



SYLLABUS for CHEMISTRY 116  
General and Inorganic Chemistry  
SPRING 2008

**INSTRUCTOR**  
**Dr. Thomas M. Zamis**

**University of Wisconsin-Stevens Point**  
College of Letters & Science  
Department of Chemistry

**I. Course Description**

**A. General and Inorganic Chemistry**

The second of a two semester course sequence for chemistry majors and minors. Laws and principles of chemistry including chemical equilibria, electrochemistry, thermodynamics, and chemical kinetics covered this semester.

3 hrs lec, 1 hr disc, 3 hrs lab per wk.

Prereq: Chem 115, GDR:NS

**B. Information for Spring Semester**

<u>TIMES:</u>	Lecture 1	T,R,F	9:00 - 9:50	Room Science A121
	Discussion 1	W	8:00 - 8:50	Science A111
	Discussion 2	W	9:00 - 9:50	Science A111
	Discussion 3	W	10:00 - 10:50	Science A111
	Lab 1	R	11:00 - 13:50	Science C128
	Lab 2	T	14:00 - 16:50	Science C128
	Lab 3	W	14:00 - 16:50	Science C128

INSTRUCTOR: Dr. Tom Zamis

Office Science B135 Phone 346-3258

Office Hours: T 10-11, 1-2 W 11-12 F 10-12 (other times by appointment)

## REQUIRED MATERIALS

TEXTBOOK: Moore, Stanitski, Jurs *Chemistry: the Molecular Science 2nd ed.*; Thomson Learning Inc.: Belmont, CA, 2005. (text rental)

LABORATORY Manual:

"*Lab Manual for Chem 116*" Bishop, Bishop, Whitten ; Thomson Learning: Belmont, CA, 2008.

(At the bookstore, purchase before your first laboratory class.)

LABORATORY Notebook: Bound, 80 Sheet, "8 x 10", quad ruled. (marble cover)

SCIENTIFIC CALCULATOR: You should have on hand for lectures, discussions and laboratories a calculator capable of performing the basic mathematical functions (+, -, x, ÷), and those involving natural logarithms and exponentials ( $\ln x$ ,  $e^x$ ), and base 10 logarithms and exponentials ( $\log x$ ,  $10^x$ ). You should be familiar with entering numbers in scientific notation on your calculator and performing calculations with numbers in this form.

## **II. Course Objectives**

It is your responsibility to learn the material given as **objectives** for each examination. Your learning will be evaluated with the use of exams and quizzes that cover **only** the material listed in the objectives. I will help you to foster an interest in chemistry and motivate you to work hard to learn the fundamentals of this interesting and important subject. I will do this by presenting interactive lectures, discussions and labs that include demonstrations, graphics, videos, web resources, current articles, real-world applications, handouts and study sheets - and your participation!

My general objectives, or goals, for you are to:

Learn the chemistry fundamentals that you need for success in later science classes

Understand the importance of chemical measurements (significant figures; units; calculations) in recording and reporting experimental data

Understand the important models and concepts used by chemists to describe atoms, molecules and chemical reactions

Learn the general concepts of physical, inorganic, organic, and analytical chemistry and biochemistry

Develop the ability to apply the fundamental concepts to problems in biochemistry, engineering, geochemistry, materials science, environmental science, medicine, forensic science and other related fields

Develop an appreciation for the many ways that chemistry affects your daily lives

These main goals will be achieved through our study of chemistry with **detailed objectives for each chapter**. The objectives will organize and integrate the material covered this semester. If you first learn the terminology of chemistry, you can then learn the fundamental models and concepts of molecules, and be able to apply the ideas to practical problems.

### III. Grading Policy

Your final grade for Chemistry 116 will be based on the total number of points earned out of 1000. The distribution of points is as follows:

Hour Exams (3 @ 150 pts)	450 points	(Fridays 2/15;3/28;4/25)
Final Exam	200 points	
Quizzes (3 @ 50 pts)	150 points	(Wednesdays 2/6;3/5;4/16)
Lab Work	170 points	
Department	30 points	

The tentative levels of achievement required for letter grades are:  
"A" 900 points      "B" 800 points      "C" 700 points      "D" 600 points  
These levels will not be raised.

