



COURSE NUMBER AND TITLE

NR.110.206 Chemistry with Lab

CREDITS

4 credits

PRE- AND COREQUISITES

None

COURSE DESCRIPTION

The course introduces the core concepts of matter and energy, atomic structure, the periodic system, chemical bonding, nomenclature, stoichiometry, weight relationships, gases, solutions, chemical reactions, thermodynamics, equilibrium, acids, bases and buffers. The course includes a virtual laboratory component designed to complement lecture topics. The course content provides the foundation of general chemistry necessary for students who are interested in applying to health profession programs.

OBJECTIVES

The course objectives are organized in line with the program outcomes. At the end of the course, the student will be able to:

1. Interconvert amount of substance between moles, mass and molecular weight.
2. Use conversion factors in calculations involving solids, liquids, gases, solutions, heat and energy.
3. Calculate and express solution concentrations in various ways, such as mass percent, parts per million, mole fraction, molality, and molarity.
4. Write balanced chemical equations and distinguish between different types of chemical reactions.
5. Describe the major components of an atom, write symbols for isotopes and calculate the average masses of elements.
6. Predict direction of change in reactions at equilibrium and measure reaction rates.
7. Predict the types of intermolecular forces within a compound.
8. Describe the geometry and polarity of molecules and predict their physical properties.
9. Describe the properties of acids and bases and measure their concentrations in solutions.

10. Understand and explain the basic structure of hydrocarbons and the types of hydrocarbons.

REQUIRED TEXTBOOKS AND OTHER COURSE MATERIALS

Guinn, D. (2019). *Essentials of General, Organic, and Biochemistry: An integrated approach* (3rd ed.). New York, NY: WH Freeman and Company.

Labster: Students must purchase access to Labster in order to access the lab component of this course. More details on how to purchase can be found in the Syllabus & Course Info area of the classroom

Sapling: Students must purchase access to Macmillan's Sapling platform in order to access homework and quiz content. More details on how to purchase can be found in the Syllabus & Course Info area of the classroom

Access to a reliable computer and internet connection: It is recommended that students using Windows-based computers should have the Windows 7 or newer operating system, and that Mac users have OS 10.6 or later. We also recommend that you use the most updated version of Google Chrome as your web browser for this course. Other operating systems and web browsers may not be fully supported by the Blackboard and Labster software. Please see the Blackboard course site and the Labster website for detailed system requirements.

SUMMARY OF LEARNING ASSESSMENTS/ASSIGNMENTS

LEARNING ASSESSMENT/ ASSIGNMENT	COURSE OBJECTIVES ADDRESSED	WEIGHT TOWARD FINAL COURSE GRADE
Module Graded Quizzes, 10 quizzes in total	1, 2, 3, 4, 5, 6, 7, 8, 9	20%
Module Homework Assignments, 10 assignments in total	1, 2, 3, 4, 5, 6, 7, 8, 9	20%
Completion of Lab Sessions and Lab Assignments & Reports, 10 lab sessions in total	1, 2, 3, 4, 5, 6, 7, 8, 9	30%
Midterm Exam	1, 2, 3, 4, 5, 6, 7, 8, 9	15%
Final Exam	1, 2, 3, 4, 5, 6, 7, 8, 9	15%

LEARNING ASSESSMENTS/ASSIGNMENTS

Homework Assignments

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Weekly homework assignments are provided online via Sapling. There are 10 homework assignments in this course. Three attempts are allowed for each question or each group of questions. You will find the assignments under the “Assessment” section of each module.

Graded Module Quizzes

These quizzes are designed to test your mastery of the material covered in each module and keep you on track in your reading. They are not timed. The quizzes are open book and open notes. One attempt is allowed for each quiz. There are 10 graded quizzes in total in this course. You will find these quizzes under the “Assessment” section of each module.

Lab Sessions

Laboratory sessions will be completed via the Labster platform, which is linked to the Blackboard Classroom. You are required to complete the related lab assignments for each lab. There are ten labs in total. The maximum point possible for each lab session is 100 points. If you miss a lab session, you will receive 0 for the lab component of that module. There are no makeup labs. An average of 60% must be achieved in the lab component of the course in order for you to pass the course. Links to lab activities and related lab assignments are provided under the “Lab” section of each module in Blackboard.

Exams

Comprehensive exams consisting of multiple choice and short answer questions will be given to assess student understanding of course content. They are open book, open notes and timed. Only one attempt is allowed for each exam. There are no makeup exams.

