

COMMUNITY COLLEGE OF RHODE ISLAND

CHEMISTRY DEPARTMENT

SYLLABUS AND COURSE POLICY INFORMATION FOR

GENERAL CHEMISTRY II

CHEM-1100
SECTION 102

FALL 2006 SEMESTER
MONDAY AND WEDNESDAY EVENINGS
KNIGHT CAMPUS

CREDITS: 5

LECTURE: 3 HOURS PER WEEK

RECITATION: 1 HOUR PER WEEK

LABORATORY: 3 HOURS PER WEEK

MEETING TIMES: Lecture; Mondays, 6:00 PM to 9:30 PM, Room 6002
Laboratory; Wednesdays, 6:00 PM to 9:30 PM, Room 3046

INSTRUCTOR: Emanuel G. Terezakis, Ph.D.
e-mail: eterezakis@ccri.edu

REQUIRED TEXT: Chemistry, 8th Edition, 2005, Raymond Chang

REQUIRED: McGraw-Hill On-Line ChemSkill Builder

Evening General Chemistry II
CHEM-1100-102
CCRI Knight Campus
Fall 2006 Semester Course Policy

Introduction: General Chemistry II is an interesting and challenging course that will prove very useful in your career. Chemistry comes easily to few people; most find it difficult to master. That's why I am here to help you meet the challenge. On these pages I tell you exactly what I expect of you and what you need to do to succeed in chemistry. I expect you to follow my recommendations but I am always available to help you and I always welcome your comments, opinions and suggestions for improving the course.

Prerequisite: You may not take this course without the proper background and skills. I teach on the assumption that you have successfully completed a General Chemistry I course with content comparable to that of CCRI's CHEM-1030. If you have not completed a course clearly identified as General Chemistry I at CCRI or elsewhere, I will ask to see your transcript and a course syllabus to determine your level of preparedness.

On-Line Access to Course Materials: The notes I lecture from in class, the weekly laboratory experiments and other selected materials may be downloaded from my CCRI Faculty WebPage. Go to CCRI's Home Page at <http://www.ccri.edu/> and click on the **College Directory** link. Under **Academic Departments**, click on **Chemistry**, then **Faculty and Staff Listing**. Click on **Professor Emanuel Terezakis**, on **Courses Taught** and on **General Chemistry II, CHEM-1100**. Select one of the General Chemistry II folders entitled **Lecture Notes, Course Policy, Laboratory Experiments** or **Previous Hour Exams** to find the documents you want to download and print.

Lectures: I do not take lecture attendance but I expect you to attend every Monday evening class. Remember that one evening lecture is equivalent to an entire week of day classes. You are responsible for all announcements, assignments and materials given in lecture. To prepare you to understand my lectures, do the assigned reading from the text (see page 5) before class. My lecture notes are available on my WebPage. You may tape record my lectures if you wish. If you are absent, read my lecture notes and copy notes from another student to catch up. ***Ringling cell phones are not welcome in my lectures.*** Set your cell phone or pager to silent mode. If you expect an important personal call, sit near the door so you can exit the classroom without disturbing the rest of the class.

Exercises and Problems: Doing problems and review exercises is the most important part of any chemistry course. It is impossible to grasp chemistry unless you work through many examples of the concepts you are trying to learn. Utilize the following three ways to improve your grasp of the material:

- A) Do the practice problems in the chapters as you read the text and check your work against the answers at the end of each chapter.
- B) Do the assigned review questions and problems in the text (see p. 6). These are not collected or graded but are nonetheless crucial to your understanding of the material. Answers to assigned questions and problems are on pages AP-4 through AP-8 of your text. If you have trouble with a concept, find more problems on that topic that I have not assigned and do those also. If you still do not grasp a concept well, telephone or e-mail me for help. You should also bring up the topic for discussion at the start of the next lecture or laboratory class.

C) You must purchase access to McGraw-Hill's On-Line ChemSkill Builder. This is a required part of the course and is an excellent supplement to the text. It can be accessed by any computer connected to the Internet and having Windows 95, 98 OR NT. If you do not own a computer, go to an Academic Computer Lab at any campus. To start ChemSkill Builder, follow the directions on the CD packaged with your Chang text. If you have purchased Chang's Chemistry without the ChemSkill Builder CD, go to the McGraw-Hill website at www.mhhe.com/csb to open your account at a cost of \$35.00. As we go through the semester, do all of the problems in the sections titled Chemical Kinetics, Chemical Equilibria, Acid-Based Equilibria, Buffers and Hydrolysis, Solubility Equilibria, Thermodynamics, Electrochemistry, Nuclear Chemistry and Organic Chemistry. The assignments are listed on page 7 of this syllabus package. Work through each section until you have grasped all the concepts well. Follow the directions to download your grades to me so you will get credit for the work. Your ChemSkill Builder score will count ten per cent of your final grade.