### IV. Course Outline (Schedule of Topics)

<u>Week</u>	<u>Dates</u>	<u>Exams &amp; Quizzes</u>	<u>Topics</u>
1	1/22 - 1/25		<b>Liquids, Solids, Materials-</b> Intermolecular forces; Liquids; Phase equilibrium, Enthalpy
2	1/28 - 2/1		Solid structures; <b>Organic Chemicals-</b> Nomenclature, Reactions
3	2/4 - 2/8	Q1	<b>Organic Chemicals-</b> Fuels, Polymers, Biochemicals; <b>Solutes &amp; Solutions-</b> Solubility
4	2/11 - 2/15	E1	<b>Solutes &amp; Solutions-</b> Concentration units; Colligative properties
5	2/18 - 2/22		<b>Chemical Kinetics-</b> Reaction rate laws; Arrhenius equation; Catalysis; Mechanisms
6	2/25 - 2/29		<b>Chemical Equilibrium-</b> Equilibrium constants; Equilibrium concentrations; Le Chatelier
7	3/3 - 3/7	Q2	<b>Thermodynamics-</b> First Law; Enthalpy
8	3/10 - 3/14		<b>Thermodynamics-</b> Entropy; Gibbs Free Energy
	3/15 - 3/23		S p r i n g   B r e a k ☺
9	3/24 - 3/28	E2	<b>Acids &amp; Bases-</b> pH; Proton transfer and conjugates; Salts
10	3/31 - 4/4		<b>Acids &amp; Bases-</b> $K_a$ , $K_b$ and pH calculations

11	4/7 - 4/11		<b>Aqueous Equilibria-</b> Acid-base titrations; Buffers
12	4/14 - 4/18	Q3	<b>Aqueous Equilibria-</b> Precipitation; Complex ions
13	4/21 - 4/25	E3	<b>Electrochemistry-</b> Oxidation-reduction reactions; Balancing Equations
14	4/28 - 5/2		<b>Electrochemistry-</b> Galvanic cells; Nernst Equation
15	5/5 - 5/9		<b>Electrochemistry-</b> Batteries; Corrosion; Electrolytic cells

**Final Exam Wednesday May 14, 12:30 - 14:30**

## V. Principal Assignments

### A. Supplementary Material

Summary sheets will be provided one week prior to exams to assist you in studying for the exams. Additional practice problems will also be provided periodically in discussion. Materials from lecture, practice problems, answers, etc. will always be available on the course web page. The link to the page is found on my web page:  
[www.uwsp.edu/chemistry/tzamis](http://www.uwsp.edu/chemistry/tzamis)

B. Reading - Moore, Stanitski, Jurs *Chemistry: the Molecular Science 2nd ed.*; Thomson Learning Inc.: Belmont, CA, 2005.

Chapter Title	CHAPTER SECTIONS
11. Liquids, Solids and Materials	11.1 - 11.8
12. Fuels, Organic Chemicals and Polymers	12.5 - 12.9
15. The Chemistry of Solutes and Solutions	15.1 - 15.8
13. Chemical Kinetics: Rates of Reactions	13.1 - 13.8
14. Chemical Equilibrium	14.1 - 14.7
18. Thermodynamics: Directionality of Chemical Reactions	6.1 - 6.4, 6.9 - 6.10 18.1 - 18.7
16. Acids and Bases	16.1 - 16.5, 16.7 - 16.10
17. Additional Aqueous Equilibria	17.1 - 17.6
19. Electrochemistry and Its Applications	19.1 - 19.13

## VI. Conduct

### A. Attendance

Attendance is not required for lecture, however the majority of the material that you will be responsible for is presented in lecture. Be sure to obtain notes from your peers on those rare occasions that you miss lecture. Department points are in part determined by attendance.

Attendance is expected for discussion. These small group sessions are your opportunity to question and interact with your instructor. Quizzes will be given during discussions, and any unexcused absences can not be made up. An *excused absence* requires that **verifiable** arrangements be made with your instructor **in advance** for things like off-campus trips or personal appointments; **or following** an emergency or illness, a written note from you explaining the circumstances is presented upon returning. Attendance is required for examinations and laboratory. Unexcused absences cannot be made up.

