5-7</li> <li>§9.7</li> </ul>
	W 10/11	<ul style="list-style-type: none"> <li>Calculating concentration practice</li> <li>Electrolytes &amp; Osmolarity</li> </ul>	<ul style="list-style-type: none"> <li>§9.6-9.7</li> <li>§9.8, 9.10</li> </ul>
	F 10/13	<ul style="list-style-type: none"> <li>Acid-base reactions</li> <li>Equilibrium recap &amp; pKa</li> </ul>	<ul style="list-style-type: none"> <li>§10.1-10.2</li> <li>§10.3</li> </ul>
		Week 7 Assignment Due	
8	M 10/16	<ul style="list-style-type: none"> <li>pH</li> <li>Predicting acid strength and calculating pH</li> </ul>	<ul style="list-style-type: none"> <li>§10.4-10.6</li> <li>§10.3-10.6</li> </ul>

	W 10/18	Catch up day	
	<b>R 10/19</b>	Week 8 Assignment Due	
	F 10/20	<i>Fall Break - No class</i>	
9	M 10/23	<b>Exam 2</b>	Chapters 5-7, 9, 10
	W 10/25	<ul style="list-style-type: none"> <li>Intro to Organic Chemistry: drawing organic structures</li> <li>Isomers</li> </ul>	<ul style="list-style-type: none"> <li>§12.1-12.2, 12.4</li> <li>§12.3</li> </ul>
	F 10/27	<ul style="list-style-type: none"> <li>Naming alkanes</li> <li>Intermolecular forces</li> </ul>	<ul style="list-style-type: none"> <li>§12.6</li> <li>§8.2, 12.7</li> </ul>
	Week 9 Assignment Due		
10	M 10/30	<ul style="list-style-type: none"> <li>Organic functional groups</li> <li>Naming alkenes &amp; alkynes</li> </ul>	<ul style="list-style-type: none"> <li>§12.2, <i>flip through 13.8, 14.1, 14.5, 14.7-14.9</i></li> <li>§13.2-13.3</li> </ul>
	W 11/1	<ul style="list-style-type: none"> <li>Isomers, part II</li> <li>Naming alcohols &amp; ethers</li> </ul>	<ul style="list-style-type: none"> <li>§13.3</li> <li>§14.2, 14.7, 14.9</li> </ul>
	F 11/3	<ul style="list-style-type: none"> <li>Intermolecular forces, part II</li> <li>Naming aldehydes &amp; ketones</li> </ul>	<ul style="list-style-type: none"> <li>§14.3, <i>review §8.2</i></li> <li>§15.2</li> </ul>
	Week 10 Assignment Due		
11	M 11/6	<ul style="list-style-type: none"> <li><b>Quiz 3</b></li> <li>Oxidation &amp; reduction of organic molecules</li> </ul>	<ul style="list-style-type: none"> <li>Chapters 12-14</li> <li>§14.4, 15.5, 15.6</li> </ul>
	W 11/8	<ul style="list-style-type: none"> <li>Naming &amp; classifying amines</li> <li>Acid-base reactions of amines</li> </ul>	<ul style="list-style-type: none"> <li>§16.2</li> <li>§16.5, 16.6</li> </ul>
	F 11/10	<ul style="list-style-type: none"> <li>Naming carboxylic acid derivatives</li> <li>Acid-base reactions of carboxylic acids</li> </ul>	<ul style="list-style-type: none"> <li>§17.1</li> <li>§17.2</li> </ul>
	Week 11 Assignment Due		
12	M 11/13	<ul style="list-style-type: none"> <li>Formation and hydrolysis of amides and esters</li> <li>Amino acids &amp; peptides</li> </ul>	<ul style="list-style-type: none"> <li>§17.3, 17.4</li> <li>§18.3-18.5</li> </ul>
	W 11/15	<ul style="list-style-type: none"> <li>Protein structure</li> <li>Protein function, classes of enzymes</li> </ul>	<ul style="list-style-type: none"> <li>§18.6-18.10</li> <li>§18.2, 19.1-19.4</li> </ul>
	F 11/17	Catch up day	TBD