In every lecture/recitation period, I will expect you to have done the assigned Review Exercises in Chang and the ChemSkill Builder exercises pertaining to the material on the evening's quiz or exam. If you fall behind in your ChemSkill assignments, it will hinder your ability to keep up with the course. I will answer any questions you have on the ChemSkill material before you take your tests.

Hour Exams: There will be four hour exams on the Monday dates shown on p. 5. They must be taken on the scheduled dates and times. If an exam is not held because the college cancels classes for inclement weather or other reason, the exam will be given at the next scheduled class (lecture, not lab) meeting. There will be no makeups for missed exams but your lowest exam score will be dropped. If you miss more than one hour exam, grading will be at my discretion. You must take the comprehensive final exam scheduled for Wednesday, December 20, 2006 to pass the course.

Quizzes: There will be a quiz every Monday at the start of the recitation/lecture period except on the evenings an hour exam is given. Each quiz will cover only the previous week's lecture topics. There will be ample time before each quiz for questions about the material. ***I EXPECT YOU TO BE PREPARED TO USE THAT TIME.*** An answer key will be posted outside the room while you take the quiz. Your graded quizzes will be handed back to you as soon as possible, usually later the same evening. Be sure to learn from your mistakes because some quiz questions may reappear on the hour exams. There are no makeups for missed quizzes but your lowest quiz score will be dropped from your final average.

Laboratory: To begin doing laboratory experiments, you must attend the first (Wednesday September 6th) evening lab in room 3046 to hear the **Safety Lecture**, witness safety demonstrations and view safety videos. Then you must read the safety policy on pages 10-13 and sign the last page. If you miss this lab, you must arrange a makeup session to be allowed to work in the lab. You will do one lab experiment each week on the Wednesday dates on the schedule (page 8) with a lab report due at the start of the lab period a week later. Follow the directions on page 8 for downloading experiments from my WebPage. (Take advantage of the free computer time and free paper provided by the college to download and print all your labs early in the semester.) *You cannot get credit for a lab report unless you are present in lab and do the experiment.* Your graded lab reports will be given back to you as soon as possible, usually by the next Monday lecture. Go over your graded reports to make sure you understand any errors you made so you can improve on subsequent reports. Lab material may appear in future hour exams. Late lab reports are penalized three points a day. One point will be taken off for reports not handed in at the start of the lab period. There are no makeups for missed labs but your lowest lab score will be dropped from your final average.

Laboratory Prestudies: A lab prestudy will be due at the start of lecture on the Monday dates shown on page 8. The answers to most prestudy questions are found by reading the lab experiment writeup. Your graded prestudies will be handed back to you the same evening. Review any errors you made so you will be prepared for the lab. If you know in advance you will be absent on a Monday, hand in the prestudy before it is due. Late prestudies are penalized three points a day. Prestudies handed in after the start of lecture are penalized one point. Your lowest prestudy score will be dropped from your final average.

Academic Dishonesty: Cheating on tests and other work will not be tolerated. No notes, tables or other written or electronic materials are allowed during exams and quizzes. Only a pencil and a calculator are allowed. Evidence of cheating will be reported to the Dean of Students and handled according to the Policy on Academic Dishonesty in the 2005-2006 CCRI Student Handbook.

Midterm Grades: I will issue you a written midterm grade report before the time designated by the registrar's office as the last day to drop without prejudice, Monday, November 13, 2006. If you receive a midterm grade of D or F, see me immediately to discuss the desirability of staying in the course. I will authorize a W (withdrawal) grade only until the last day to drop. If you decide to drop the course, fill out a drop slip for the Registrar and make sure you return your chemistry locker key. If you do not return your laboratory locker key by the end of the semester, restrictions will be placed on your ability to register for subsequent courses or obtain your CCRI grade transcript.

