

University of Montana

ScholarWorks at University of Montana

University of Montana Course Syllabi, 2011-2015

Fall 9-1-2015

CHMY 121N.00: Introduction to General Chemistry

Daniel J. Dwyer

University of Montana, Missoula, daniel.dwyer@umontana.edu

Follow this and additional works at: <https://scholarworks.umt.edu/syllabi2011-2015>

Let us know how access to this document benefits you.

Recommended Citation

Dwyer, Daniel J., "CHMY 121N.00: Introduction to General Chemistry" (2015). *University of Montana Course Syllabi, 2011-2015*. 33.

<https://scholarworks.umt.edu/syllabi2011-2015/33>

This Syllabus is brought to you for free and open access by ScholarWorks at University of Montana. It has been accepted for inclusion in University of Montana Course Syllabi, 2011-2015 by an authorized administrator of ScholarWorks at University of Montana. For more information, please contact scholarworks@mso.umt.edu.

CHMY 121N Introduction of General Chemistry AUTUMN 2015 SYLLABUS

4:10 Lecture

Course web site:: University of Montana Moodle Site
(<http://umonline.umt.edu/>)

All lectures, quiz keys and midterm keys will be posted on Moodle.

Instructor

Dr. Daniel Dwyer, daniel.dwyer@umontana.edu, (406) 243-4432
Office: Chemistry 206

Office Hours

Monday 10:00 am to 2:00 pm

Tuesday, Wednesday, Thursday 1:00 to 3:00

Or by appointment

Prerequisite

The ability to use algebra: rearrange equations, work with fractions, and be able to calculate logs and exponents. If your algebra skills are weak, please master them prior to attempting CHMY 121N. You should be *eligible to enroll* in MATH 117 or higher to satisfy the math prerequisites for this course.

Course Description

CHMY 121N is aimed at students who require a working knowledge of chemistry for careers in fields such as forestry, resource management, wildlife biology, botany, zoology, nursing, medical technology, physical therapy, athletic training, exercise science, forensic anthropology and environmental studies. It provides a foundation of chemical principles illustrated through their application to "real world" examples, especially those with environmental, physiological or medical implications. The course systematically develops skills in fundamental chemistry: atomic and molecular theory, nuclear chemistry, chemical bonding, chemical reactions (precipitation, acid/base and redox), states of matter, and aqueous solution chemistry. In addition, you will gain experience with analytical thinking and quantitative problem solving. Organic chemistry - the study of carbon-containing compounds - is integrated into lecture throughout the semester.

Required Materials

- **Text Book: *Chemistry 121 Introduction to General Chemistry, Volume 1 Introduction to General, Organic, and Biochemistry. 10th Edition*** by Frederick A Bettelheim, William H. Brown, Mary K. Campbell and Shawn O. Farrell, 2012. With the purchase of

a new text you also get the *Solutions Manual for Introduction to General, Organic, and Biochemistry* and access to the OWL2 online homework/learning system.

- **Cengage OWL2** online homework and e-book. **Class Name: 4:10 Lecture**

Student Registration URL: <http://login.cengagebrain.com/course/E-24YE2CFDEY2GZ>

- **A scientific calculator.** Your calculator needs to be able to handle logs and exponents.

Lecture

TWRF 4:10 PM – 5:00 PM, Urey Lecture Hall 101. Lectures will be given on Tuesdays, Wednesdays and Thursdays. There will be no regular Friday lectures. The Friday before each midterm exam there will be an optional review/help sessions held during the Friday lecture period. Each regular lecture will be used to introduce new material and to work on problems in groups. This last part is based on the idea that active students learn more efficiently than passive students. A traditional lecture is a passive way of learning. To make it more active, we will use a portion of the lecture time to solve problems in groups during the so-called breakout questions.

