Welcome to CH101, a world of chemistry. This is the first course in the sequence of general chemistry courses given at MTU designed for science majors and engineers. You should have had a course in chemistry in high school before attempting CH101. The course for persons with no previous chemistry is CH090.


General Chemistry Office: ChemMet 206A (phone 7-2297)

Drops, adds, and section changes will be handled in the Registrar/Scheduling Office in the Administration Bldg. during the first week of classes.

If you have any questions about General Chemistry, ChemMet 206A is the place to come!!

Chemistry Learning Center (CLC): ChemMet 206/208 (phone 7-2297)
Lois Blau, Coordinator

The CLC, operated by the Department of Chemistry, is a free service available to all students enrolled in General Chemistry. The Center is staffed by upper level undergraduates who have a good background in Chemistry. The purpose of the Learning Center is to provide extra assistance to students outside of lecture. Times are available for both scheduled appointments and walk-in hours. Stop by for more information.

Those students who have been assigned to CH011 or have added CH011 should stop by the Chemistry Learning Center starting on Tuesday (7 September) of the first week of classes to sign up for a weekly appointment with a Coach. All students wishing to have a weekly appointment must be enrolled in CH011. You must attend your first appointment in the Learning Center. Grades in CH011 are based on attendance - you must attend eight (8) of nine (9) weekly appointments in order to receive a passing grade.

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<th>Chemistry Learning Center Walk-in and Appointment Hours</th>
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<td><strong>EVENING HOURS:</strong> Sunday through Wednesday 6:00 pm - 9:00 pm</td>
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<td><strong>DAYTIME HOURS:</strong> Monday through Thursday 10:00 am - 4:00 pm</td>
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Course Handouts

We urge you to file all handouts for this course including examinations, for future reference. For example, you will wish to save this handout since much of the following information will be of use to you during this quarter. Extra copies of assignments are available as long as they last in the Chemistry Learning Center.

Calculations

Please equip yourself with a calculator capable of performing the following operations: add, subtract, multiply, divide, log, $10^x$. We anticipate that you are proficient in the use of this calculator. Please bring the calculator (with a new or recently charged battery) to all lecture sessions, lecture quizzes, and hour examinations.

Class Meetings

This course will meet four times per week for lecture (Monday, Tuesday, Wednesday, and Friday at 10 am or 11 am in Fisher 135).

Absence policy: An EXCUSED absence is a license to make up missed work. The excuse may originate with the office of the Dean of Students or be recognized by your instructor when you explain the reason for your absence. We recognize any reasonable excuse, except over-sleeping or the chance of a visit home.

The lecture instructor may issue an excused absence for lecture quizzes, an hour exam or the final exam.

If you have work to make up, arrangements for doing so must be made within one week (7 days) of your return to classes. Failure to do so will result in an automatic zero for the missed work. This does not mean that the work must be made up in this period, but that arrangements for making it up must be completed.

If you are planning an excused absence (athletic trip, etc.), try to make your arrangements as early as you can before you leave. It will often be possible to simplify the make-up procedure if you do this.

An unexcused absence is an automatic zero for any quiz or exam missed.

Grading

Your course grade will be composited from the following:

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<td>Hour Exam I</td>
<td>100</td>
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<td>Hour Exam II</td>
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<td>Lecture Quizzes (best 5 of 6)</td>
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<td>Final Exam</td>
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<td><strong>Total</strong></td>
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Lecture Quizzes

Lecture quizzes will be given six (6) times during the quarter, starting with the meeting of 15 September. The quizzes will each be from ten to twenty minutes in length and each is worth 20 points. The lowest quiz score will be dropped. These quizzes will cover material as announced in class. Quizzes will be given DURING the lecture meeting time in Fisher 135.

Hour Exams

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<tr>
<th>Wednesday</th>
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<tr>
<td>Wednesday</td>
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Hour exams will be given as group exams at the above stated times. Room assignments will be announced just prior to the exam. The assignments will be posted in the Chemistry Learning Center (Room 206/208 ChemMet) and on the bulletin board in the hall across from the CLC, as well as announced in lecture.

NOTE: Lecture quizzes will NOT be of the multiple choice type. Instead, you will be expected to write answers in the form of statements, chemical equations, problem solutions, etc., as appropriate. A small portion of the hour exams may also require written answers. These exams will consist of predominantly multiple choice-type answers.