Supplemental Material

Throughout the course, you will find Practice Questions under the “Optional Learning Activities” section in each module. In addition, eTextbook is also available if you prefer to read the textbook online. These activities provide self-assessment of the information presented in the lectures and the textbook and are not graded or counted towards your final course grade.

GRADING SCALE

RANGE	LETTER GRADE	GRADE POINT
97 – 100	A+	4.0
93 – 96	A	4.0
90 – 92	A-	3.7
87 – 89	B+	3.3
83 – 86	B	3.0
80 – 82	B-	2.7
77 – 79	C+	2.3
73 – 76	C	2.0
70 – 72	C-	1.7
67 – 69	D+	1.3
63 – 66	D	1.0
60 – 62	D-	0.7
<60	F	0

HONOR CODE

Students enrolled in the Johns Hopkins University School of Nursing are expected to conduct themselves in a manner that upholds the values of this institution of higher education. Each student is obligated to refrain from violating academic ethics and maintaining high standards of conduct. In addition, the School of Nursing upholds the professional code of ethics established in the Code of Ethics for Nurses (ANA, 2015). Each student is held accountable for adhering to the American Nurses Association Code of Ethics. For the full Johns Hopkins School of Nursing Honor code, please see the current [academic catalog and handbook](#).

ACADEMIC POLICIES

For a full list of academic policies, please see the current academic catalog and handbook.

COURSE POLICIES

All course assignments must be turned in by the specified due date and time. Once the due date and time have passed, 10% of the total points you have earned on the assignment will be deducted per day (per 24 hour period). There are no makeup or extra credit assignments allowed, and assignments submitted more than 10 days late will not receive credit. Please contact the course instructor prior to the due date in the case of extenuating circumstances.

COMMUNICATION POLICY

Students may communicate with the instructor by email, which is provided in the

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Contact Information area. The instructor will respond to students within 48 hours. Assignment feedback will be provided to students within two weeks of submission.

All official communication, notices, & announcements will be distributed through student JHU-SON e-mail accounts via blackboard. The student is accountable for checking this account regularly and for all course communication sent to it.

Students are responsible for reading “Netiquette” which is located under Syllabus & Course Info on the Blackboard site. Netiquette provides simple guidelines for civil on-line discourse & behavior, that participants are to follow and expect of one another.

EXAM INTEGRITY & STUDENT IDENTITY VERIFICATION

This course may require the use of technology and/or software to ensure exam integrity and verify the identity of the student taking the exam. Additional information and directions will be provided in the course website.

DISABILITY SERVICES

If you have a disability and may require accommodation in this course, please contact the *Office of Student Affairs* at (410) 955-7545 or SON-DSS@jhu.edu to discuss your specific needs.

COURSE SCHEDULE

Module	Module Subtopics	Learning Activities & Resources	Learning Assignments/ Assessments
Welcome – Start Here		Familiarize yourself with Blackboard and Labster Labs	Discussion Board: Introduce Yourself Avoiding Plagiarism Module
Module 1: Matter, Energy and Measurement	<ul style="list-style-type: none"> • Matter and Energy • Measurement in Science and Medicine • Significant Figures and Measurement • Using Dimensional Analysis 	Guinn, D. (2019). Essentials of General, Organic, and Biochemistry: An integrated approach (3rd ed.). Chapter 1: Matter, Energy and Measurement Review the lecture materials posted in the module for this week.	Module 1 Homework Module 1 Quiz Module 1 Lab Assignment
Module 2: Atomic Structure and Radioisotopes	<ul style="list-style-type: none"> • Elements and the Structure of the Atom • Navigating the Periodic Table of the Elements • Electron arrangement and Valence Electrons • Radioisotopes: alpha and beta decay • High Energy Electromagnetic Radiation Penetrating power and Biological Effects of Radiation 	Guinn, D. (2019). Essentials of General, Organic, and Biochemistry: An integrated approach (3rd ed.). Chapter 2: Atomic Structure and Radioisotopes Review the lecture materials posted in the module for this week.	Module 2 Homework Module 2 Quiz Module 2 Lab Assignment