Final Grades: Your score totals have the following approximate weights when added up to calculate your final average. Hour Exams, 25%; Final Exam, 20%; Lab Reports, 25%; Prestudies, 5%; Quizzes, 15%, On-Line ChemSkill Builder problems, 10%. Your final grade will be determined from your average as follows: 90.0 to 100%, A; 80.0 to 89.9%, B; 70.0 to 79.9%, C; 60.0 to 69.9%, D; 0 to 59.9%, F. If you withdraw unofficially from the course any time before the final exam, your grade will be WP or WF (Withdrawal Passing or Withdrawal Failing). If you attend class up to the end but do not take the final exam, your grade will be I (incomplete). If you wish to make up the I grade, contact me to schedule a makeup final before the end of the Spring 2007 semester. Otherwise, the I grade will revert to a WF grade which will remain permanently on your transcript.

Office Hours: I am based at the Flanagan Campus and not always available for daytime Warwick office hours. In lieu of office hours, I will arrive in class (room 6002) and lab (room 3046) about 5:30 PM every Monday and Wednesday so you will have the opportunity to ask me questions either privately or with the rest of the class. You may also drop by my Flanagan Campus office (room 1222) any time you are in the area, make an appointment to see me at either campus or telephone me at 333-7140. You may also e-mail me at eterezakis@mail.ccri.edu.

Emanuel G. Terezakis, Ph.D.
Professor of Chemistry

Evening General Chemistry II
CHEM-1100-102
CCRI Knight Campus
Fall 2006 Semester Course Syllabus

- A. CHEMICAL KINETICS:** Reaction Rates, The Rate Law, Relation Between Reactant Concentration and Time, Activation Energy, Temperature Dependence of Rate Constants, Reaction Mechanisms, Catalysis.
- B. CHEMICAL EQUILIBRIUM:** The Concept of Equilibrium, The Equilibrium Constant, Writing Equilibrium Constant Expressions, Chemical Kinetics And Chemical Equilibrium, Factors that Affect Chemical Equilibrium.
- C. ACIDS AND BASES:** Brønsted Acids and Bases, Acid-Base Properties of Water, The pH Concept, Acid and Base Strengths, Weak Acids and Bases, Acid and Base Ionization Constants, Acids and their Conjugate Bases, Diprotic and Polyprotic Acids, Molecular Structure and Acid Strengths, Acid-Base Properties of Salts, Acid-Base Properties of Oxides and Hydroxides, Lewis Acids and Bases.
- D. ACID-BASE AND SOLUBILITY EQUILIBRIA:** Homogeneous vs. Heterogeneous Equilibria, The Common Ion Effect, Buffer Solutions, Acid-Base Titrations, Acid -Base Indicators, Solubility Equilibria, The Common ion Effect and Solubility, pH and Solubility, Complex Ion Equilibria and Solubility, The Solubility Product.
- E. ENTROPY, FREE ENERGY AND EQUILIBRIUM:** The Three Laws of Thermodynamics, Spontaneous Processes and Entropy, The Second Law of Thermodynamics, Gibbs Free Energy, Free Energy And Chemical Equilibrium, Thermodynamics In Living Systems.
- F. ELECTROCHEMISTRY:** Redox Reactions, Galvanic Cells, Electrochemical Cells, Standard Reduction Potentials, Spontaneity of Redox Reactions, Effect of Concentration on Cell EMF, Batteries, Corrosion, Electrolysis.
- G. TRANSITION METAL CHEMISTRY:** Properties of the Transition Metals, Chemistry of Iron and Copper, Coordination Compounds and Their Structure, Crystal Field Theory, Reactions of Coordination Compounds.
- H. NUCLEAR CHEMISTRY:** Nuclear Reactions, Nuclear Stability, Natural Radioactivity, Nuclear Transmutation, Nuclear Fission, Nuclear Fusion, Uses of Radioisotopes, Biological Effects of Radiation.
- I. ORGANIC CHEMISTRY:** Classes of Organic Compounds, Organic Nomenclature, Aliphatic Hydrocarbons, Aromatic Hydrocarbons, Chemistry of the Functional Groups.

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CCRI Knight Campus
Fall 2006 Semester
WEEKLY READING ASSIGNMENTS AND EXAM SCHEDULE

The table below gives the tentative schedule for pages in Chang's Chemistry, 8th Ed to be covered during each week's lecture. To help you understand the lectures better, always read the assigned text pages *before* coming to class. You may also find it useful to read my on-line lecture notes. Carefully note the dates scheduled for the four hour exams and the final exam.

