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CHMY 141N.00: College Chemistry I

Daniel J. Dwyer

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

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CHMY 141 College Chemistry I Spring 2015 SYLLABUS

Course web site :: Moodle

This syllabus, 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

MWF 10:10 – 12:00 AM. Two hours after class 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 141. You should be *eligible to enroll* in MATH 115 or higher to satisfy the math prerequisites for this course.

Course Description

An introductory survey of chemistry. We follow the standard curriculum in the United States, as suggested by the American Chemical Society. This is the first semester of a two-semester sequence. The sequence provides an introduction to the principles of physical and inorganic chemistry appropriate for the level of knowledge necessary for students who plan on majoring in the health sciences, engineering, or the sciences. A major theme of the course is to introduce you to the chemist's view of the universe, with an emphasis on making connections between the macroscopic and the particulate levels of matter. Students taking CHMY 141 generally have majors that require two years or more of chemistry. CHMY 221–223 is a two-semester sequence in organic chemistry that is typically taken after CHMY 141–143, and thus concepts from organic chemistry are only touched upon lightly in the course.

The teaching staff has three overarching goals with respect to your intellectual development:

- 1. Development of your scientific reasoning skills.** In other words, we will work to help you with the development of your ability to think, specifically with respect to those thinking patterns commonly used by scientists. Chemists often use skills such as mathematical pattern recognition, the development and manipulation of mental models of particulate-level phenomena, and proportional, probabilistic, combinatorial, and correlational thinking. As mentioned in the prerequisite section, please note that fundamental algebraic skills are assumed to already be in place in this course. Our job is to help you link algebra and general chemistry.
- 2. Development of your content knowledge.** This is knowledge of facts, models, laws, and other information associated with chemistry.

3. **Development of your understanding of the nature of science.** We want you to understand that science is a process of developing causal questions, proposing explanations, planning a test of the proposed explanation and predicting the result, and drawing conclusions about the natural world based on the observed results.

Required Materials

Cracolice, M.S., & Peters, E.I. (2014). *General Chemistry: An Inquiry Approach Part I Autumn 2014–Spring 2015*. Mason, OH: Cengage Learning.

Cracolice, M. S. (2015). *Think Out Loud! Part I Spring 2015 Version*. Mason, OH: Cengage Learning.

A nonprogrammable, single-line display scientific calculator. You may not use a programmable calculator or one that displays more than one line of information for exams and quizzes in this course.

A spiral-bound college-lined (or grid-lined) paper notebook. Consistently doing the homework is the key to success in this course. An organized homework notebook will provide you with a mechanism to get feedback on homework-like quiz and exam questions. Bring your homework notebook with you to PLTL workshop and when you attend office hours.

A pack of 40 or more 3 × 5 index cards. You will use these to summarize each lesson by writing concept definitions, problem-solving approaches, data to be memorized, etc., for each lesson. Use them to study for the comprehensive final exam in both CHMY 141 and 143.

Lecture

MWF 9:10 PM – 10:00 AM, ISB 110. Each lecture begins with a ten-minute quiz based on the homework assigned in the lecture immediately prior. The remainder of the period is used to introduce new material, generally using *Think Out Loud!* and working with your Peer-Led Team Leader.

Laboratory

A list of laboratory sections and times may be found on CyberBear. All labs are in CHEM 401. Details about the laboratory are covered in a separate syllabus. Prof. Adams supervises the laboratory instructors. You will meet your laboratory instructor at the first laboratory meeting.

Peer-Led Team Learning Workshop

A list of workshop sections and their times and locations may be found on CyberBear.

Peer-Led Team Learning is a method of instruction that involves peers: undergraduate students who have done well in the course previously. It is designed to actively engage you in the process of learning chemistry. It also will develop your communication skills and ability to work in a team environment, both of which are viewed as essential by industrial employers.

Evaluation

Evaluation for the purpose of establishing a course grade is based on:

Midterm Examinations	40%	Final Examination	30%
Laboratory	14%	Quizzes	14%
PLTL Workshop	2%		

Midterm Examinations

Four midterm exams are given on the **Thursday evenings** specified in the calendar, **5:10 PM–6:55 PM**. Each midterm exam is comprehensive, covering all material in the course to that date. Exams generally consist of twelve questions, with one question each from older material, laboratory, and workshop, and nine questions from the newer material.

Final Examination

The final examination is given on the date and time specified by the registrar, **Tuesday, May 12th, 10:10 AM–12:10 PM**. The exam is a standardized exam developed by the American Chemical Society. It is a 70-item multiple-choice instrument. Your raw score on this exam is converted to your final exam score based on a conversion curve that I have established based on national norms. 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 exam.