### B. Student Conduct

The following are from the University publication "Community Rights and Responsibilities". The full document is available from the UWSP Web Page under UWSP Students, Links for Students.

Nearly 10,000 students, staff, faculty and visitors descend on our one square mile campus each day of the academic year. It is apparent that as a learning community, we need standards or codes of conduct which clarify the behavioral expectations for our academic and nonacademic environments. The policies and procedures spelled out in our Community Rights and Responsibilities publication provide for a sense of order for all while respecting the dignity and rights of individuals. Through these policies, civility within our learning community is affirmed, diversity is pursued, the importance of each person is honored and well defined procedures guide behavior for the common good.

The University of Wisconsin system believes that academic honesty and integrity are fundamental to the mission of higher education and of the University of Wisconsin system. The university has a responsibility to promote academic honesty and integrity and to develop procedures to deal effectively with instances of academic dishonesty. Students are responsible for the honest completion and representation of their work, for the appropriate citation of sources, and for respect of others' academic endeavors. Students who violate these standards must be confronted and must accept the consequences of their actions.

#### UWSP 14.03 ACADEMIC MISCONDUCT SUBJECT TO DISCIPLINARY ACTION.

(1) Academic misconduct is an act in which a student:

- (a) Seeks to claim credit for the work or efforts of another without authorization or citation;
- (b) Uses unauthorized materials or fabricated data in any academic exercise;
- (c) Forges or falsifies academic documents or records;
- (d) Intentionally impedes or damages the academic work of others;
- (e) Engages in conduct aimed at making false representation of a student's academic performance; or
- (f) Assists other students in any of these acts.
- (g) Violates electronic communication policies or standards as agreed upon when logging on initially (See [uwsp.edu/it/policy](http://uwsp.edu/it/policy)).

(2) Examples of academic misconduct include, but are not limited to: cheating on an examination; collaborating with others in work to be presented, contrary to the stated rules of the course; submitting a paper or assignment as one's own work when a part or all of the paper or assignment is the work of another; submitting a paper or assignment that contains ideas or research of others without appropriately identifying the sources of those ideas; stealing examinations or course materials; submitting, if contrary to the rules of a course, work previously presented in another course; tampering with the laboratory experiment or computer program of another student; knowingly and intentionally assisting another student in any of the above, including assistance in an arrangement whereby any work, classroom performance, examination or other activity is submitted or performed by a person other than the student under whose name the work is submitted or performed.

**Chemistry 116 Laboratory Schedule  
for Spring Semester 2008**

**LABORATORY Manual:**

*"Lab Manual for Chem 116"* Bishop, Bishop, Whitten ; Thomson Learning: Belmont, CA, 2008.

<b>Week</b>	<b>Experiment</b>
<b>1</b>	Check-in
<b>2</b>	<b>Exp. #7 - Thin Layer Chromatography</b>
<b>3</b>	<b>Handout - Gas Chromatographic Analysis of Fats</b>
<b>4</b>	<b>Exp. #40 - Synthesis of Esters</b>
<b>5</b>	<b>Exp. #41 - Polymers</b>
<b>6</b>	<b>Exp. #21 - Molecular Weight by Freezing Point Depression</b>
<b>7</b>	<b>Handout - Kinetics of a Bleaching Reaction</b>
<b>8</b>	<b>Exp. #32 - Spectrophotometric Determination of <math>K_{eq}</math></b>
	Spring Break!!!! (No Lab)
<b>9</b>	<b>Exp. #31 - Chemical Equilibrium - Reversibility</b>
<b>10</b>	<b>Handout - Thermodynamics of Potassium Nitrate Solubility</b>
<b>11</b>	<b>Exp. #23 - Acid Base Titration Analysis</b>
<b>12</b>	<b>Exp. #23 - Acid Base Titration Analysis</b>
<b>13</b>	<b>Exp. #34 - Solubility Products</b>
<b>14</b>	<b>Exp. #25 - Voltaic and Electrolytic Cells</b>
<b>15</b>	Check out
<b>16</b>	Exam Week-No Lab