		Week 12 Assignment Due	
13	M 11/20	<b>Exam 3</b>	Chapters 12-19
	W 11/22 - F 11/24	<i>Thanksgiving Break - No class</i>	
14	M 11/27	<ul style="list-style-type: none"> <li>Chirality &amp; Fischer projections</li> <li>Isomers, part III</li> </ul>	<ul style="list-style-type: none"> <li>§14.10, 20.2</li> <li>§14.10</li> </ul>
	W 11/29	<ul style="list-style-type: none"> <li>Classifying sugars</li> <li>Biologically important sugars</li> </ul>	<ul style="list-style-type: none"> <li>§20.1-20.3</li> <li>§20.4, 20.6, 20.7</li> </ul>
	F 12/1	<ul style="list-style-type: none"> <li>Types of lipids</li> <li>Membranes</li> </ul>	<ul style="list-style-type: none"> <li>§23.1-23.3, 23.5, 23.6</li> <li>§23.7</li> </ul>
Week 14 Assignment Due			
15	M 12/4	<ul style="list-style-type: none"> <li><b>Quiz 4</b></li> <li>Reactions of lipids</li> </ul>	<ul style="list-style-type: none"> <li>Chapters 20, 23</li> <li>§23.4</li> </ul>
	W 12/6	<ul style="list-style-type: none"> <li>Nucleic acids</li> <li>The Central Dogma</li> </ul>	<ul style="list-style-type: none"> <li>§26.1-26.3</li> <li>§26.4</li> </ul>
	F 12/8	Catch up Day / Exam review	
Week 15 Assignment Due			
4:30 - 7 pm, Friday, December 15th		<b><i>Comprehensive Final Exam</i></b>	

\*Online discussions have two due dates. Your first original post is due by Monday at midnight. You should also respond to at least three other students' posts by Wednesday at midnight.

## ASSESSMENT AND GRADING

**Participation-** In order to foster a sense of community and to strengthen the interactions between faith and science, you will have to complete the weekly discussions on Christian practices. Hope you will enjoy doing these :)

**Assignments** - Problems requiring greater thought and reflection will be completed outside of class and will be due each week on Friday. Given the large class size and recognizing the need for rapid feedback, assignments will be *electronic* and provided through Modified Mastering Chemistry. If you bought a new book from the book store you already received access to Modified Mastering in your bundle; alternatively, access to Modified Mastering with the eBook can be purchased online. The Modified Mastering format allows you to check your answer in real time. Note that the interface will only accept homework submissions up to the set due time and date.

**Quizzes** - Periodically, on Mondays, there will be in-class quizzes in two parts. First, you will have ~10 minutes to complete the quiz on your own (for an *individual* score). Then, you'll have the opportunity to repeat the quiz in your groups (for a *group* score). Your final score will be a combination of your individual and group scores.

**Exams** - There will be three midterm exams (one hour each, in class) and one final (two hours). Despite focusing on recently-covered material, midterm exams are technically *cumulative* and may assume knowledge from earlier in CHE1003.

The final exam is a *comprehensive* standardized multiple choice exam published by the American Chemical Society, with 3-5 additional free response questions. See the course schedule for exam dates.

Makeup examinations will be given only for excused absences. In such cases, appropriate documentation must be provided within two working days of the end of the excused absence.

The activities described above will contribute to your total course grade according to the following distribution:

Grade distribution

<b>Participation (Christian practice discussion boards)</b>	10%
<b>Online homework (Mastering Chemistry)</b>	15%
<b>Quizzes (individual + group)</b>	25%
<b>Midterm exams</b>	30%
<b>Final exam (ACS standardized exam)</b>	20%

Student grades will be posted in the Canvas grade book throughout the course. Letter grades will be assigned at the end of the course based on your percentage of total possible points, according to the following scale:

Grade scale				
A	B	C	D	F
A 93-100	B+ 87-89	C+ 77-79	D+ 67-69	F Less than 59
A- 90-92	B 83-86	C 73-76	D 63-66	
	B- 80-82	C- 70-72	D- 60-62	

### FINAL EXAMINATION POLICY

Successful completion of this class requires taking the final examination on its scheduled day. The final examination schedule is posted on the [Class Schedules](#) site. If you find yourself scheduled for three (3) or more final examinations on the same day, you are authorized to contact each professor to arrange a different time for one of those exams. However, unless you have three (3) or more exams on the same day, no requests for alternative final examinations will be granted.

