

## Chemistry 108 Fundamentals of Chemistry Spring 2005

**Instructor:** Dr. Carol Libby  
214 Collier Hall of Science  
610-861-1629  
cblibby@cs.moravian.edu

**Meets:** Class MWF 10:20-11:10AM204 CHS  
Prob. Session Thurs. 10:20-11:10AM204 CHS  
Lab 12:45-3:45PM  
Mon. and Tues. 211 CHS  
Fri. 210 CHS

**Office Hours:** by appointment and  
Wed. 11:30 AM→12:30 PM  
Thurs. 11:30 AM→12:30 PM  
Fri. 11:20 AM→12:30 PM

### Required Materials

- Essentials of *General, Organic, and Biological Chemistry*, by H. Stephen Stoker.
- Calculator that can do logarithms. Log function will be used for 1 week later in the semester. Cell phone calculator not acceptable.
- [optional but strongly recommended] 3-ring binder with tab dividers to organize class and lab handouts.

### Goals of the Course

The goals of this course are for students to:

- learn chemical explanations for everyday phenomena, especially ones involving human health
- gain experience with tools that chemists use in the laboratory to elucidate chemical phenomena and solve problems
- be able to use commonly available reference materials to learn useful information about chemicals and pharmaceuticals
- appreciate and apply qualitative and quantitative aspects of chemistry, particularly those related to atomic and molecular structure; radioisotopes; bonding; organic and bio-molecules; solutions; energy; and acids, bases, and buffers
- become aware of the limitations in scientific measurement and explanation
- improve critical thinking and problem solving skills, especially for situations involving calculations and physical or chemical phenomena

### Attendance

Attendance at M, W, Th, F *class meetings* is *expected*. You are responsible for all material and assignments made in class.

Attendance at *lab* is *mandatory*. If an emergency or illness occurs and you must miss lab, inform me *as soon as possible* (email or phone/voice mail), preferably before lab. If you are excused from a lab, *you* are responsible for arranging a make-up time with me by the classroom period following your lab absence. A lab make-up period will be agreed upon or an alternate exercise assigned. If you fail to arrange lab or complete the lab make-up on time, you will earn 0 points for that lab exercise. If you have more than 2 “0 point” labs, you will fail the course.

Attendance at *exams* is *required*. If you must miss an exam because of illness or emergency, inform me ahead of time (preferably by email or phone/voice mail). Failure to do so may result in a grade of zero for the missed exam.

Personal travel plans, except for emergencies, are not valid excuses for class, lab, exam, or quiz absence. Student athletes who will miss lab to travel to away events must arrange their lab make-up day *before* they are absent.

### Course Outline

Organizing Matter: basic concepts	<i>Chapter 1, 5</i>
Measurement	<i>Chapter 2</i>
Organizing Matter: atoms, elements & the periodic table	<i>Chapter 3</i>
Chemical Bonds	<i>Chapter 4</i>
Introduction to Organic Chemistry	<i>Chapters 10, 11, 12 &amp; 13</i>
Energy and Properties of Matter	<i>Chapters 2, 6, &amp; 7</i>

NOTE: This course does not fulfill requirements for a biology or chemistry major or medical school application.

Lipids

Chapter 15

Chemical Reactions: oxidation, energy and equilibrium

Chapter 8

Chemical Reactions: acids &amp; bases, pH, and buffers

Chapter 9

Radioactivity

Chapter 3

These topics will be covered as time allows and may be integrated into other units: Amino Acids and Proteins (*Chapter 16*), Carbohydrates (*Chapter 14*), Nucleotides and Nucleic Acids (*Chapters 17, 18*).

These topics will be covered in the lab: chemical calculations involving masses, moles and concentration (*Chapters 5, 7*).

## Evaluation

Hour Exams	110 points each			330 points
	Fri. Feb. 4	Wed. March 16	Fri. April 12	
Final Exam				180 points
Lab Reports				280 points
Quizzes				160 points
Lab and class participation				<u>50 points</u>
				Total = 1000 points

Your final grade in the course will be based on the number of points you earn, >900 points=A-, >800 points=B-, >700 points=C-, >600 points=D-, < 600 points=F. The points required for a letter grade *may* be adjusted downward. Final grades will include +’s and -’s. The points earned - letter grade correlation will be announced after each hour exam.