Week No.	Monday Lecture Dates	Assigned reading in Chang , <u>CHEMISTRY, 8TH ED, 2005</u>
1	Sept. 4	Holiday, No Classes Held
2	Sept. 11	Chap. 13 , pp. 531-554
3	Sept. 18	Chap. 13 , pp. 555-574
4	Sept. 25	Chap. 14 , pp. 585-617
5*	Oct. 2	Chap. 15 , pp. 627-643
6	(Wed.) Oct. 11	Chap. 15 , pp. 644-669
7	Oct. 16	Chap. 16 , pp. 680-700
8*	Oct. 23	Chap. 16 , pp. 701-715
9	Oct. 30	Chap. 16 , pp. 716-721; Chap. 18 , pp. 763-776
10	Nov. 6	Chap. 18 , pp. 777-789; Chap. 19 , pp. 797-810
11	Nov. 13	Holiday, No lecture Scheduled
12*	Nov. 20	Chap. 19 , pp. 811-826
13	Nov. 27	Chap. 19 , pp. 827-832; Chap. 22 , pp. 911-929
14	Dec. 4	Chap. 22 , pp. 930-936; Chap 23 , pp. 943-959
15*	Dec. 11	Chap. 23 , pp. 960-971; Chap. 24 , pp. 979-989
16	Dec. 18	Chap. 24 , pp. 990-1005
16	(Wed.) Dec. 20	Comprehensive Final Examination

EXAM	EXAM DATES	CHANG CHAPTERS COVERED
* Hour Exam No. 1	Monday, October 2, 2006	13 and 14
* Hour Exam No. 2	Monday, October 23, 2006	15 and part of 16
* Hour Exam No. 3	Monday, November 20, 2006	16, 18 and 19
* Hour Exam No. 4	Monday, December 11, 2006	22, 23 and part of 24
* Final Exam	Wednesday, December 20, 2006	Comprehensive Final

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Fall 2006 Semester Assigned Review Exercises in Chang, Chemistry, 8th edition

Chang Chapter No.	Review Exercise Problem Numbers Chang, <u>Chemistry</u>, 8th edition
13	2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 38, 40, 44, 46, 48, 50, 54, 56, 58, 62, 64, 68, 70, 72, 74, 76, 80, 82, 84, 86, 88, 94, 96, 98, 102.
14	2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 40, 42, 44, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 76, 78, 82, 84, 92.
15	2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 80, 86, 88, 90, 92, 94, 96, 98, 100, 104, 108, 110, 112, 116, 124, 126, 128.
16	2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 38, 40, 42, 44, 46, 48, 50, 52, 56, 58, 60, 62, 64, 66, 70, 74, 76, 78, 80, 82, 86, 88, 90, 94, 98, 106, 110, 112, 116.
18	2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 32, 34, 38, 40, 42, 44, 46, 52, 54, 56, 58, 60, 64, 66, 68, 70, 72, 80.
19	2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 44, 46, 52, 54, 58, 60, 64, 72, 74, 82, 84, 90.
22	2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 28, 30, 32, 34, 36, 38, 42, 46, 52, 54, 60, 62, 66, 68.
23	2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 44, 46, 54, 56, 58, 62, 64, 68.
24	2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 46, 48, 50, 56, 58, 60, 62, 64, 66.

Evening General Chemistry II
CHEM-1100-102
CCRI Knight Campus
Fall 2006 Semester Instructions for McGraw-Hill ChemSkill Builder

McGraw-Hill's *On-Line ChemSkill Builder* is a required part of this course and an excellent supplement to Chang's practice problems. You will receive credit for ChemSkill Builder equivalent to that of one hour exam, or 10% of your final grade. ChemSkill can be accessed by any computer with Windows 95, 98 or NT that is connected to the Internet. If you have no computer, go to an Academic Computer Lab at any campus. To start ChemSkill, follow the directions in the CD packaged with your text. If you purchased Chang's Chemistry without ChemSkill, go to McGraw-Hill's website at www.mhhe.com/csb to open an account for \$35.00.

ChemSkill Builder for General Chemistry II consists of ten units corresponding to Chang Chapters 13, 14, 15, 16, 18, 19, 22, 23 and 24. Do the ChemSkill Builder units indicated below as we cover the chapters. Besides adding to your semester point total, the exercises help you learn the class material for quizzes and hour exams. *Do not let yourself fall behind.* You can repeat each section until you get all the questions right. ChemSkill is the part of the course you have the most control over. With some effort, you will make a significant positive contribution to your semester point total. When I download your results, I only see your highest scores so it is possible to get a perfect score on your ChemSkill work or the equivalent of 100 points on an hour exam. The deadline for completing ChemSkill Builder is the night of the final exam, Wednesday, December 20, 2006. After the final I will download your ChemSkill scores for inclusion in your final grade.