### PLNU COPYRIGHT POLICY

Point Loma Nazarene University, as a non-profit educational institution, is entitled by law to use materials protected by the US Copyright Act for classroom education. Any use of those materials outside the class may violate the law.

## PLNU ACADEMIC HONESTY POLICY

Students should demonstrate academic honesty by doing original work and by giving appropriate credit to the ideas of others. Academic dishonesty is the act of presenting information, ideas, and/or concepts as one's own when in reality they are the results of another person's creativity and effort. A faculty member who believes a situation involving academic dishonesty has been detected may assign a failing grade for that assignment or examination, or, depending on the seriousness of the offense, for the course. Faculty should follow and students may appeal using the procedure in the university Catalog. See [Academic Policies](#) for definitions of kinds of academic dishonesty and for further policy information.

## PLNU ACADEMIC ACCOMMODATIONS POLICY

PLNU is committed to providing equal opportunity for participation in all its programs, services, and activities. Students with disabilities may request course-related accommodations by contacting the Educational Access Center (EAC), located in the Bond Academic Center (EAC@pointloma.edu or 619-849-2486). Once a student's eligibility for an accommodation has been determined, the EAC will issue an academic accommodation plan ("AP") to all faculty who teach courses in which the student is enrolled each semester.

PLNU highly recommends that students speak with their professors during the first two weeks of each semester/term about the implementation of their AP in that particular course and/or if they do not wish to utilize some or all of the elements of their AP in that course.

Students who need accommodations for a disability should contact the EAC as early as possible (i.e., ideally before the beginning of the semester) to assure appropriate accommodations can be provided. It is the student's responsibility to make the first contact with the EAC.

## LANGUAGE AND BELONGING

Point Loma Nazarene University faculty are committed to helping create a safe and hospitable learning environment for all students. As Christian scholars we are keenly aware of the power of language and believe in treating others with dignity. As such, it is important that our language be equitable, inclusive, and prejudice free. Inclusive/Bias-free language is the standard outlined by all major academic style guides, including MLA, APA, and Chicago, and it is the expected norm in university-level work. Good writing and speaking do not use unsubstantiated or irrelevant generalizations about personal qualities such as age, disability, economic class, ethnicity, marital status, parentage, political or religious beliefs, race, gender, sex, or sexual orientation. Inclusive language also avoids using stereotypes or terminology that demeans persons or groups based on age, disability, class, ethnicity, gender, race, language, or national origin. Respectful use of language is particularly important when referring to those outside of the religious and lifestyle commitments of those in the PLNU community. By working toward precision and clarity of language, we mark ourselves as serious and respectful scholars, and we model the Christ-like quality of hospitality.

You may report an incident(s) using the [Bias Incident Reporting Form](#).

## SEXUAL MISCONDUCT AND DISCRIMINATION

In support of a safe learning environment, if you (or someone you know) have experienced any form of sexual discrimination or misconduct, including sexual assault, dating or domestic violence, or stalking, know that accommodations and resources are available through the Title IX Office at [pointloma.edu/Title-IX](http://pointloma.edu/Title-IX). Please be aware that under Title IX of the Education Amendments of 1972, faculty and staff are required to disclose information about such misconduct to the Title IX Office.

If you wish to speak to a confidential employee who does not have this reporting responsibility, you can contact Counseling Services at [counselingservices@pointloma.edu](mailto:counselingservices@pointloma.edu) or find a list of campus pastors at [pointloma.edu/title-ix](http://pointloma.edu/title-ix).

## **PLNU ATTENDANCE AND PARTICIPATION POLICY**

Regular and punctual attendance at all class sessions is considered essential to optimum academic achievement. If the student is absent for more than 10 percent of class sessions, the instructor will issue a written warning of de-enrollment. If the absences exceed 20 percent, the student may be de-enrolled without notice until the university withdrawal date or, after that date, receive an "F" grade.

## **SPIRITUAL CARE**

Please be aware PLNU strives to be a place where you grow as whole persons. To this end, we provide resources for our students to encounter God and grow in their Christian faith.

If students have questions, a desire to meet with the chaplain or have prayer requests you can contact the [Office of Spiritual Life & Formation](#)