Hour exams will be given during class period on these days: Fri. Feb. 4, Wed. March 16, Fri. April 12. Mark your calendars now. I do not intend to change the exam dates. Each exam will specifically test class material covered since the previous exam. However, remember that the nature of chemistry is cumulative, and I will assume that you have mastered past material. Concepts covered in labs may also be tested; you will be informed of these. You must bring a calculator. Make-up exams will be administered only if absolutely necessary. However, I hope I do not have to do this, as I find it difficult to be fair to everyone when different exams are given or the same exam is given at a different time.

The final exam will be held during finals week (May 2-7) at the time and place scheduled by the registrar. The exam will be comprehensive, but material covered since the last hour exam will be more heavily emphasized.

Each lab report will be given a grade of O, S+, S, S-, or U. See lab syllabus for more details.

There will be 8 quizzes, each worth 20 points. They will be given at the beginning of class on days marked in the “Course Calendar,” all except one being a Friday. Quizzes will be on material covered in class since the last quiz or exam and assigned associated material in the textbook. Quizzes will be approximately 5 minutes long. If you miss a quiz without pre-arranging your absence, you will get a zero. If you are excused from a quiz, your missed quiz grade will be determined by your performance on the remaining quizzes in the semester or by the final exam if the last quiz is missed.

How do you earn the 50 points for class participation? Be present, ask and answer questions during class, observe the Class Participation Policies (see next page), don't disrupt the classroom, prepare for lab and adhere to safety rules, and contribute to the overall positive learning environment of the course. Performance points (12.5 maximum) will be awarded 4 times during the semester at approximately 4-week intervals.

## Laboratory

See “Lab Syllabus.”

### Thursday Problem Solving Session

Attendance and participation in this class period is required of everyone registered for the class, not just students who perceive they have “problems.” There will be time for you to ask for help on any material we have covered in class or lab. We may also go over background information on the next lab, review material before quizzes and exams, or engage in exploratory group activities. You are to bring your textbook, upcoming lab write-ups, and calculator to Thursday classes.

### Academic Honesty Policy

Plagiarism will not be tolerated. Plagiarism is the misrepresentation of someone else's work as your own. You are encouraged to work with classmates on lab reports and pre-lab assignments, but the answers you turn in must reflect your data and your understanding of how to solve the problem or answer the question. Any work you turn in must be written in your own words or figures.

If you believe that there are situations in the course that foster academic dishonesty, please bring them to my attention. Likewise, if you have observed cheating, bring the details to my attention as soon as practical. Insofar as it is possible, your anonymity will be protected.

Evidence of plagiarism and cheating will be dealt with in accordance with the college policy on academic honesty found in the Student Handbook. In the event of a suspected infraction – in fairness to your peers and the standards of the college – it is my job to send the materials in question to the Dean's Office at which time you are given the chance to provide your perspective on the matter.

### Communications

From time to time I will need to communicate with you by email. You should check your email daily for class messages. Following the first class period, you must send me an email with the email address you want me to use, the one you will check regularly. If this address changes during the semester, it is your responsibility to inform me. I will compile and distribute a class email list to facilitate your contacting classmates.

All email communications must follow this format for the header "Subject" line: Chem 108-your last name-few words indicating reason for email, for example, **Chem 108-Smith-1/23 lab**. If your name is not on the subject line, I will return the message unread. Also don't forget to sign each email with your name.

### Class Participation Policies

- New class handouts will be on the back desk when you enter class. If you need an “old” handout, see me *before* class starts.
- Turn off cell phones.
- Have your class notes out and be ready to start at 10:20 AM, using the classroom clock as the “official time.”
- Sit in the front four rows of the classroom to facilitate class interaction.
- Stay in your seat for the entire class. Take care of personal needs before class so you don't have to leave in the middle and disrupt the classroom.
- If you must leave the classroom for a special reason, inform me ahead of time and quietly exit. If a bathroom emergency does arise, please feel free to immediately leave.
- On quiz and exam days, spread out in the classroom so that there is an empty chair between you and your neighbor(s).

### Additional Information And Some Hints For Success

- This syllabus outlines the policies for the course. You are responsible for understanding them. Do not expect them to change. Any changes in course policy will be announced in class or via an email message.