Laboratory

The total number of laboratory points is multiplied by $[140/(\text{total lab points})]$ in the calculation of your final grade. The details of laboratory grading are outlined in a separate document.

Quizzes

Each lesson in *Think Out Loud!* ends with a reading and homework assignment from the textbook. The homework questions should be the focus of your study. At the *beginning* of each lecture, a ten-minute quiz will be administered with questions drawn from the textbook reading, programmed text examples, and/or homework questions. In general, when a lesson focuses on numerically-oriented concepts, the quiz question(s) will be a homework question with the compounds and/or numbers changed. When the lesson is more conceptually oriented, the quiz question(s) will be derived to test your grasp of the concepts from the reading. Each quiz is graded on a five-point scale. To allow for illness, emergencies, and other legitimate reasons to miss class, only the best 28 quizzes are used in the calculation of your final grade, for a total of 140 points.

PLTL Workshop

Each workshop is graded based on preparation, attendance, and participation. You will receive 2 points for coming to workshop prepared and then participating actively, 1 point if you do not come prepared or do not make any significant contribution while attending, and no points if you do not come prepared and do not attend and participate in the entire workshop session. The best 10 workshop grades are used in the calculation of your final grade, for a total of 20 points.

Grading Distribution

The laboratory, homework, and workshop actually count for *much* more than the 30% that it may first appear. An actual percentage calculation is not possible because all course components are integrated, but keep in mind that every exam contains laboratory, homework, and workshop questions.

Midterm Exam Grading Standards

Midterm exams are graded on a 100-point scale by a process I call “modified multiple choice.” The philosophy here is to establish a general pattern for grading that can be consistently and fairly applied to an exam that is scored by a number of graders. The typical grading criteria for an 10-point calculation question are:

- 10 points Solution clearly and correctly shown, correct answer and sig figs
- 5 points Solution clearly shown but with one error
- 0 points Two or more errors in the solution

Additionally, one point is subtracted for any of the following: (a) significant figures error, (b) calculation error, (c) not showing unit cancellation or omitting units.

Not all questions will fit this pattern. Nonetheless, you hopefully can understand the general philosophy from this example. 50% or more of the possible credit is reserved for solutions that clearly show a correct understanding of the answer. 50% of the credit is awarded to answers that have one error in the solution process. No credit is given for answers with no work, a difficult-to-follow solution, or those with two or more errors.

Make-up Exams, Quizzes, Workshops

No make-ups exams are allowed. In a class of this size, there is no possible way to fairly design special make-up exams for individual students. Students who miss exams for legitimate emergencies or illnesses will be allowed to replace one midterm score with the final exam score. If circumstances are such that you have to miss two or more midterms, it is unlikely that you have been able to learn the major concepts of the course. See me about a medical withdrawal. Nine of the 37 quizzes and two of the 12 workshops are not used in the calculation of your course grade to account for special circumstances such as emergencies and illnesses.

Grades

4	Midterm Exams	@ 100 points =	400 points
1	Final Exam	@ 300 points =	300 points
1	Laboratory Score	@ 140 points =	140 points
28	Quizzes	@ 5 points =	140 points
10	Workshop Evaluations	@ 2 points =	<u>20 points</u>
Total			1000 points

A	930 – 1000 points	A–	900 – 929 points
B+	870 – 899 points	B	830 – 869 points
B–	800 – 829 points	C+	770 – 799 points
C	730 – 769 points	C–	700 – 729 points
D+	670 – 699 points	D	630 – 669 points
D–	600 – 629 points	F	0 – 599 points

600 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 February 13th) may listen to the entire course or any part thereof at their discretion and will be issued a final grade of AUD.

Midterm Grade Errors

When midterm exams are returned, please check your exam for grading errors promptly. The answer key is posted the day following the exam on Moodle. Barring emergencies, exams are returned on the Monday lecture following the exam. If you believe a grading error has occurred:

- a) Write-up a request for re-grade clearly indicating the grading error.
- b) Attach the request to the front of your unaltered exam.
- c) Suspected grading errors must be submitted to the instructor in class *no later than one week* after the graded exam is returned.
- d) The instructor will return your re-grade request to the original grader, who will explain why their original assessment was correct or s/he will adjust your grade if an error did occur.
- e) Graders are allowed to adjust your grade up or down or make no adjustment.
- f) Do not write on any material that has been graded and returned to you.
- g) Keep all graded materials until after final course grades are assigned.

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

February 13th 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.

April 6th is the last day to drop with the signatures of your advisor and the instructor with W appearing on your transcript. After **April 8th**, you have made the decision to stay in the course until the end. After this date, you must have documented justification of a circumstance beyond your control to drop the course. This includes accident, illness, family emergency, etc.