Recitations

Recitations are held on Monday. Students will complete a recitation exercise during recitation period. The recitation exercises are open-book worksheets. (Please bring you textbook, class notes and calculator). You are encouraged to work on the exercises in groups of 2-3. Please go to the section in which you are officially registered. You must turn in your exercise to your TA before leaving recitation. There will be 11 recitation periods each worth 10 points. 100 points on the recitation exercises will be considered a perfect score. Any points above 100 will be considered bonus points toward your total points. There will be no make-ups for missed recitations.

Online Homework (OWL2)

There are 14 online homework assignments. One for each week of the semester. The online homework is required and will be graded. The homework assignments become available each Monday morning and they must be completed by midnight the following Monday in order to receive full credit for the assignment. Each of the 14 homework assignments is worth 10 points. 100 points on the homework will be considered a perfect score. Any points above 100 will be considered bonus points toward your total points. If the homework is not completed by the due date

a penalty of 10% will apply to that assignment.

Midterm Exams

Four midterm exams will be given during this course on dates specified on the calendar (see below). Each midterm will cover the material discussed during the prior 8-9 lectures. Exams will be administered during the lecture times. Due to the large size of this course all exams will be multiple choice graded by the University's *Scantron* System. You will need to bring a small form and two number two pencils to all exams. The "small red scantron" forms can be purchased at the bookstore and other locations around campus.

Makeup Exams

If you miss an exam due to legitimate excuses (illness, military duty, death in the family, field trip, etc) you must contact me before the exam to schedule a make-up. No more than one make-up per semester will be allowed.

Final Exam

The final exam is given on the date and time specified by the Registrar.

The final exam is *a comprehensive exam that will cover all of the material addressed in class*. The national standard exam written by the American Chemical Society will be used.

The final is mandatory; you will be assigned a grade of **F** for the course if you do not take the final exam, regardless of your point total prior to the final exam.

Grades

10 Recitations	@ 10 points each =	100 points
10 Owl Homework	@ 10 points each =	100 points
4 Midterm Exams	@ 100 points each =	400 points
1 Final Exam	@ 200 points =	<u>200 points</u>
Total		800 points

A	740 – 800 points	A–	720 – 739 points
B+	696 – 738 points	B	664 – 695 points
B–	640 – 663 points	C+	616 – 639 points
C	584 – 615 points	C–	560 – 583 points
D+	536 – 559 points	D	504 – 535 points
D–	480 – 534 points	F	0 – 479 points

455 or more points required for CR for those using CR/NCR option

A grade of audit (AUD) is recorded for all students who register in courses as auditors, intending to listen to the courses without earning credit or being graded.

Any student who initially enrolls as an auditor or changes his or her grade option to audit (on or before September 21st) may listen to the entire course or any part thereof at their discretion and will be issued a final grade of AUD.

Study Time

A standard formula used in colleges and universities is to allow for two hours study time for each hour of lecture. Given that this is a three-credit course, there are three scheduled lecture hours per week and thus six hours per week outside of class, for a total of nine hours per week devoted to the course. (A standard load of 15 credits therefore results in a 45-hour school week.) This means that an "average" student should spend nine hours per week working on this course. Students who expect higher than average grades should expect to spend a higher than average amount of time studying for the course.

Drops

September 21th by 5:00 PM is the last day to drop the class without W on your transcript. Also, this is the last day to switch to Audit.

November 2nd is the last day to drop with the signatures of your advisor and the instructor with W appearing on your transcript. After November 2nd, drops with the signatures of your advisor, the instructor and the Dean of the College and WP or a WF will appear on your transcript.

Disabilities

Any student in this course with disability, which may prevent the student from fully demonstrating his or her abilities, should contact the instructor personally as soon as possible so necessary accommodations can be discussed to ensure full participation. Students with disabilities are strongly encouraged to contact Disability Services for Students (DSS) in the Lommasson Center room 154, phone (406) 243-4216

Academic Honesty

All students must practice academic honesty. Academic misconduct is subject to an academic penalty by the course instructor and/or a disciplinary sanction by the university. All students need to be familiar with the Student Conduct Code. The Code is available for review online at http://life.umt.edu/vpsa/student_conduct.php

Grading Philosophy

An "A" student is someone who can solve homework-like problems under exam conditions with near-100% accuracy and can demonstrate the understanding of the

major course concepts through the correct solution of application questions on exams, and who can successfully solve novel problems on exams.