- You will receive class notes, handouts that will serve as the framework for each class. There will be space on these handouts for you to take notes. The purpose of these handouts is to allow you to focus on what is being said in class and not be preoccupied with writing down data or diagrams. These class notes do not necessarily contain the most important points of the lecture; it is your responsibility to listen in class and record the important information in your own words, in a way that is most meaningful to you.
- I will hand out Study Guides for each topic we cover. These will detail exact reading assignments, terms and concepts I expect you to understand, and problems you should be able to solve. You should integrate what is covered in class, assignments in the text, and lab material with expectations laid out in the study guide.
- Be organized. Have a system for handling this syllabus, class handouts, Study Guides, returned quizzes, exams, and lab reports. If you just randomly stuff them in a notebook, you will eventually lose something important. All class materials will be 3-hole punched, so you can conveniently store them in a binder.
- I work hard to evaluate each student fairly. If you have a question or concern about a grading issue, see me during office hours or make an appointment to talk to me about it. Immediately before or after class are not good times for these discussions.
- Consider forming a study group that meets at least once a week to review course material and work problems. If you establish a regular meeting time, I will try to arrange to have a "chemistry consultant" meet with your study group. Chemistry consultants are Moravian College students who have done well in chemistry courses and are interested in sharing their expertise and enthusiasm with Chem 108 students. The chem consultant's job is to help you if you encounter problems and guide you to a deeper understanding of the material. He or she will not set the study group agenda, but rather help you to figure out how to solve problems for yourself.
- My goal in this course is for you to understand the chemical concepts we cover. I do not put much stock in memorization; however there are times when you must know (a.k.a. memorize) material. On tests, don't expect me to ask you for rules and definitions; however, I will ask you to demonstrate that you *understand* rules and definitions. For example, I *won't* ask you to list solubility rules, but rather to say whether you expect  $\text{AgNO}_3$  to be soluble in water. I *won't* ask you the steps for naming a hydrocarbon; I *will* ask you, "What's  $\text{CH}_3(\text{CH}_2)_4\text{CH}_3$  called?" I *won't* request a definition of a structural isomer, but rather ask you if two given structures are structural isomers.
- There is no such thing as a "stupid question," so please do speak up in class if you need clarification. You are probably not the only person with the same concern. I need to know when students are truly confused.
- Establish a regular time in your schedule to study chemistry. The pace of this course will be brisk. We will cover roughly a chapter a week. You will have to turn in a lab report and take a quiz or exam almost every week. **DO NOT FALL BEHIND!**
- Examine the attached course calendar carefully. Put the exam dates on your calendar NOW. It is **HIGHLY** unlikely that test days will be changed. Notice what other tests, papers or important events are happening around the same time.
- Often there is more than one way to solve a given problem. You may find that a study partner or I approach a given problem differently than you do. If you come up with different answers, examine each step individually to discover the faulty logic or arithmetic error.
- Some chemistry problems are difficult and the answer or the approach to solve the problem may not be obvious on the first reading. Read it again. Don't give up! Be persistent! Get the satisfaction and confidence that comes with successful problem solving. On the other hand, for you very determined people, follow the "30 minute rule". If you can't solve the problem after working on it for 30 minutes, send me an email, so that I can provide some guidance.

*"...I was taught that the way of progress is neither swift nor easy..."*

Marie Curie

### Lab

Instructor: Dr. Carol Libby  
 214 Collier Hall of Science  
 610-861-1629  
 cblibby@cs.moravian.edu

12:45-3:45PM  
 Mon. and Tues. 211 CHS  
 Fri. 210 CHS

- **Attendance at lab is mandatory.** If an emergency or illness occurs and you must miss lab, inform me *as soon as possible* (email or phone/voice mail), preferably before lab. If you are excused from a lab, you are responsible for arranging a make-up time with me by the classroom period following your lab absence. Student athletes who will miss lab to travel to away events must arrange their lab make-up day *before* they are absent. Lab make-up days are Monday, Tuesday, or Friday. A lab make-up period will be agreed upon or an alternate exercise assigned. If you fail to arrange lab or complete the lab make-up on time, you will earn 0 points for that lab exercise. If you have more than 2 "0 point" labs, you will fail the course.
- Many of the laboratory exercises will parallel material we are covering in class. To keep class and lab work coordinated, I will **distribute the weekly lab assignment by the Wednesday before** each lab. We will do experiments from this list:
  - Measurement and Significant Figures
  - Using Density to Identify Substances
  - Isolation of Active Ingredients from Analgesic Tablets
  - Identification of an Unknown Analgesic Tablet Using TLC
  - Cations and Anions: Testing in Consumer Products
  - Models of Organic Compounds: Molecular Shapes and Functional Groups
  - Solution Concentrations: I. V. Saline and Blood Alcohol Concentrations
  - NSAID Information Project (using reference materials to find chemical and medical information, learning chemical and pharmacological properties of a major class of pain relievers, finding out about drug development and approval)
  - Acids, Bases, pH's and Buffers
  - Synthesis of an Analgesic
  - Properties of Organic Compounds: IR, Solubility and Melting Point
  - Thermodynamics: Specific Heat of Metals & Energy Content of Foods
- A three ring binder is suggested to **organize lab handouts and reports**. You will refer back to previous work during the semester, so you must retain these records.
- It is essential that you **read the assigned lab exercise before coming to lab**. Any "Pre-Lab Study Questions" assigned must be completed before you will be allowed to start lab work.
- Completed **lab reports are to be turned in before leaving lab**. If you are not finished with the report by 3:45 PM, hand it in at the next classroom meeting. Late lab reports will be reduced by one grade.
- Lab reports will be given a **grade** of O, S+, S, S-, or U. The NSAID Information Project meets 2 lab periods and is worth a total of 60 (3 lab reports) points.

