

**Ivy Tech Community College  
Lafayette/Regional Syllabus**

**Course Information**

**Semester 053**

**Course and Section Number:** CHM 106 - 01 D

**Credits:** 5.0

**Course Title:** GENERAL CHEMISTRY II

**Contact Hours:** 3 Hours Lecture  
4 Hours Lab

**Prerequisites/Corequisites:** CHM 105 General Chemistry I and MAT 132  
Algebra/Trigonometry or MAT 133 College Algebra or MAT  
136 College Algebra

**Division:** General Education & Support Services      **Program:** Chemistry

**Days:** TR 8:00 – 11:20 AM      **Time:** 8:00 – 9:15 AM      IVY 1278

**Building:**      **Room:** 9:30 – 11:20 AM      IVY 2235

**Faculty Information**

**Name:** Michael Shevlin

**Office Location:** N/A

**E-mail address:** mshevlin@ivytech.edu

**Contact Phone Number:** 765 - 429 - 8313

**FAX number:** 765 - 269 - 5148

**Office Hours:** By appointment

**Division Office:** General Education Division, Ivy Hall 1166, 765 - 269 - 5710

**Catalog Description:**

The second in a series of two introductory courses designed to cover general chemistry including kinetics, equilibria, acid/base chemistry, thermodynamics, electrochemistry, nuclear chemistry, organic chemistry, and descriptive inorganic chemistry.

**General Course Objectives:**

Upon successful completion of this course the student will be expected to:

1. Describe chemical kinetics, calculate a rate law for a given reaction and propose reaction mechanisms.
2. Explain chemical equilibrium including the equilibrium constant and its use in solving problems.
3. Apply equilibrium knowledge to acid/base equilibria, solubility equilibria, and complex ion equilibria.
4. Calculate the pH for strong and weak acid and base solutions, expressing the nature of acids and bases.
5. Describe the basic concepts of thermodynamics including entropy, free energy, and spontaneous processes.
6. Identify the basics of electrochemistry and calculate galvanic cells, standard reduction potentials, cell potentials, batteries, corrosion, and electrolysis.
7. Relate basic radiochemistry including nuclear stability, nuclear transformations, detection, and uses of radioactivity, radioactive decay, fission, and fusion.

8. Describe the properties of various inorganic elements.
9. Relate the chemistry of some basic organic molecules especially alkanes, alkenes, and aromatics.

### **Course Content:**

Topical areas of study include -

Concentration and reaction rate	Controlling reaction rates	Reaction mechanisms
Chemical equilibrium	Equilibrium constants	Types of acids and bases
Weak acids and bases	pH	Salts in water
Titration	Buffer solutions	Solubility equilibrium
Thermodynamics	Entropy	Gibbs free energy
Electrochemistry	Galvanic cells	Electrolysis
Descriptive inorganic chemistry	Alkali metals	Alkaline earth metals
Boron family	Carbon family	Nitrogen family
Oxygen family	Halogens	Noble gases
Transition metals	Nuclear chemistry	Organic chemistry

### **Required Texts:**

Chemistry 6<sup>th</sup> Edition, Zumdahl and Zumdahl, ISBN #: 0618221565

Experimental Chemistry 6<sup>th</sup> Edition, Hall, ISBN # 061822159X

### **References:**

N/A

### **Supplies:**

Bound lab notebook, laboratory safety goggles, calculator. It is extremely helpful to have a graphing calculator that has the ability to solve equations. It is possible to pass this course using only a scientific calculator, but it is inadvisable unless you are very proficient at performing algebra by hand.

### **Additional Resources:**

Supplementary material will be posted at <http://apostasy.dyndns.org/~academics/>

### **Teaching Methods:**

Teaching methods include lectures, group discussions, individual assignments, problem solving sessions, and laboratory work.

## **Grading and Evaluation:**

Course grades are available for students by logging into the College's online student system. Grades will not be distributed by mail.

**Methods of Evaluation:** Homework will be assigned each meeting to reinforce the material covered in lecture and will be due the following meeting. Quizzes will be administered every meeting over the material covered in preceding lectures. Lab reports will be due at the beginning of lecture of the meeting following completion of the lab. There will be three examinations during the course of the semester and a cumulative final examination at the end of the semester. Exams will be administered during the lab period as listed in the course schedule. If the class average is low at the end of the semester, scores will be adjusted upward to maintain a 70% average.