A “B” student is someone who can solve homework-like problems under exam conditions with near-100% accuracy and can demonstrate the understanding of the major course concepts through the correct solution of application questions on exams, but struggles with novel problems on exams.

A “C” student is someone who can solve **most** homework-like problems under exam conditions and can demonstrate the understanding of the major course concepts through the correct solution of most application questions on exams, and has a demonstrable understanding of the major concepts of the course.

A “D” student earns a passing grade. Thus a demonstrated understanding of the major concepts of the course is required. This includes the ability to solve most homework-like problems on exams.

A student who cannot demonstrate an understanding of the major concepts of the course through his/her performance on exams will not earn a passing grade.

CHMY 121 Autumn Semester, 2015

Date	Lecture	Owl Homework
Aug 31	No recitation	
Sept 1	Chapter 1.1-1.3 Intro to Chemistry Scientific Method Scientific Notation	
Sept 2	Chapter 1.4-1.6 Significant Figures Metric Units and Prefixes Dosage and Body Weight Temperature	
Sept 3	Chapter 1.7-1.9 Factor Label Method States of Matter Density and Specific Gravity	
Sept 4	No Class	
Sept 7	Labor Day No Class	OWLv2 Assignment 1 Due
Sept 8	Chapter 1 .9	

	Energy Heat and Temperature Specific Heat	
Sept 9	Chapter 2.1-2.3 Classification of Matter Elements and Compounds Dalton's Atomic Theory Conservation of Mass	O
Sept 10	Chapter 2.4.1-2.5 Atomic Structure Mass Number Atomic Number Isotopes Atomic Weight Periodic Table	
Sept 11	Friday No Class	
Sept 14	Recitation 1	OWLv2 Assignment 2 Due
Sept 15	Chapter 2.6-2.7 Electron Configurations Shells, Subshells, Orbitals	
Sept 16	Chapter 2.8 Valence Electrons Lewis Dot Structures Periodic Properties	
Sept 17	Chapter 3.1-3.4 Chemical Bonding The Octet Rule Monatomic Anions and Cations Polyatomic Anions Ionic vs Covalent Bonds Electronegativity	
Sept 18	Friday Class Review for Midterm 1 and help session (Optional Class)	
Sept 21	Recitation 2	OWLv2 Assignment 3 Due
Sept 22	Midterm 1 Chapters 1-2	
Sept 23	Chapter 3.5 Ionic Bonds Ionic Crystals Formula Units Ionic Compound Nomenclature	
Sept 24	Chapter 3.6 Covalent Bonding Polar and nonpolar Bonds Carbon bonds single, double triple bonds	

Sept 25	Friday No Class	
Sept 28	Recitation # 3	OWLv2 Assignment 4 Due
Sept 29	Chapter 3.6-3.3.9 Lewis Structures Exceptions to the Octet Rule Binary Covalent Nomenclature Resonance Structures	
Sept 30	Chapter 3.10-3.11 VSEPR Model Predicting Bond Angles Molecular Polarity	
Oct 1	Chapter 4.1-4.4 Chemical Reactions Balancing Chemical Equations Combustion Reactions Combination/Decomposition /Replacement Reactions	
Oct 2	Friday No Class	
Oct 5	Recitation 4	OWLv2 Assignment 5 Due
Oct 6	Net Ionic Equations Precipitation Reactions Solubility Rules Redox Reactions Voltaic Cells	
Oct 7	Chapter 4.5-4.7 Molecular Weights Formula Weights Avogadro's Number	
Oct 8	Stoichiometry Limiting Reagent Percent Yield	
Oct 9	Friday No Class	
Oct 12	Recitation 5	OWLv2 Assignment 6 Due
Oct 13	Chapter 4.8-4.10 Thermochemistry Heat of Reaction	
Oct 14	Chapter 5.1-5.4 Gas Pressure Boyle's Law Charles's Law Combined Gas law Ideal Gas Law Dalton's Law of Partial Pressure	
Oct 15	Chapter 5.4- 5.7	