Module	Module Subtopics	Learning Activities & Resources	Learning Assignments/ Assessments
Module 3: Ionic and Covalent compounds	<ul style="list-style-type: none"> • Ionic Compounds Containing Monoatomic Ions • Ionic Compounds Containing Polyatomic Ions • Covalent Compounds • Writing Lewis Dot Structures of Covalent Compounds 	<p>Guinn, D. (2019). Essentials of General, Organic, and Biochemistry: An integrated approach (3rd ed.).</p> <p>Chapter 3: Ionic and covalent compounds</p> <p>Review the lecture materials posted in the module for this week.</p>	<p>Module 3 Homework Module 3 Quiz Module 3 Lab Assignment</p>
Module 4: Molecular Geometry and Polarity	<ul style="list-style-type: none"> • Three-Dimensional Shapes of Molecules • Bond Dipoles and Molecular Polarity • Intermolecular Forces of Attraction in a Compound 	<p>Guinn, D. (2019). Essentials of General, Organic, and Biochemistry: An integrated approach (3rd ed.).</p> <p>Chapter 4: Molecular Geometry and Polarity</p> <p>Review the lecture materials posted in the module for this week.</p>	<p>Module 4 Homework Module 4 Quiz Module 4 Lab Assignment</p>
Module 5: Chemical Quantities	<ul style="list-style-type: none"> • Counting and Weighing Matter: The Mole • Writing and Balancing Chemical Equations • Types of Chemical Reactions 	<p>Guinn, D. (2019). Essentials of General, Organic, and Biochemistry: An integrated approach (3rd ed.).</p> <p>Chapter 5: Chemical Quantities</p> <p>Review the lecture materials posted in the module for this</p>	<p>Module 5 Homework Module 5 Quiz Module 5 Lab Assignment</p>

Module	Module Subtopics	Learning Activities & Resources	Learning Assignments/ Assessments
		week.	
Exam 1		Review content in Module 1 through Module 5	
Module 6: Chemical Reactions	<ul style="list-style-type: none"> • Energy and Chemical Reactions • Rates of Chemical Reactions • Chemical Equilibrium 	<p>Guinn, D. (2019). Essentials of General, Organic, and Biochemistry: An integrated approach (3rd ed.).</p> <p>Chapter 6: Chemical Reactions</p> <p>Review the lecture materials posted in the module for this week.</p>	<p>Module 6 Homework</p> <p>Module 6 Quiz</p> <p>Module 6 Lab Assignment</p>
Module 7: Changes of State and Gas Laws	<ul style="list-style-type: none"> • Changes of State • Properties of Gases and the Gas Laws • Gas Mixtures and Partial Pressures 	<p>Guinn, D. (2019). Essentials of General, Organic, and Biochemistry: An integrated approach (3rd ed.).</p> <p>Chapter 7: Changes of State and Gas Laws</p> <p>Review the lecture materials posted in the module for this week.</p>	<p>Module 7 Homework</p> <p>Module 7 Quiz</p> <p>Module 7 Lab Assignment</p>
Module 8: Mixtures, Solution concentrations, Osmosis and Dialysis	<ul style="list-style-type: none"> • Types of Mixtures • Solutions: Dissolving Covalent and Ionic Compounds in a Solvent • Solution Concentration 	<p>Guinn, D. (2019). Essentials of General, Organic, and Biochemistry: An integrated approach (3rd ed.).</p>	<p>Module 8 Homework</p> <p>Module 8 Quiz</p> <p>Module 8 Lab Assignment</p>

Module	Module Subtopics	Learning Activities & Resources	Learning Assignments/ Assessments
	<ul style="list-style-type: none"> • Solution Dosage Calculations in Medicine • Solution Dilution Calculations Osmosis and Dialysis 	<p>Chapter 8: Mixtures, Solution concentrations, Osmosis and Dialysis</p> <p>Review the lecture materials posted in the module for this week.</p>	
Module 9: Acids and Bases	<ul style="list-style-type: none"> • Acids and Bases • pH • Acid-Base Neutralization Reactions • Buffers 	<p>Guinn, D. (2019). Essentials of General, Organic, and Biochemistry: An integrated approach (3rd ed.).</p> <p>Chapter 9: Acids and Bases</p> <p>Review the lecture materials posted in the module for this week.</p>	<p>Module 9 Homework Module 9 Quiz Module 9 Lab Assignment</p>
Module 10: Introduction to Organic Chemistry	<ul style="list-style-type: none"> • Introduction to Organic Chemistry and Hydrocarbons • Alkanes and Cycloalkanes • Writing Condensed and Skeletal Line Structures of Alkanes and Cycloalkanes • Alkenes and Alkynes • Aromatic Hydrocarbons • Naming Substituted Hydrocarbons 	<p>Guinn, D. (2019). Essentials of General, Organic, and Biochemistry: An integrated approach (3rd ed.).</p> <p>Chapter 10: Introduction to Organic Chemistry</p> <p>Review the lecture materials posted in the module for this week.</p>	<p>Module 10 Homework Module 10 Quiz Module 10 Lab Assignment</p>

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Module	Module Subtopics	Learning Activities & Resources	Learning Assignments/ Assessments
Final Exam		Review content in Module 1 through Module 10	