*Students failing to turn in more than two lab reports during the course of the semester will automatically fail the course. This includes late lab reports and unexcused absences, and absolutely no exceptions will be made.*

<b>Graded Elements:</b>	<b>Homework</b>	<b>10%</b>
	<b>Quizzes</b>	<b>20%</b>
	<b>Labs</b>	<b>20%</b>
	<b>Exams</b>	<b>30%</b>
	<b>Final Exam</b>	<b>20%</b>

<b>Grading Scale:</b>	<b>90 – 100</b>	<b>A</b>
	<b>80 – 89</b>	<b>B</b>
	<b>70 – 79</b>	<b>C</b>
	<b>60 – 69</b>	<b>D</b>
	<b>0 – 59</b>	<b>F</b>

## **Research Assignments:**

N/A

## **Additional Assignment/Grading Information:**

### **Laboratory Notebook and Prelab**

You must use a bound laboratory notebook (not a spiral notebook). Each lab should begin on a new page and be labeled with the name of the lab and the date it was performed. The next section in the lab notebook should be the prelab, which should be completed before coming to the lab. The prelab will consist of an outline or flow chart of the procedure you will use in the lab. This section should not be a verbatim copy of the procedure from the lab manual, and it must be sufficiently detailed that you can work from it without referring to your lab manual. *Students will not be permitted to begin work in the laboratory until the prelab is complete.*

During the experiment, you will record all data and observations in your notebook. The information should be in chronological order and all entries should be clearly labeled. Do not leave large spaces between entries. When recording observations and data, it is better to err on the side of caution and write as much as possible rather than omit important details.

## **Lab Reports**

Laboratory work will be performed individually unless otherwise instructed. Lab reports will be completed individually and must be typed and include the following information:

Introduction	A sentence or two summarizing the experiment
Experimental	A paragraph describing the method used in the laboratory
Reactions	Balanced chemical equations for all reactions conducted in the lab
Results	Observations, data tables, graphs, etc.
Calculations	Sample calculations for values computed for the lab
Discussion	A paragraph or two explaining the results
Questions	Answers to questions provided in the laboratory

## **Makeups/Late submittals:**

*Late homework and laboratory assignments will not be accepted.* Homework and exams may be made up following a documented, excused absence. Due to time constraints, there will be no make-up sessions available for laboratory work. Quizzes and labs missed due to excused absences will not be averaged into the final grade. *It is the responsibility of the student to obtain missed homework assignments.*

## **Attendance:**

Attendance is mandatory. If a student is unable to attend any of the sessions, it is the responsibility of the student to inform the instructor before the scheduled class. Absences will be excused only for illness or death in the immediate family and must be accompanied by appropriate documentation.

## **Last Date and Responsibility for Withdrawal:**

Last date to withdraw is April 10, 2006. Students are to complete a Drop/Add form to withdraw a class. If you do not do this, you may receive a grade of "F" for the course.

## **Additional Class Information:**

None

## **Academic Honesty Statement:**

The College is committed to academic integrity in all its practices. The faculty value intellectual integrity and a high standard of academic conduct. Activities that violate academic integrity undermine the quality and diminish the value of educational achievement.

Cheating on papers, tests or other academic works is a violation of College rules. No student shall engage in behavior that, in the judgment of the instructor of the class, may be construed as cheating. This may include, but is not limited to, plagiarism or other forms of academic dishonesty such as the acquisition without permission of tests or other academic materials and/or distribution of these materials and other academic work. This includes students who aid and abet as well as those who attempt such behavior.

## **Conduct:**

**Cell Phones in Class:** Cell phones and pagers should be turned off when you are in class. If your cell phone or pager rings during class, points may be deducted from your grade. If you have unusual circumstances, you should talk to the instructor.

Any use of cell phones and pagers during a quiz or test is strictly prohibited. Any student who violates this policy will earn a zero on the quiz or test.

Emergency calls may be addressed to the Registrar's Office at (765) 269-5119; the Registrar's staff will have you contacted in the classroom. After 5:00 p.m., calls may be directed to the main switchboard at (765) 269-5100. In the event of an emergency after 9:00 p.m., calls should be directed to the security officer on duty at (765) 269-5254, (765) 430-2882, or (765) 430-2883.