	Kinetic Molecular Theory Intermolecular Forces London Dispersion Forces Dipole-dipole interactions Hydrogen Bonding	
Oct 16	Midterm2 Review and Help Session (optional)	
Oct 19	Recitation 6	OWLv2 Assignment 7 Due
Oct 20	Midterm 2	
Oct 21	Chapter 5.8-5.9 Liquids Surface Tension Vapor Pressure Boiling Point	
Oct 22	Chapter 5.10 Solids Phase Changes Heat of fusion and vaporization	
Oct 23	No class Friday	
Oct 26	Recitation 7	OWLv2 Assignment 8 Due
Oct 27	Chapter 6.1-6.4 Definition of a Solution Defining Characteristics of solutions What factors effect solubility	
Oct 28	Chapter 6.5 Concentrations mass/volume % Concentrations mass/mass % molarity dilution ppm and ppb	
Oct 29	Chapter 6.6 -6.7 Solvation of ionic compounds Solid hydrates Electrolytes	
Oct 30	Friday No Class	
Nov 2	Recitation 8	OWLv2 Assignment 9 Due
Nov 3	Chapter 6.8 Colloids Colligative Properties Osmosis (may need more time)	
Nov 4	Chapter 7.1 -7.4 Rates of Chemical Reactions Molecular Collisions and Reaction Rates Activation Energy The Influence of concentration, temperature and catalysts	

Nov 5	Chapter 7.5-7.7 Equilibrium Equilibrium constant Using the Equilibrium Constant Le Chatelier's Principle	
Nov 6	Review for Midterm 3 and Help Session (optional)	
Nov 9	Recitation 8	OWLv2 Assignment 10 Due
Nov 10	Midterm 3	
Nov 11	Veteran's Day No Class	
Nov 12	Chapter 8.1-8.3 Introduction to Acids and Bases Strength of Acids and Bases Conjugate Acid-Base Pairs Acid Nomenclature	
Nov 13	No Class Friday	
Nov 16	Recitation 9	OWLv2 Assignment 11 Due
Nov 17	Chapter 8.4-8.8 Acid –Base Equilibrium K_a and pK_a Reactions of acids K_w , pH, pOH	
Nov 18	Chapter 8.9-8.10 Titrations	
Nov 19	Chapter 8.11-8.12 Buffers pH of a buffer TRIS, HEPES, MOPS Buffers with strange names	
Nov 20	No Class Friday	
Nov 23	Recitation 9	OWLv2 Assignment 12 Due
Nov 24	Chapter 9.1-9.3 Radioactivity Beta emission, alpha emission, positron emission, electron capture, gamma emission Balancing Nuclear Equations	
Nov 25-29	Thanksgiving Break	
Nov 30	Recitation 10	OWLv2 Assignment 13 Due
Dec 1	Chapter 9.4-9.6 Half-life Radioactive Dating Detection and measurement of Nuclear Radiation	
Dec 2	Chapter 9.6- 9.9	

	Dosimetry Nuclear Medicine	
Dec 3	Chapter 9.9 Nuclear Fusion Nuclear Fission	
Dec 4	Friday Midterm 4 Review and Help Session (Optional)	
Dec 7	Recitation 11	OWLv2 Assignment 14 Due
Dec 8	Midterm 4	
Dec 9	Course Review for ACS Final Exam	
Dec 10	Course Assessment	
Dec 11	No Friday Class	
Dec 15	ACS Final Exam 1:10 -3:10 (4:10 Lecture)	