CHEMISTRY 1003
Fundamentals of General, Organic and Biological Chemistry

Welcome to CHE 1003:

Chemistry 1003 is an introductory chemistry class, and it is suitable for anyone who has never taken any chemistry classes before and is a General Education requirement. Chemistry might be scary for some of you, but we would like to challenge you to work regularly, practice and ask questions in order to succeed. Some teaching methods used in this course (group and team work, peer evaluation, online lectures) might be different than what you are used to, yet we are confident that it will improve your learning experience and you will be better prepared for your future endeavors. We are glad you are here and we look forward to helping you discover or rediscover the importance of chemistry in your environment.

Meeting days: MWF	**Instructor title and name:** Dr. Matthieu Rouffet, Professor of Chemistry and Department Chair
Meeting times: 8.20 am - 9.25 am	**Phone:** 619-849-3278
Meeting location: LSCC 205A	**Email:** matthieurouffet@pointloma.edu
Final Exam: Wednesday 12/14/2022 (Main campus)	**Office location:** Rohr Science 340 **Office hours:** Rohr Science 350 Monday, Tuesday and Friday 2.30 pm until 4.00 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.

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:

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, 8th 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*

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***: 3JR5XY.
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	T 8/30	• Course Introduction	• Syllabus
	W 08/31	• States of matter (Chapter 1) • Classification of Matter	• δ1.2 • δ1.3-1.5
	F 9/2	• Scientific measurements	• δ1.6-1.9

		• Unit conversions & density	• δ1.10, 1.12
		Week 1 Homework Assignment Due (mastering chemistry)	
2	M 9/5	*Labor Day - No class*	
	W 9/7	• Solving unit conversion problems • Atoms and subatomic particles (Chapter 2)	• δ1.6-1.9, δ1.10, 1.12 • δ2.1-2.2
	F 9/8	• Isotopes & atomic mass • The periodic table	• δ2.3 • δ2.4, 2.5
		Week 2 Homework Assignment Due (mastering chemistry)	
3	M 9/12	• Quiz 1 • Atomic structure	• Chapters 1-2.3 • δ2.6-2.9
	W 9/14	• Ionic Compounds (Chapter 3) • Covalent bonds (Chapter 4)	• Chapter 3 • δ4.1-4.4
	F 9/15	• Drawing Lewis dot structures	• δ4.6, 4.7
		Week 3 Homework Assignment Due (mastering chemistry)	
4	M 9/19	• VSEPR and molecular shape • Electronegativity and polarity	• δ4.8 • δ4.9, 4.10
	W 9/21	• Practice drawing molecules: Lewis structures and VSEPR	• Chapter 4
	F 9/23	Catch up day	TBD
		Week 4 Homework Assignment Due (mastering chemistry)	
5	M 9/26	**Exam 1**	• Chapters 1-4
	W 9/28	• Balancing chemical equations (Chapter 5) • Types of chemical reactions	• δ5.1, 5.2 • δ5.3, 5.4
	F 9/30	• Oxidation & reduction reactions	• δ5.5, 5.6
		Week 5 Homework Assignment Due (mastering chemistry)	

6	M 10/3	• Moles and molecular weight (Chapter 6) • Solving mass-to-mass conversion problems	• δ6.1-6.4
	W 10/5	• Reaction energy diagrams (Chapter 7) • Equilibria	• δ7.1, 7.5, 7.6 • δ7.7-7.9
	F 10/7	• Solutions & solubility (Chapter 9) • Calculating concentration	• δ9.1-9.3 • δ9.6
		Week 6 Homework Assignment Due (mastering chemistry)	
7	M 10/10	• Quiz 2 • Dilutions	• Chapters 5-7 • δ9.7
	W 10/12	• Calculating concentration practice • Electrolytes & Osmolarity	• δ9.6-9.7 • δ9.8, 9.10
	F 10/14	• Acid-base reactions (Chapter 10) • Equilibrium recap & pKa	• δ10.1-10.2 • δ10.3
		Week 7 Homework Assignment Due (mastering chemistry)	
8	M 10/17	• pH • Predicting acid strength and calculating pH	• δ10.4-10.6 • δ10.3-10.6
	W 10/19	Catch up day	
	R 10/20	Week 8 Homework Assignment Due (mastering chemistry)	
	F 10/21	*Fall Break - No class*	
9	M 10/24	**Exam 2**	Chapters 5-7, 9, 10
	W 10/26	• Intro to Organic Chemistry (Chapter 12): drawing organic structures • Isomers	• δ12.1-12.2, 12.4 • δ12.3
	F 10/28	• Naming alkanes • Intermolecular forces	• δ12.6 • δ8.2, 12.7

		Week 9 Homework Assignment Due (mastering chemistry)	
10	M 10/31	• Organic functional groups • Naming alkenes & alkynes (Chapter 13)	• δ12.2, *flip through 13.8, 14.1, 14.5, 14.7-14.9* • δ13.2-13.3
	W 11/2	• Isomers, part II • Naming alcohols & ethers (Chapter 14)	• δ13.3 • δ14.2, 14.7, 14.9
	F 11/4	• Intermolecular forces, part II • Naming aldehydes & ketones (Chapter 15)	• δ14.3, *review δ8.2* • δ15.2
		Week 10 Homework Assignment Due (mastering chemistry)	
11	M 11/7	• Quiz 3 • Oxidation & reduction of organic molecules	• Chapters 12-14 • δ14.4, 15.5, 15.6
	W 11/9	• Naming & classifying amines (Chapter 16) • Acid-base reactions of amines	• δ16.2 • δ16.5, 16.6
	F 11/11	• Naming carboxylic acid derivatives (Chapter 17) • Acid-base reactions of carboxylic acids	• δ17.1 • δ17.2
		Week 11 Homework Assignment Due (mastering chemistry)	
12	M 11/14	• Formation and hydrolysis of amides and esters • Amino acids & peptides (Chapter 18)	• δ17.3, 17.4 • δ18.3-18.5
	W 11/16	• Protein structure • Protein function, classes of enzymes (Chapter 19)	• δ18.6-18.10 • δ18.2, 19.1-19.4
	F 11/18	Catch up day	TBD
		Week 12 Homework Assignment Due (mastering chemistry)	
13	M 11/21	**Exam 3**	Chapters 12-19