## **Lab Rules and Regulations:**

1. Safety goggles must be worn in the laboratory at all times; there are NO exceptions. If you do not have your own goggles, you may purchase them through the bookstore.
2. Student must be appropriately dressed in the laboratory at all times. This means wearing clothing that protects the skin from the neck to below the knees. Sleeveless or tank top shirts, shorts or skirts that don't cover the knees, open-toed shoes and sandals (even with socks), are unacceptable in the laboratory. You may bring appropriate clothing to change into for the lab. Students will not be permitted to work in the lab wearing inappropriate clothing. Labs missed for this reason will be counted as unexcused.
3. If you require vision correction, you are advised to wear regular glasses rather than contact lenses in the laboratory. Chemicals and vapors can lodge behind contact lens and cause severe damage to the eyes. Also, contact lenses interfere with the use of an eyewash. If you insist on wearing contact lenses in the laboratory, you must inform your instructor of this at the beginning of the semester.
4. To avoid contact with flames and chemicals, hair longer than shoulder length must be appropriately contained.
5. Food and beverages are prohibited in the laboratory. Do not apply cosmetics in the laboratory.
6. No unauthorized experiments may be performed at any time

## **ADA Statement:**

Ivy Tech State College seeks to provide reasonable accommodations for qualified individuals with documented disabilities. If you need an accommodation because of a documented disability, you are required to register with Disability Support Services at the beginning of each semester. The Disabilities Services Coordinator is Tony Criswell; he is located in the Learning Resource Center, Ivy Hall Room 1157F. If you will require assistance during an emergency evacuation, notify your instructor immediately. Look for evacuation procedures posted in your classrooms.

### **Extra Assistance:**

Sue Hume-Graham, Student Support and Development Advisor whose office is located in Ivy 1145, can provide academic counseling to assist with general academic and daily life management skills, such as time and stress management. She can also provide limited personal counseling and referral to outside assistance agencies. Tony Criswell, Disability Services Coordinator in Ivy 1157F, provides additional assistance for special needs students.

### **Virtual Library**

The Ivy Tech Virtual Library is available to students on- and off- campus, offering full-text journals and books and other resources essential for course assignments. Go to <http://www.ivytech.edu/library> and choose the Virtual Library link for your campus.

### **E-mail:**

E-mail communication from the College is directed to the online student system. Students are responsible for checking their e-mail accounts, even if they also use other e-mail accounts. Please refer to the Ivy Vine Student Handbook for more information.

### **Assessment:**

Ivy Tech State College is committed to graduating students who have the appropriate technical and general education skills. Each approved technical program in the College annually assesses its program graduates for technical competence. As all graduates are to be assessed for technical competence, students are expected to participate in assessment activities as required by their program. General Education skills are assessed through an authentic assessment project that uses work submitted by students as a part of their regular course requirements.

### **Course (SUMMA) Evaluations:**

Course evaluations by students will be conducted during the fall and spring semesters using the College's "Student Evaluation of Instruction" form.

### **Emergency Procedures:**

Please note emergency evacuation procedures posted in the classroom.

### **Certification and Licensing Statement:**

Ivy Tech cannot guarantee that any student will pass a certification or licensing exam. Your success will be determined by several factors beyond the instruction you are given in the classroom including your test-taking skills, your willingness to study outside of class, and your satisfactory completion of appropriate practice exams. Certification and licensure exam questions are drawn from databases of hundreds of possible questions; therefore, a thorough understanding of the subject matter is required. The goal of Ivy Tech in providing a certification exam studies class is to assist you in understanding the material sufficiently to provide a firm foundation for your studies as you prepare for the exam.