Chang Chapt.	Chang Chapter Titles	ChemSkill Units
13	Chemical Kinetics	16
14	Chemical Equilibrium	17
15	Acids and Bases	18
16	Acid and Base Solubility Equilibria	19 20.1 through 20.4
18	Thermodynamics	21
19	Electrochemistry	22
22	Transition Metals	20.5
23	Nuclear Chemistry	23
24	Organic Chemistry	24

Reporting ChemSkill Problems: Report any difficulties with ChemSkill Builder immediately to the McGraw-Hill help line and to me by e-mail so the problem won't delay your understanding of the material or interfere with your receiving full credit for your work.

1. Anytime there is any difficulty with a ChemSkill screen, *do not* go on to another problem. If you do, the code details that cause the problem will be lost.
2. "Capture" the screen that's giving problems by pressing your keyboard Print Screen button.
3. Press Control C to copy the screen to the clipboard. Open a blank Word document and press Control V to paste the screen into that document.
4. Compose an e-mail message to techsup@mcgraw-hill.com explaining the problem and attach the saved screen so the McGraw-Hill IT person will know what to fix. Send a copy of the message to me at eterezakis@ccri.edu.

Evening General Chemistry II
CHEM-1100-102
CCRI Knight Campus
Fall 2006 Semester LABORATORY SCHEDULE

This laboratory schedule will be followed exactly unless circumstances beyond my control make a change necessary. You will do one lab experiment each week on the scheduled Wednesday dates with a lab report due at the start of the lab period a week later. You will cannot get credit for a lab report unless you are present in lab and actually do the experiment. Download and print copies of these experiments from my webpage well in advance of the laboratory dates. On CCRI's Home Page at <http://www.ccri.edu/>, click on the College Directory link. Under Academic Departments, click on Chemistry, Faculty and Staff Listing, Professor Emanuel Terezakis, Courses Taught, General Chemistry II, CHEM-1100 and then Laboratory Experiments. From the list of CHEM-1100 labs, click on the ones you want to print. Note: The experiment *numbers* are for purposes of identification only; they do not reflect the order in which the labs will be done.

Inform me by e-mail or telephone immediately if you experience a problem accessing or printing a lab. (On occasion, some browsers fail to recognize html or pdf code.) Take advantage of the free computer time and free paper provided by CCRI. Download and print all your labs early in the semester in one of the campus academic computer labs. I may supplement the downloaded lab writeups with additional written materials. You will be informed well in advance of any changes so you have time to prepare. If you are absent from any class or lab, check with a fellow student so you won't miss any announced changes. Be sure to read and understand each experiment well in advance of the lab date so you can hand in your prestudy on time and be prepared to do the lab in a proper and safe manner.

Week No.	Wednesday Laboratory Dates	Exp. No.	Experiment Title	Monday Prestudy Due Dates
1	Sept. 6	—	Lab Locker Check-In, Laboratory Safety Orientation	—
2	Sept. 13	1	Spectroscopy: Beers Law	Sept. 11
3	Sept. 20	4	Determination of Water Hardness	Sept. 18
4	Sept. 27	17	Calcium Analysis by Atomic Absorption	Sept. 25
5	Oct. 4	13	Kinetics of the Phenolphthalein/NaOH Reaction	Oct. 2
6	Oct. 11	—	Monday Schedule Followed, No Lab Experiment	—
7	Oct. 18	7	The Equilibrium Constant of a Chemical Reaction	Oct. 16
8	Oct. 25	8	Le Chatelier's Principle	Oct. 23
9	Nov. 1	2	Group A Cation Analysis	Oct. 30
10	Nov. 8	3	Group B Cation Analysis	Nov. 6
11	Nov. 15	9	pH: Measurement and Uses	Nov. 13
12	Nov. 22	6	Determination of the ΔH of Neutralization	Nov. 20
13	Nov. 29	11	Thermodynamic Study of a Reaction	Nov. 27
14	Dec. 6	5	Redox Titration of Ferrous Ion with Permanganate	Dec. 4
15	Dec. 13	12	Voltaic and Electrolytic Cells and Lab Checkout	Dec. 11
16	Dec. 20	—	No Lab Scheduled, Comprehensive Final Exam	—

GENERAL CHEMISTRY II, CHEM-1100 LABORATORY REPORT REQUIREMENTS

Introduction: A written report is required for every experiment you do in General Chemistry II. Together with the lab prestudies, reports are worth 35% of your final grade. Just as you work on your experiments by yourself, so should lab reports be individual efforts. You receive credit for them so they must be your work alone. Do not copy results or answers from anyone else. Make each report a neat, informative, high quality, professional-looking document *you can be proud of*. Learning to write lab reports is excellent preparation for all careers where good communication skills are required.