O	for reports which are unusually outstanding, no record keeping errors	20 pts.
S+	for reports demonstrating superior effort and understanding, minor record keeping errors	19 pts.
<b>S</b>	<b>for reports which have been completed properly and which demonstrate that the student has a reasonable grasp of the content and significance of the experiment</b>	17 pts.
S-	for reports that are acceptable but contain deficiencies	15 pts.
U	for reports that are not acceptable, submitted by a student who has gone through the motions of performing an experiment, but who fails to present a reasonable analysis of the data obtained, demonstrate an understanding of its significance, or complete the report.	10 pts.

- Your **safety** and that of your classmates and the environment are of utmost importance. You will be issued safety goggles and must wear them at all times in the lab. Cautions and handling instructions will be provided to inform you of specific safety hazards in each lab exercise.
- For your **safety**, you must wear closed toe shoes and clothes that cover you from shoulders to knees, i. e. no sandals, exposed midriffs, miniskirts or short shorts. *You will not be allowed to work in lab unless appropriately clothed.*
- You must arrive at lab **on time**. Important prelab instructions and safety warnings are provided at the beginning of each lab. Waiting for latecomers delays the entire lab class. Chronic lateness will be taken into account in the class participation grade. If you are more than 5 minutes late more than 2 times, expect zero points for that 12.5 point class participation marking period (see class syllabus, p. 2).
- **Accurate and authentic record keeping** are the basis for progress in science and medicine. Because of this you will be required to adopt the following practices, which are the standard for recording scientific and clinical information:
  - Lab *data and calculations* from data must be recorded in black, preferably, or blue pen. You may answer prelab and lab report questions that are not data or calculations in pencil.
  - No whiteout or erasures are allowed. If you make a mistake, cross it out neatly by drawing a single line through it.
  - Measured data and calculated values must be reported in the proper number of significant figures.
  - Appropriate units must be attached to all values.
  - All decimal numbers must be preceded by a zero, e. g. 0.32 g, not .32 g. This zero is sometimes called a “courtesy zero” or a “leading zero.” It alerts the reader that a decimal number is coming and that the dot is just not a random spot.

Chem 108		January 2005					Course Calendar
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	
9	10 Lab 1	11 Lab 1	12	13	14 Lab 1	15	
16	17 MLK Day No class No lab	18 No lab	19	20	21 Lab 2 Quiz 1	22	
23	24 Lab 2	25 Lab 2	26	27	28 Lab 3 Quiz 2	29	
February 2005							
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	
30	31 Lab 3	1 Lab 3	2	3	4 Lab 4 Exam I	5	
6	7 Lab 4	8 Lab 4	9	10	11 Lab 5 Quiz 3	12	
13	14 Lab 5	15 Lab 5	16	17	18 Lab 6 Quiz 4	19	
20	21 Lab 6	22 Lab 6	23	24	25 Lab 7 Quiz 5	26	
March 2005							
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	
27	28 Lab 7	1 Lab 7	2	3	4 Lab 8	5 Spring Recess	
6 Spring Recess	7 Spring Recess	8 Spring Recess	9 Spring Recess	10 Spring Recess	11 Spring Recess	12 Spring Recess	
13 Spring Recess	14 Lab 8	15 Lab 8	16 Exam II	17	18 Lab 9	19	
20	21 Lab 9	22 Lab 9	23	24	25 Easter Recess	26 Easter Recess	
27 Easter Recess	28 Easter Recess	29 No lab	30	31	1 Lab 10 Quiz 6	2	
April 2005							
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	
3	4 Lab 10	5 Lab 10	6	7	8 Lab 11 Quiz 7	9	
10	11 Lab 11	12 Lab 11	13	14	15 Lab 12 Exam III	16	
17	18 Lab 12	19 Lab 12	20	21	22 Lab 13	23	
24	25 Lab 13	26 Lab 13	27 Quiz 8	28	29 Last Day of Class	30	