	W 11/23 - F 11/25	*Thanksgiving Break - No class*	
14	M 11/28	• Chirality & Fischer projections • Isomers, part III	• δ14.10, 20.2 • δ14.10
	W 11/30	• Classifying sugars (Chapter 20) • Biologically important sugars	• δ20.1-20.3 • δ20.4, 20.6, 20.7
	F 12/2	• Types of lipids (Chapter 23) • Membranes	• δ23.1-23.3, 23.5, 23.6 • δ23.7
		Week 14 Homework Assignment Due (mastering chemistry)	
15	M 12/5	• Quiz 4 • Reactions of lipids	• Chapters 20, 23 • δ23.4
	W 12/7	• Nucleic acids (Chapter 26) • The Central Dogma	• δ26.1-26.3 • δ26.4
	F 12/9	Catch up Day / Exam review	
		Week 15 Homework Assignment Due (mastering chemistry)	
4:30 - 7 pm, Wednesday, December 14th		***Comprehensive Final Exam***	

*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

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

Lecture video quizzes & Participation	15%
Online homework (Mastering Chemistry)	15%
Quizzes	15%
Midterm exams	35%
Final exam (ACS standardized exam)	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:

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	

STATE AUTHORIZATION

State authorization is a formal determination by a state that Point Loma Nazarene University is approved to conduct activities regulated by that state. In certain states outside California, Point Loma Nazarene University is not authorized to enroll online (distance education) students. If a student moves to another state after admission to the program and/or enrollment in an online course, continuation within the program and/or course will depend on whether Point Loma Nazarene University is authorized to offer distance education courses in that state. It is the student's responsibility to notify the institution of any change in his or her physical location. Refer to the map on State Authorization to view which states allow online (distance education) outside of California.

INCOMPLETES AND LATE ASSIGNMENTS

All assignments are to be submitted/turned in by the beginning of the class session when they are due—including assignments posted in Canvas. Incompletes will only be assigned in extremely unusual circumstances.

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

While all students are expected to meet the minimum standards for completion of this course as established by the instructor, students with disabilities may require academic adjustments, modifications or auxiliary aids/services. At Point Loma Nazarene University (PLNU), these students are requested to register with the Disability Resource Center (DRC), located in the Bond Academic Center. (DRC@pointloma.edu or 619-849-2486). The DRC's policies and procedures for assisting such students in the development of an appropriate academic adjustment plan (AP) allows PLNU to comply with Section 504 of the Rehabilitation Act and the Americans with Disabilities Act. Section 504 (a) prohibits discrimination against students with special needs and guarantees all qualified students equal access to and benefits of PLNU programs and activities. After the student files the required documentation, the DRC, in conjunction with the student, will develop an AP to meet that student's specific learning needs. The DRC will thereafter email the student's AP to all faculty who teach courses in which the student is enrolled each semester. The AP must be implemented in all such courses.

If students do not wish to avail themselves of some or all of the elements of their AP in a particular course, it is the responsibility of those students to notify their professor in that course. PLNU highly recommends that DRC students speak with their professors during the first two weeks of each semester about the applicability of their AP in that particular course and/or if they do not desire to take advantage of some or all of the elements of their AP in that course.

PLNU ATTENDANCE AND PARTICIPATION POLICY

This course is being taught in the hybrid format, which means that you will engage with your fellow classmates and instructor in real time during weekly *synchronous* class meetings on Zoom and you will engage with other material *asynchronously* online. You will have weekly **Zoom meetings** (focused on group work and problem solving)**, online lecture videos** (with embedded quizzes), periodic **online discussions**, four **quizzes**, three **midterm exams**, and a comprehensive **final exam**.

Regular and punctual attendance at all **synchronous** class sessions is considered essential to optimum academic achievement. If the student is absent for more than 10 percent of class sessions (virtual or face-to-face), 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 drop date or, after that date, receive the appropriate grade for their work and participation. In addition, a portion of the credit hour content will be delivered **asynchronously** and attendance will be determined by submitting the assignments by the posted due dates. See Academic Policies in the Undergraduate Academic Catalog. If absences exceed these limits but are due to university excused health issues, an exception will be granted.

Asynchronous Attendance/Participation Definition

A day of attendance in asynchronous content is determined as contributing a substantive note, assignment, discussion, or submission by the posted due date. Failure to meet these standards will result in an absence for that day. Three days of attendance (one Zoom, and two online) are required each week. (The online days may be any day during the week.)

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 Development

USE OF TECHNOLOGY

In order to be successful in the online environment, you'll need to meet the minimum technology and system requirements; please refer to the *Technology and System Requirements* information. Additionally, students are required to have headphone speakers compatible with their computer available to use. If a student is in need of technological resources please contact student-tech-request@pointloma.edu.

Problems with technology do not relieve you of the responsibility of participating, turning in your assignments, or completing your class work.