

**CHE153: GENERAL CHEMISTRY II SYLLABUS****Spring 2017****INSTRUCTORS:**

Dr. Laurance Beauvais  
 Office: Rohr Science 302C  
 Phone: 619-849-3251  
 Email: [laurancebeauvais@pointloma.edu](mailto:laurancebeauvais@pointloma.edu)  
 Office Hours: M 1:00 – 2:00 pm  
                   WF 12:15 – 2:00 pm  
                   Th 12:00 – 1:00 pm  
                   and by appointment

Dr. Ariane Jansma  
 Office: Rohr Science 305D  
 Phone: 619-849-2623  
 Email: [ajansma@pointloma.edu](mailto:ajansma@pointloma.edu)  
 Office Hours: MWF 12:15 pm – 1:15 pm  
                   T 9:00 am – 12:00 pm  
                   Additional times available  
                   by appointment

**LAB COORDINATOR:**

Dr. David Lingner  
 Office: Rohr Science 302D  
 Phone: 619-849-2470  
 Email: [davidlingner@pointloma.edu](mailto:davidlingner@pointloma.edu)

**LAB: (ST209)**

Section 1 M 2:45 – 6:15 pm  
 Section 2 T 8:00 – 11:30 am  
 Section 3 T 1:30 – 5:00 pm  
 Section 4 T 6:00 – 9:30 pm  
 Section 5 W 2:45 – 6:15 pm  
 Section 6 W 6:30–10:00 pm  
 Section 7 R 8:00 – 11:30 am  
 Section 8 R 1:30 – 5:00 pm  
 Section 9 R 6:00 – 9:30 pm

**LECTURE:**

Section 1 (LA1) MWF 8:30–9:35 am  
 Section 2 (LA1) MWF 11:00 am–12:05 pm  
 Section 3 (LA102) MWF 11:00 am–12:05 pm

**REQUIRED BOOKS AND COURSE MATERIALS\*:**

1. *Textbook*: Tro, Chemistry: A Molecular Approach Plus MasteringChemistry with eText, Pearson, 4<sup>th</sup> Edition, ISBN-13: 9780134103976 (hardcover text), 9780134162454 (looseleaf text), or 9780134162485 (etext)
2. *Laboratory Manual*: Custom Lab Manual, ISBN: 1-319-09190-3
3. *Online Homework*: MasteringChemistry [www.masteringchemistry.com](http://www.masteringchemistry.com) (bundled with text or purchased separately)
4. *Course Website*: canvas.pointloma.edu Course ID: **CHE153SPRING2018**
5. *Scientific Calculator*: Non-graphing, non-programmable calculator required for exams.
6. *Clicker*: I-Clicker 2, ISBN-13: 9781429280471
7. *Laboratory Safety Glasses and Lab Coat*: Sold in lab.

**Optional Materials:**

Tro, Study Guide for Chemistry: A Molecular Approach, Pearson, 4<sup>th</sup> Edition 2017, ISBN-13: 9780134066271. Tro, Selected Solutions Manual for Chemistry: A Molecular Approach, Pearson, 4<sup>th</sup> Edition 2017, ISBN-13: 9780134066288.

\* These materials are used for both semesters of the General Chemistry. No new materials are required for the second semester (CHE153) if you took CHE152 last semester.

**OBJECTIVES:**

This is the second course in a two-semester sequence studying the general principles of Chemistry. The course is designed to teach chemical facts and theories, to provide a conceptual framework of modern chemistry and to develop laboratory skills in the practice of chemical science. Topics covered include solutions, reaction rates, chemical equilibrium (including acid-base equilibria and solubility equilibria), thermodynamics, electrochemistry, and descriptive chemistry of both non-metals and metals (including transition metals). Course includes a three and one-half-hour laboratory session each week.

**LEARNING OUTCOMES:**

An in depth knowledge of chemistry is critical in understanding basic and applied sciences, engineering, and medical professions as well as providing valuable insight for comprehending current events and policies.