Final Exam

The Final Exam has been scheduled for Monday, November 15th from 2:45 to 4:45 pm. The Final Exam will be questions entirely of the multiple choice type.

In our CH101 Great Record Book of Life, everyone currently has a perfect score of 500 points. We prefer to make as few deductions as possible. As we close the Fall of 1993, we will evaluate your overall performance in CH101; we will consider the time rate of change of your grades (i.e., dG/dt) -- improvement will pay!!!

Resurrection Points

The grading in this course will employ an idea due to D. R. Herschbach (a Nobel laureate in Chemistry): you cannot permanently lose any points on the hour exams. Each of the two hour exams will cover specified work; the final will cover those same segments plus the work after Exam 2. The final will consist of three sections corresponding to these units. The number of points assigned to each of the first two sections of your final exam will be increased by the number of points you lost on the corresponding hour exam, thus giving you the opportunity to resurrect those points. This concept will be explained in greater depth at a later time.

Study Hints and Problem Solving

See CHEMISTRY MATTERS pp. 2 - 5. We strongly urge you to form a study group.

If you run into difficulties, visit the Chemistry Learning Center (ChemMet 208). Bring your notes, exams, quizzes, and worked homework with you.
Homework

Text: Chang 4th ed.

Homework problems are assigned; these will not be collected. Problems or concepts that are giving you difficulty should be brought to the Chemistry Learning Center.

"One must learn by doing the thing; though you think you know it, you have no certainty until you try."  Sophocles

ASSIGNMENT FOR WEEK 1:  
7 - 10 September

1. Read Chang, Chapter 1 Tools of Chemistry  
(This chapter is considered a review of high school physical science and math and will therefore be covered briefly. The material will be covered on quizzes and exams.)

Math Review

A. Exponential Notation  
B. Significant Figures  
C. Rounding Off  
D. Making One-Significant Figure Estimates (i.e., checking the calculator)

References: CHEMISTRY MATTERS and Chang

Factor-Label Analysis (Also called Dimensional Analysis)

A. Unit Algebra  
B. Conversion Factors, Simple  
C. Conversion Factors, Complicated  
(i.e., convert m³/kg² to mm³/g²)

References: CHEMISTRY MATTERS and Chang

Density and Percentage

A. Percent and Fraction  
B. Density

Reference: Chang

Temperature Scales

°C, °F, and Kelvin

Reference: Chang
2. Problems: Chang Chapter 1:
15, 16, 17, 19, 37, 39, 43, 60, 64, 69, 72, 73, 75, 76.

**WARNING:** WE WILL REQUIRE A FACTOR-LABEL (DIMENSIONAL ANALYSIS) SETUP, WITH UNITS, FOR CREDIT TO BE ASSIGNED ON EXAMS. PRACTICE ALL HOMEWORK PROBLEMS USING A COMPLETE FACTOR-LABEL SETUP.

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**ASSIGNMENT FOR WEEK 2**

13 - 17 September

1. Read Chang, Chapter 2 Atoms, Molecules, and Ions

2. Problems: Chang Chapter 2:
15, 17, 19, 30, 35-38, 39a, 44, 53, 59, 64, 66, 71, 78, 81, 83, 85, 110, 111, 112, 115, 118, 120, 123

Problems 110, 111 and 112 deal with inorganic nomenclature [Chang pp. 65-76]; they are assigned for practice. This material will not be covered in lecture but will be covered on exams.

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**ASSIGNMENT FOR WEEKS 3 and 4, 20 - 24 September and 27 September to 1 October**


2. Read Chang, Chapter 3 Chemical Reactions I: Chemical Equations and Reactions in Aqueous Solutions

3. Problems: Chang Chapter 3: 6, 7, (alternate equations) and 8, 13-15, 19a-i, 21, 22, 30, 31, 40, 44, 53, 54, 60a-c, 60e-i, 65, 73, 74 [Redox Balancing covered with topics in Chapter 4, 55, 56]

**WARNING:** The first printing of Chang has an error. Example 3.7 (p. 119) should read: Write a balanced ionic equation to represent the oxidation of iodide ion (I⁻) by permanganate ion (MnO₄⁻) in a basic solution to yield iodine (I₂) and manganese(IV) oxide (MnO₂).