### **Right of Revision**

**NOTE:** This syllabus and the information contained within it are subject to change without notice.

## Assignments and Tentative Course Schedule:

<b>Class Meeting</b>	<b>Topic</b>	<b>Assigned Work</b>	<b>Work Due and Exams</b>
Week 1 1 / 10	Introduction Chapter 12: Chemical Kinetics	HW 1	
1 / 12	Chapter 12 Lab 1: Rates of Chemical Reactions ( <i>Experiment 25, page 303</i> )	HW 2	HW 1
Week 2 1 / 17	Chapter 12 Lab 1 continued	HW 3	HW 2
1 / 19	Chapter 13: Chemical Equilibrium Lab 2: Chemical Equilibrium ( <i>Experiment 26 Part I, page 313</i> )	HW 4	HW 3 Lab 1
Week 3 1 / 24	Chapter 13 Lab 2 continued	HW 5	HW 4
1 / 26	Chapter 13 Lab 3: Chemical Equilibrium ( <i>Experiment 26 Part II, page 318</i> )	HW 6	HW 5 Lab 2
Week 4 1 / 31	Chapter 14: Acids and Bases <b>EXAM I</b>	HW 7	HW 6 Lab 3
2 / 2	Chapter 14 Lab 4: Acid-Base Titrations ( <i>Experiment 29, page 361</i> )	HW 8	HW 7
Week 5 2 / 7	Chapter 14 Lab 4 continued	HW 9	HW 8
2 / 9	Chapter 15: Applications of Aqueous Equilibria Lab 5: Acids, Bases, and Buffered Systems ( <i>Experiment 28, page 345</i> )	HW 10	HW 9 Lab 4
Week 6 2 / 14	Chapter 15 Lab 5 continued	HW 11	HW 10
2 / 16	Chapter 15 Lab 6: Potentiometric Titrations ( <i>Handout</i> )	HW 12	HW 11 Lab 5
Week 7 2 / 21	Chapter 15 Problem solving session	HW 13	HW 12 Lab 6
2 / 23	Chapter 16: Spontaneity, Entropy, and Free Energy <b>EXAM II</b>	HW 14	HW 13
Week 8 2 / 28	Chapter 16 Lab 7: Solubility of Calcium Nitrate ( <i>Handout</i> )	HW 15	HW 14
3 / 2	Chapter 16 Lab 7 continued	HW 16	HW 15
Week 9 3 / 7	Chapter 17: Electrochemistry Lab 8: Chemical Cells ( <i>Experiment 32, page 391</i> )	HW 17	HW 16 Lab 7

3 / 9	Chapter 17 Lab 9: Electrolysis ( <i>Experiment 33 part I, page 401</i> )	HW 18	HW 17 Lab 8
Week 10 3 / 14	<b>NO CLASS</b>		
3 / 16	<b>NO CLASS</b>		
Week 11 3 / 21	Chapter 17 Problem solving session	HW 19	HW 18 Lab 9
3 / 23	Chapter 18: The Nucleus: A Chemist's View <b>EXAM III</b>	HW 20	HW 19
Week 12 3 / 28	Chapter 18 Lab 10: Qualitative Analysis of the Group I Cations ( <i>Experiment 43, page 527</i> )	HW 21	HW 20
3 / 30	Chapter 19: The Representative Elements: Group 1A-4A Lab 10 continued	HW 22	HW 21
Week 13 4 / 4	Chapter 20: The Representative Elements: Group 5A-8A Lab 11: Qualitative Analysis of the Group II Cations ( <i>Experiment 44, page 535</i> )	HW 23	HW 22 Lab 10
4 / 6	Chapter 21: Transition Metals & Coordination Chemistry Lab 11 continued	HW 24	HW 23
Week 14 4 / 11	Chapter 21 Lab 12: Qualitative Analysis of the Group III Cations ( <i>Experiment 45: page 543</i> )	HW 25	HW 24 Lab 11
4 / 13	Chapter 22: Organic and Biological Molecules Lab 12 continued	HW 26	HW 25
Week 15 4 / 18	Chapter 22 Lab 13: Qualitative Analysis of Group IV and V Cations ( <i>Experiment 46, page 555</i> )	HW 27	HW 26 Lab 12
4 / 20	Chapter 22 Lab 13 continued	HW 28	HW 27
Week 16 4 / 25	Chapter 22 Lab 14: Preparation and Properties of Esters ( <i>Experiment 39 part II, page 483</i> )	HW 29	HW 28 Lab 13
4 / 27	Chapter 22	HW 30	HW 29 Lab 14
Week 17 5 / 2	Review		HW 30
5 / 4	<b>FINAL EXAMINATION</b>		