Specifically, upon completion of this course, students will be able to:

- Demonstrate a foundational knowledge of the general principles of chemistry including the behavior of solutions, the characteristics of equilibrium (including acid/base equilibrium), the significance of free energy, the properties of electrochemistry, and structures of transition metal and their compounds.
- Solve problems related to describing basic chemical kinetics, characterizing reaction equilibrium, predicting the direction of spontaneous change, calculating electrochemical cell potentials and writing chemical equations for selected chemical reactions.
- Perform basic chemical laboratory techniques related to the topics listed above.

**PREREQUISITES:**

**Chemistry Prerequisite:** Successful completion of General Chemistry I (CHE 152), or the equivalent.

**Mathematical Expectations:** Math skills equivalent to those taught in pre-calculus.

**COREQUISITE:** CHE153L

**EVALUATION:**

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

Hour Examinations (4)	40%
Laboratory Work	25%
Homework	10%
Quizzes and In-Class Activities	10%
Final Examination	15%

Letter grades will be assigned at the end of the course based on your percentage of total possible points, according to the following APPROXIMATE scale:

A	90 – 100%
B	80 – 90%
C	70 – 80%
D	60 – 70%
F	< 60%

(+) and (–) grades will be assigned within each bracket. There is no A+ grade.

**Strategies for success in CHE153**

1. It is crucial that you primarily understand as well as memorize course material. You will be expected to synthesize your knowledge on homework, quizzes, and exams. Focus on recognizing patterns and learn to apply the problem solving strategies that are introduced in the book and lecture.
2. Working problems is the key to success. Work the practice problems in the book as you read the material and start homework sets early so that you can take advantage of office hours and review sessions.
3. Come prepared to class. The time you invest in reading the assigned sections and answering prelecture problems will be repaid in full when it comes time to study for exams.
4. Get help if you don't understand something. The instructors are here for you!

*Advice from recent General Chemistry students*

- Read the sections assigned for each lecture beforehand. Even if you don't understand what you are reading, it will make so much sense when the instructor explains it. Doing this keeps you on top of this class and makes quizzes and tests much easier to study for.
- I advise them to start mastering chemistry assignments as soon as they are assigned. They should take advantage of office hours, too.
- Go to office hours if you don't understand something! Read the textbook - it actually helps so much to go over those examples and do them yourself. When studying for the exams, redo examples from class handouts.
- Dedicate a certain amount of time each day to reviewing in class material and go to his office hours if you are confused about anything at all.
- Pay attention and show up to class! Also read and take notes on the sections that will be covered in lecture. If you're struggling in the class or just not understanding even one thing, go to the tutoring center or office hours and really get it down.
- Stay on top from the beginning. Work on test taking strategy. Study. Exams are everything.
- Pay attention in lab, as long as you do well in lab you should be fine.
- Study hard and prioritize your time. Also, make a good relationship with the professor.
- Apply yourself and work hard. You as an individual determine your success in general chemistry.
- Take the class seriously from the very beginning. Review notes directly after class.

**ADMINISTRATION:**

1. **Attendance:** You are responsible for all the material covered during class. Regular and punctual attendance at all classes is considered essential to optimum academic achievement. If the student is absent from more than 10 percent of class meetings, the faculty member can file a written report which may result in 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. See [Academic Policies](#) in the Undergraduate Academic Catalog. A lab absence will result in a zero on that lab report and lab quiz.
2. The use of portable electronic devices (phones, laptops, iPods, etc.) not related to the course is not permitted in the classroom or lab.
3. **Online Homework:** Homework will be assigned regularly through MasteringChemistry ([www.masteringchemistry.com](http://www.masteringchemistry.com) course ID: **CHE153SPRING2018**). Successful completion of the homework is essential in mastering the course material. Late assignments will not be accepted.