Step 1: The skeletal equation is: \( \text{MnO}_4^- + \text{I}^- \rightarrow \text{MnO}_2 + \text{I}_2 \)

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**Hour Exam I**

6:00 PM

Wednesday, 6 October

Room Assignments will be posted outside the Chemistry Learning Center
ASSIGNMENT FOR WEEK 5 4 - 8 October

1. Read Chang, Chapter 4 Chemical Reactions II: Mass Relationships

2. Problems: Chang Chapter 4: 6, 8 (Note: 8b NaHCO₃ is the correct formula), 9, 11, 12, 16, 20, 22, 24, 29, 33, 35, 36, 43, 48, 49, 52, 55, 58, 63, 64, 67, 71, 76, 77, 79, 82, 94 and 102

Chang Chapter 3: 55, 56, 62

STOICHIOMETRY PROBLEMS WILL BE ASSIGNED FOR EXAMS THROUGHOUT THE REMAINDER OF THIS TERM.

ASSIGNMENT FOR WEEK 6 11 - 15 October

1. Read Chang, Chapter 6 Section 6.1 through 6.6.

2. Problems: Chang Chapter 6: 16, 23, 28, 38, 40, 41, 47, 52, 78, 81, 91
(Note: ΔH_f° of octane and ethanol are negative, not positive)

ASSIGNMENT FOR WEEK 7 18 - 22 October

1. Read Chang, Chapter 7 Quantum Theory and the Electronic Structure of Atoms

2. Problems: Chang Chapter 7: 10, 17, 30, 34, 37, 59, 60, 62-65, 68, 73, 85-88, 90, 93, 96, 106, 108

Hour Exam II
6:00 PM
Wednesday, 27 October
Room Assignments will be posted outside the Chemistry Learning Center

ASSIGNMENT FOR WEEK 8 25 - 29 October

1. Complete Chapter 7

2. Read Chang, Chapter 8 Periodic Relationships Among the Elements

3. Problems: Chang Chapter 8:
20, 21, 26, 27, 29, 34, 37, 40, 41, 53, 54, 55, 71, 73, 74, 77, 81, 82, 93, 94, 99

-6-
ASSIGNMENT FOR WEEKS 9 and 10

1. Complete Chapter 8, if necessary.

2. Read Chang, Chapter 9 Chemical Bonding I: Basic Concepts
   Sections 9.1, 9.2, 9.4, 9.5, 9.6, 9.8, 9.9, 9.10 p. 377-378 only

3. Problems: Chang Chapter 9: 18, 20, 39, 41a, 41b, 41c, 80
   Draw a Lewis Dot structure for each species written below. The central atom is underlined.
   \( \text{ICl}_2^-, \text{H}_2\text{SO}_4, \text{ClO}_3^-, \text{PO}_4^{3-}, \text{H}_2\text{CO} \) (both H on carbon), \( \text{SO}_2, \text{CO}_3^{2-}, \text{CaCl}_2, \text{XeF}_4, \text{BF}_3 \)

4. Read Chang, Chapter 10 Chemical Bonding II: Molecular Geometry and Molecular Orbitals
   Sections 10.1-10.3, 10.5 (Skip Figures 10.14 and 10.18)

5. Problems: Chang Chapter 10: 22, 23, 39, 40, 46
   Use VSEPR to predict the geometry of the following species (include bond angles). The central atom is underlined.
   \( \text{PCl}_3, \text{CHCl}_3, \text{SiH}_4, \text{NH}_4^+, \text{CO}_3^{2-}, \text{ICl}_2^-, \text{XeF}_4, \text{BF}_3, \text{H}_2\text{O}, \text{SO}_2, \text{N}_2, \text{PCl}_5, \text{SF}_6 \).
   Note that Lewis structures of some of these were assigned above (in Number 3).

Check Final Score

Please be sure to check your scores as they are posted outside of the Chemistry Learning Center (ChemMet 206/208) in the hall bulletin board. If you notice any discrepancies, be sure to check with Mrs. Blau (ChemMet 206A). We want to be certain that you receive the proper grade at the end of the quarter.

FINAL EXAM

2:45 to 4:45 PM

Monday, November 15th

Room Assignments for the final exam will be posted on the University Master Final Exam Schedule.
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