Data must be recorded while you are doing the experiment in black ink on the data sheets provided. A datum is an observation, not a guess or a conclusion about the meaning of a test. Simply put down what you *observe* with your senses at the time you are doing the lab. Never record data in pencil or on scraps of paper for transfer to a data sheet later. If you make a mistake and wish to repeat a measurement, do not erase or scribble over the incorrect data entry. Draw a single line through it and write the new value next to it. Never copy data from another student or guess at what a measured value should be. Never erase, cover with Whiteout or otherwise attempt to change a data entry. Never rewrite a data sheet to make it look better. Have your instructor inspect and approve all your measurements and initial your data sheet before you leave lab. Properly filled-out data sheets must be stapled to the back when you hand in your report. Answer all report questions in black ink and show setups and calculations in the spaces provided. Lab report questions and calculations will be worth 20 out of a possible 25 points.

The lab report must be prefaced by a title page and a typewritten abstract page (titled *Abstract*) on 8 1/2" x 11" white unlined paper. The title page must contain the course name and number, experiment name, the date performed and your name. The abstract should consist of three brief paragraphs stating: 1) Name and purpose of the experiment; 2) What was done in the lab. Briefly describe the experiment without going into detail. Tell what tests were done and for what reason; 3) Briefly state the results of your experiment, your calculated values and conclusions. The abstract should be in the past tense, third person, passive voice with correct spelling and grammar. It should be neat, concise, informative and to the point, without unnecessary detail. Make it interesting and inviting to read. Together, the title page and abstract count five points toward your lab score. An example of a well-written abstract follows:

ABSTRACT

Experiment No. 9, The Three States of Matter, was performed in order to study the physical characteristics of solids, liquids and gases.

The compressibility of air was tested with a manometer. The density of air was compared to that of water. The ability of water to dissolve the solids sodium chloride, benzoic acid and wax was tested. The approximate melting point of each solid was measured on a hotplate.

The experiment showed how intermolecular forces affect physical properties. Ionic substances have the highest melting points and nonpolar substances, the lowest.

Your report must be handed in on time at the *beginning* of the laboratory period, and stapled together with pages in the order: title page, abstract page, report, questions, graphs, other supporting material and finally, data sheets. Unstapled reports are not acceptable. Full credit for reports will not be given unless all the above standards are met. Late reports are penalized three points per day.

COMMUNITY COLLEGE OF RHODE ISLAND
CHEMISTRY DEPARTMENT LABORATORY SAFETY REGULATIONS

INTRODUCTION: The chemistry laboratory can be a dangerous place in which to work. This statement is not meant to frighten you, but to make you aware that, for your safety and that of others, certain basic safety rules must be observed. You are expected to conduct yourself in a responsible manner and respect the safety and rights of your fellow students. The following procedures must be followed at all times. Disregard for the rules or for the instructor's warnings will be grounds for your expulsion from the laboratory. Before you can proceed with the laboratory part of this course, you must read these rules and sign the statement at the end of the document attesting that you understand the rules and agree to follow them.

EXPERIMENT INSTRUCTIONS: Safety instructions and procedures for each experiment are given at the beginning of the lab period. For your protection and that of others, you must be present to hear this information. If you are not, you may not be allowed to do the experiment and will receive no credit for the lab. Never perform unauthorized or unsupervised experiments. Never enter the lab unless an instructor or a paraprofessional is present.

EYE PROTECTION: Chemical splash goggles meeting OSHA requirements AINSI Z87-1-1979 are sold in the campus bookstores. These goggles must be worn in the laboratory at all times even if you yourself are not engaged in an experiment at the moment. If you wear eyeglasses, the goggles will fit over them. Goggles are to be put on as soon as you enter the lab. Do not remove them until you are ready to leave the lab. If you do not follow the rules for wearing safety goggles, you will be asked to leave the lab and will receive a zero for the day's experiment.