- In-Class Activities:** In-Class activities will be assigned and collected periodically during the semester. In-class activities cannot be made up; however, the lowest in-class activity score will be discarded when final grades are computed. **clickers will be used regularly to record in-class participation.**
- Exams and Quizzes:** Four exams and a comprehensive final will be given during the semester. Make-up exams will be arranged only if the instructor is contacted prior to the scheduled exam time and then only if you present an institutionally valid excuse. Unannounced quizzes will be given periodically throughout the semester. Quizzes cannot be made up; however, the lowest quiz score will be discarded when final grades are computed. *Only non-graphing and non-programmable calculators may be used for exams and quizzes.*
- Laboratories:** Laboratory sections will meet on a weekly basis. Attendance is mandatory at all laboratory sessions. If you must miss a lab for a valid reason, you should make prior arrangements with the lab coordinator to ascertain if you can attend another lab section. No other shifts in lab schedules will be permitted. There will be no opportunity to make up missed labs. Furthermore, you are responsible for all the material covered in the lab even if you did not attend. Some experiments will be done individually, while others are best worked in pairs. Your lab instructor will specify when you work in pairs. In either case, individual lab reports will be submitted at the end of each period. A quiz, given at the beginning of each lab period, is designed to test individual understanding of the current and previous experiments.
- Canvas:** Canvas ([canvas.pointloma.edu](http://canvas.pointloma.edu)) is used as a repository for course material such as lecture notes, slides, and miscellaneous items. Announcements will be sent out via Canvas. It is your responsibility to check Canvas regularly and to confirm that your correct email address is in the system. Grades will be posted periodically to Canvas.

#### **OTHER MATTERS:**

**Academic Accommodations Policy:** If you have a diagnosed disability, please contact PLNU's Disability Resource Center (DRC) within the first two weeks of class to demonstrate need and to register for accommodation by phone at 619-849-2486 or by e-mail at [DRC@pointloma.edu](mailto:DRC@pointloma.edu). See [Disability Resource Center](#) for additional information.

**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.

**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. No requests for early examinations or alternative days will be approved.

**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 Mission:** 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 becomes an expression of faith. Being of Wesleyan heritage, we aspire to be a learning community where grace is foundational, truth is pursued, and holiness is a way of life.

**GENERAL CHEMISTRY II (CHE 153)  
SPRING 2017 CLASS SCHEDULE**

<u>DATE</u>	<u>TOPIC</u>	<u>READING ASSIGNMENT</u>
Jan 9 (T)	Properties of Solutions	Chapter 13.1 – 13.2, 13.5
Jan 10 (W)	Factors Affecting Solubility	Chapter 13.3 – 13.4
Jan 12 (F)	Colligative Properties	Chapter 13.6 – 13.7
<i>Jan 15 (M)</i>	<i>Martin Luther King Holiday</i>	
Jan 17 (W)	Colligative Properties	Chapter 13.6 – 13.7
Jan 19 (F)	Reaction Rates	Chapter 14.1 – 14.3
Jan 22 (M)	Integrated Rate Law and Effect of Temperature	Chapter 14.4 – 14.5
Jan 24 (W)	Collision Theory and Reaction Mechanisms	Chapter 14.5 – 14.6
Jan 26 (F)	Catalysis	Chapter 14.7
Jan 29 (M)	Principles of Chemical Equilibrium	Chapter 15.1 – 15.5
Jan 31 (W)	Equilibrium Calculations	Chapter 15.6 – 15.7
<b>Feb 2 (F)</b>	<b>EXAM 1 (Chapter 13, 14, 15a)</b>	
Feb 5 (M)	Equilibrium Calculations & Le Chatelier's Principle	Chapter 15.8 – 15.9
Feb 7 (W)	Le Chatelier's Principle	Chapter 15.9
Feb 9 (F)	Nature of Acid and Base	Chapter 16.1 – 16.4
Feb 12 (M)	pH Calculations and Acid/Base Strength	Chapter 16.5 – 16.6
Feb 14 (W)	Bases, Salts, and Polyprotic Acids	Chapter 16.7– 16.9
Feb 16 (F)	Acids Strength and Molecular Structure	Chapter 16.10 – 16.11
Feb 19 (M)	Common Ions and Buffers	Chapter 17.1 – 17.3
Feb 21 (W)	Titration Principles	Chapter 17.4
Feb 23 (F)	pH Curves and Indicators	Chapter 17.4
Feb 26 (M)	Solubility Equilibria	Chapter 17.5 – 17.6