Disabilities

If you are a student with a disability who will require reasonable program modifications in this course, please meet with Disability Services for Students in Lommasson 154 for assistance in developing a plan to address program modifications. If you are already working with Disability Services, arrange to meet with me during my office hours to discuss reasonable modifications that may be necessary.

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.

CHMY 141 Academic Calendar 2013-14 Spring Semester, 2014

Date	Lecture	Quizzes	PLTL Workshop
Jan 26	Lesson #1 Algebra	No Quiz	
Jan 28	Lesson #2 Science/ Gas Law	Quiz 1	
Jan 29	Thursday 5:10 PM		PLTL L1, L2
Jan 30	Lesson #3 Sig Figs/ Metric	Quiz 2	
Feb 2	Lesson #4 Classes of Matter	Quiz 3	
Feb 4	Lesson #5 Matter/ Elements	Quiz 4	
Feb 5	Thursday 5:10 PM		PLTL L3, L4, L5
Feb 6	Lesson #6 Atomic Structure	Quiz 5	
Feb 9	Lesson #7 Mass/Isotopes	Quiz 6	
Feb 11	Lesson #8 Nomenclature I	Quiz 7	
Feb 12	Thursday 5:10 PM		PLTL L6, L7, L8
Feb 13	Lesson #9 Nomenclature II	Quiz 8	
Feb 16	No Class Presidents Day		
Feb 18	Review for Midterm #1	Quiz 9	PLTL L9 TBA
Feb 19	Midterm #1		Thursday 5:10 -6:55
Feb 20	Lesson #10 Formula Mass	No Quiz	
Feb 23	Lesson #11 Formula	Quiz 10	
Feb 25	Lesson #12 Chem Equations	Quiz 11	
Feb 26	Thursday 5:10 PM		PLTL L10, L11, L12
Feb 27	Lesson #13 Stoichiometry I	Quiz 12	
Mar 2	Lesson #14 Stoichiometry II	Quiz 13	
Mar 4	Lesson #15 Stoichiometry III	Quiz 14	
Mar 5	Thursday 5:10 PM		PLTL L13, L14, L15
Mar 6	Lesson #16 Gas Law	Quiz 15	
Mar 9	Lesson #17 Molar Volume	Quiz 16	
Mar 11	Review for Midterm #2	Quiz 17	PLTL L16, L17 TBA
Mar 12	Midterm #2	Thursday 5:10 -6:55	
Mar 13	Lesson #20 Chemical Energy	No Quiz	
Mar 16	Lesson #21 Phase Changes	Quiz 18	
Mar 18	Lesson #22 Calorimeters	Quiz 19	
Mar 19	Thursday 5:10 PM		PLTL L20, L21, L22
Mar 20	Lesson #23 Bohr Model	Quiz 20	
Mar 23	Lesson #24 Quantum Model	Quiz 21	
Mar 25	Lesson #25 e ⁻ configurations	Quiz 22	
Mar 26	Thursday 5:10 PM		PLTL L23, L24, L25
Mar 27	Lesson #26 Periodic Trends	Quiz 23	

Mar 30- April 3	Spring Break	No Class	
April 6	Lesson #27 Ionic/ Covalent	No Quiz	
April 8	Review for Midterm #3	Quiz 24	PLTL L26, L27 TBA
April 9	Midterm #3	Thursday 5:10 -6:55	
April 10	Lesson #28 Lewis Diagrams	No Quiz	
April 13	Lesson #29 Bond Order	Quiz 25	
April 15	Lesson #30 VSEPR	Quiz 26	
April 16	Thursday 5:10 PM		PLTL L28, L29, L30
April 17	Lesson #31 Hybridization	Quiz 27	
April 20	Lesson #32 MO Theory	Quiz 28	
April 22	Lesson #33 Liquid State	Quiz 29	
April 23	Thursday 5:10 PM		PLTL L31, L32, L33
April 24	Lesson #34 Phase Diagram	Quiz 30	
April 27	Lesson #36 Solutions	Quiz 31	
April 29	Review for Midterm #4	Quiz 32	PLTL L34, L36 TBA
April 30	Midterm #4	Thursday 5:10 -6:55	
May 1	Lesson #37 Net Ionic Eqns	No Quiz	
May 4	Lesson #38 Redox Rxs	Quiz 33	
May 6	Lesson #39 Solution Stoich	Quiz 34	
May 7			PLTL L37, L38, L39
May 8	Last day of class Final Review	No Quiz	
May 12	Final Exam @ 10:10-12:10 AM in TBA		