It is unsafe to wear contact lenses in the lab. A chemical splashed into the eye will be trapped against the cornea by the contact lens, increasing the likelihood of eye damage. Vapors such as hydrogen chloride or ammonia are absorbed by some lenses and can cause severe irritation or injury. You are strongly advised not to wear contacts in the lab. If possible, you should wear ordinary glasses under your goggles.

Chemical eye injuries are best treated by prompt and prolonged flushing with water. Your instructor will demonstrate the use of the eye wash fountain. If you get something in your eye, have someone lead you the eyewash immediately. If you see someone else in trouble, bring that person to the eyewash. Hold the eye open in the stream of water to get complete flushing of the eye and flush for 15 minutes or more. Report any eye injury or irritation to your lab instructor immediately.

CLOTHING: Wear only appropriate clothing in the lab. Not allowed are loose flowing sleeves or blouses, bulky jewelry, scarves, shorts, miniskirts, bare feet, sandals and open toe shoes. Required are tight long sleeves or short sleeves, slacks or mid-length skirts and regular shoes or sneakers. Wear a plastic apron over your clothing to protect you from corrosive or hot liquids. Keep purses and book bags out of the way. Hang outerwear on the coat rack; do not leave it on the benches.

FOOD, DRINK AND CIGARETTES: No food or drink of any kind are allowed in the lab. Even wrapped candy, gum or cigarettes must not be put on benchtops because they may become contaminated. Smoking is banned throughout the College and it is never allowed in any laboratories due to the obvious hazard presented by flammable liquids and gases. Do not put anything that has been in the lab, such as a pen, in your mouth. Wash your hands before leaving lab to avoid carrying toxic materials out with you.

BUNSEN BURNER: Your instructor will show you how to light a Bunsen burner and how to avoid strikeback, or burning of gas at the base of the burner. Do not leave the burner on when it is not needed and be careful that it does not ignite your hair or clothing. Turn off the main gas valve when the burner is off. Any object you heat remains a burn hazard for some time, so treat all glassware, iron rings and clamps as if they are hot. The Bunsen burner, especially if it has accidentally struck back, can also become very hot.

CHEMICAL HANDLING: When dispensing chemicals, read the label carefully before you start and measure the appropriate amount as indicated by the experiment directions. Do not take an excess. To avoid contamination and a possible violent reaction, never return unwanted chemicals to their containers. Do not put your dropper into a supply bottle. Do not lay stoppers on the benchtop. When heating chemicals in a test tube, do not point the test tube at anyone or look down into it. Always dispense and dilute concentrated acids in a fume hood. To avoid overheating and spurting, never add water to an acid; always add acid to water slowly with stirring. Always give a warning when carrying a container of a hot or reactive chemical past anyone in the lab.

FIRES AND FIRE ALARMS: Learn the location of each fire extinguisher. Your instructor will demonstrate the use of a fire extinguisher as well as other techniques for putting out minor fires. If a fire does occur in the lab, notify your instructor and move away from it carefully to avoid causing an accident. Know the locations of all laboratory exits before a fire occurs. The laboratory is equipped with a fire blanket for extinguishing clothing fires; your instructor will demonstrate its use. If your clothing catches fire, roll yourself up in the blanket to extinguish the flames or drench yourself with the safety shower.

Long hair must be tied back behind your head. Long bangs must be secured with a hairnet. Hair can easily ignite from a burner flame and cause serious face and scalp burns. Flammable liquids such as acetone, hexane, and ethanol must be stored and dispensed in the hood. Even if there are no flames in the lab, do not take supply bottles of flammables out of the hood.

In case of a fire alarm, whether planned or unexpected, shut off any burner, hotplate or running water you are using and leave the lab as quickly as possible in an orderly manner. Your instructor will tell you beforehand which emergency route to take out of the building. Once out of the building, walk clear of the exits so you will not hinder anyone else's escape.

MATERIAL SAFETY DATA SHEETS: Material Safety Data Sheets (MSDS's) which list the properties and hazards of chemicals are available if you have concerns or questions about any substance you use in the lab. Your instructor will teach you to read and interpret MSDS's and will provide copies on request.

CHEMICAL SPILLS: A solution spilled on your clothing or skin, especially a concentrated acid or alkali, can be dangerous. Wear a plastic apron to protect against this type of accident. If a spill gets on your body, wash it off immediately under the safety shower and remove any contaminated clothing. A spill on your hand or arm should be washed off in the sink without delay. Inform your instructor of any accident. Large spills on a benchtop or floor require your instructor's help for proper cleanup.