*Feb 28 (W)*                      *Complex Ion Equilibria*                      Chapter 17.7 – 17.8  
**Mar 2 (F)**                      **EXAM 2 (Chapters 15b, 16, and 17)**

<u>DATE</u>	<u>TOPIC</u>	<u>READING ASSIGNMENT</u>
<i>Mar 5 – 9</i>	<i>Spring Mid-Term Break</i>	
Mar 12 (M)	Spontaneity, Entropy, and 2 <sup>nd</sup> Law	Chapter 18.1 – 18.3
Mar 14 (W)	Free Energy – The Concept	Chapter 18.4 – 18.5
Mar 16 (F)	Free Energy and Chemical Reactions	Chapter 18.6 – 18.7
Mar 19 (M)	Free Energy and the Equilibrium Constant	Chapter 18.8 – 18.10
Mar 21 (W)	Free Energy and the Equilibrium Constant	Chapter 18.8 – 18.10
Mar 23 (F)	Half Reactions and Balancing	Chapter 19.1 – 19.2
Mar 26 (M)	Cell Potential and Free Energy	Chapter 19.4 – 19.5
Mar 28 (W)	Cell Potential and Concentration Effects	Chapter 19.6 – 19.7
Mar 29 (F)	<i>EASTER RECESS – NO CLASS</i>	
Apr 2 (M)	<i>EASTER RECESS – NO CLASS</i>	
Apr 4 (W)	Electrolysis and Corrosion	Chapter 19.8 – 19.9
<b>Apr 6 (F)</b>	<b>Exam 3 (Chapter 18 and 19)</b>	
Apr 9 (M)	Coordination Compounds and Isomers	Chapter 25.1 – 25.4
Apr 11 (W)	Metal-Ligand Bonding and “d” Orbitals	Chapter 25.5 – 25.6
Apr 13 (F)	Metal-Ligand Bonding and “d” Orbitals	Chapter 25.5 – 25.6
Apr 16 (M)	Radioactivity and Nuclear Chemistry	Chapter 20
Apr 18 (W)	Radioactivity and Nuclear Chemistry	Chapter 20
Apr 20 (F)	Capstone Material	Handout
Apr 23 (M)	Capstone Material	Handout
Apr 25 (W)	Capstone Material	Handout
<b>Apr 27 (F)</b>	<b>EXAM 4 (Chapters 23, 24, and 25)</b>	

**May 4**  
**(4:30 – 7:00 pm)**

**ACS COMPREHENSIVE FINAL EXAM**  
**(COVERS ALL TOPICS IN CHE 152 & 153)**  
**(See Final Exam Schedule)**

**GENERAL CHEMISTRY II (CHE 153)**  
**Spring 2018**  
**Laboratory Schedule**

<b>SESSION</b>	<b>Week of (M,T,W,R)</b>	<b>EXPERIMENTS</b>
1	January 16*	Colligative Properties: The Molar Mass of a Soluble Substance by Freezing-Point Depression
2	January 22	Chemical Kinetics
3	January 29	Gas Phase Equilibrium
4	February 5	Some Example of Chemical Equilibria: Le Châtelier's Principle
5	February 12	Determination of the Molar Mass and Ionization Constant of a Weak Acid
6	February 19	Weak Acids and Hydrolysis
7	February 26	The Solubility Product Constant of Calcium Iodate, $\text{Ca}(\text{IO}_3)_2$
8	<b>March 5</b>	<b>Spring Mid-Term Break – No Lab</b>
9	March 12	Qualitative Analysis Part I
10	March 19	Equilibrium, Free Energy and Entropy
11/12	<b>March 26 ** and April 2</b>	Electrochemical Cells and Electrolysis
13	April 9	Qualitative Analysis Part II
14	April 16	Transition-Metal Complexes
15	April 23	Ligand Field Spectra of Copper(II) Complexes

\*Monday lab section meets on Friday this week

\*\*Monday and Tuesday sections will meet before Easter recess. Wednesday and Thursday sections meet after Easter recess