ELECTRICAL SAFETY: Keep water away from electrical devices. Never touch an electrical appliance, hotplate, stirrer, lamp, computer, switch or plug with wet hands. Never touch an electrical device and a water pipe or other ground at the same time; this could result in a fatal shock. To unplug a device, grasp the plug firmly with your dry hand; do not yank on the wire. Report any defective or malfunctioning equipment to your instructor at once.

COMPRESSED AIR: Compressed air may be used only for purposes specified by the instructor and only when the user is wearing eye protection. Compressed air must never be used to clean clothing. Never point the air nozzle toward anyone's face or body.

TOUCHING, TASTING AND SMELLING: Never deliberately taste anything in the lab. Acids and alkalis can cause severe mouth burns. Substances such as lead salts are very toxic even though they may taste sweet. Supposedly safe substances such as glucose may be contaminated. Never pipet solutions by mouth; it is easy to ingest a solution accidentally this way. Use a rubber pipet bulb to provide suction. Never touch any chemical with your bare hands. Use appropriate containers to dispense liquids and a spatula for solids. Use rubber gloves to clean up spills or contamination. Keep hands away from your face, especially from eyes and lips. Reactions that generate poisonous gases or fumes must be done in a hood. The lab manual and your instructor will advise you about this. Never deliberately inhale any gas. Some are very irritating or toxic. Do not smell chemicals indiscriminately. To smell something, first ask your instructor's permission; then waft a small amount of vapor toward your nose with your hand and sniff cautiously.

PREGNANCY: The lab experiments in this course have been designed to minimize unnecessary exposure to hazardous substances. However, it is not advisable for pregnant women to be exposed to any chemicals. If you are pregnant, suspect you are pregnant or become pregnant during the semester, ask the instructor for a list of the chemicals used in the experiments. Show the list to your physician and follow his or her recommendation.

CHEMICAL DISPOSAL: Few chemicals can be poured down the drain without interfering with the action of a sewage plant or harming the environment when residues of the chemical reach the water table or ocean. For this reason, never to pour any chemical into a sink drain unless told to do so by your instructor. Never put any chemical into the trash where it might start a fire or contaminate a landfill. Specific instructions will be given for chemical disposal before each experiment. Labeled containers will be placed in the hoods for collecting each toxic waste. These wastes will later be removed from the college premises by a certified disposal company. Ask your instructor if you are in doubt about any procedure. Paper towels, litmus paper, matches and wooden splints must be thrown in trash receptacles, not the sinks.

INJURIES: All injuries, no matter how slight, must be reported to the instructor for evaluation and referral to the school nurse and Security. If there is any doubt about the severity of an injury, call Security instead of moving the victim. When helping an injured person, College employees and students must make every effort to avoid contact with blood and other body fluids which may carry the viruses that cause AIDS, Hepatitis B and Hepatitis C. Just as in a clinical setting, Universal Precautions must be observed. That is, assume all body fluids are potentially infectious. First aid kits and disposable gloves are available in all areas where injuries are likely. Mucous membrane or broken skin contact with body fluids must be reported to the school nurse and to Security at once. The College has a protocol for testing and counseling anyone who has been exposed to bloodborne pathogens.

VISITORS: Visitors, especially children, are not allowed in the lab at any time, even if no experiments are being conducted. Children are also not allowed in the laboratory prep rooms or, at the Warwick Campus, in the corridor outside the labs.

CCRI ENVIRONMENTAL HEALTH AND SAFETY: To read all of CCRI's EHS (Environmental Health and Safety) policies, visit CCRI's homepage at <http://www.ccri.edu>. Near the top of the homepage, click on the DIRECTORY link and under Special Programs click on Environmental Health and Safety. At the bottom of the EHS index (opening) page you will see a list of about 30 policies, award announcements and other documents pertaining to CCRI's accomplishments in environmental health and safety.

**COMMUNITY COLLEGE OF RHODE ISLAND
CHEMISTRY DEPARTMENT LABORATORY SAFETY REGULATIONS**

I have read and understood the laboratory safety regulations on the preceding four pages and I agree to abide by them. I understand that any violation of the rules may result in my being asked to leave the lab and being given a zero grade for the day. I understand that I will be handling hazardous materials. I have been warned and I understand the risks involved in using them.

Signature: _____

Today's Date: _____

Course Name: General Chemistry II

Course Number: CHEM-1100

Section: 102