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*1136-TR-P-CRED-REG-CHEM-121-JK-66370-SPR2013*

## SYLLABUS

### Basic Chemistry, Chem 121 JK

Tuesday, Thursday: 12:30 pm — 3:10 pm

Studio Class (Room #3162)

<b>Instructor:</b>	Ahmed A. Hakeem; Office: Room #3628, E-mail: <a href="mailto:ahakeem@ccc.edu">ahakeem@ccc.edu</a> M, W 3:00 pm – 6:00 pm (By Appointment: 8:45 PM – 9:15 PM) T, Th 9:45 AM – 11:00 PM 3:15 PM — 5:15 PM
<b>Required Materials:</b>	<ol style="list-style-type: none"> <li>1. <b>Text Book:</b> Introductory Chemistry Essentials by Nivaldo Tro 4<sup>th</sup> Ed.</li> <li>2. <b>Laboratory Manual, Catalyst:</b> The Pearson Custom Library for Chemistry, (Experiments will also be provided other than this manual)</li> <li>3. Scientific calculator (No cell phone calculators in the class)</li> </ol>
<b>Course Description:</b>	<b>Chem. 121:</b> Principles of general inorganic chemistry, including properties of matter, dimensional analysis, fundamentals of stoichiometry, interpretation of the periodic table, nomenclature & introduction to solution chemistry, and commonly used concentration units
<b>Prerequisites:</b>	Eligibility for Mathematics 99 or higher and concurrent enrollment in Chemistry 121, or consent of department chair

### Student Learning Objectives (SLO):

At the completion of this course, the successful student will be able to:

1. Demonstrate the use of significant figures in: additions, subtractions, multiplications, and divisions
2. Convert numbers in decimal notation to scientific notation and vice versa
3. Explain the arrangement of electrons in an atom and its affects on bonding and chemical properties
4. Compare and contrast the chemical behavior and physical properties of common substances
5. Predict and explain the electronic and molecular structures of common substances using models
6. Determine the qualitative and quantitative relationships between matter and energy involved in chemical or physical processes
7. Classify matter by its state and bonding behavior using the Periodic Table as a reference
8. Solve quantitative problems (stoichiometric) involving chemical formulas and equations
9. Formulate and test hypotheses
10. Perform laboratory experiments demonstrating safe and proper use of standard chemistry glassware and equipment
11. Record, graph, chart and interpret data obtained from experimentation

### Evaluation:

Your grade will be based on your performance in the following:

10 Quizzes + 1 take home quiz (20 pts each)	220 pts	20%
10 Labs (15 pts each)	150 pts	20%
3 Midterm Exams (100 pts each)	300 pts	25%
1 Final Exam (Comprehensive, 100 pts)	100 pts	25%
1 Exit Exam (30 pts)	<u>30 pts</u>	<u>10%</u>
Total	800 pts	100%

Note: No make-ups for Quizzes, exams, or labs.

**Final Grades:** Letter grades will be assigned as per the following:

A	90%
B	80%
C	70%
D	60%
F	<60%

**Attendance:** Your attendance is required at all classes. Excessive absences will result in your being dropped from the course or receiving an F.

**Quizzes:** Each lecture quiz will cover the material discussed in the class pertaining to the chapter discussed. See attached tentative lecture and quiz schedule.

**Exams:** There will be three midterm exams and one final exam. You must bring your own calculator, pencil, and eraser for exams. Cell phones should not be used at any time during the exam, *even as calculators*. Once the exam begins you may not leave the room unless you turn in the exam, so plan to take a bathroom break *before* the exam.

**Exit Exam:** In order to insure uniform expectations across all sections of Chem. 121 at Truman College, the department has instituted an 'Exit exam'. There will be 30 multiple choice questions to be done in 60 minutes. 17 correct answers are needed in the exit exam to pass the course.

**Labs:** The procedure for each experiment is fully described in the laboratory manual. Therefore, you must have your own copy of the laboratory manual to perform the experiments. You are expected to read the expt. before coming to lab.

When assigned by the instructor, pre-lab questions will be due before the lab begins, and must be turned in before you will be permitted to start the lab. When post lab questions or reports are assigned, they will be due at the beginning of the next lab period, unless otherwise announced. Late lab reports score 0 for that portion of the lab grade. **There will be no make up laboratory experiments.** No pre-lab, post-lab, or data sheets will be accepted from students who miss the lab period. Lab reports should be neatly typed.

**Academic Dishonesty** Academic dishonesty is a serious offense, which includes but is not limited the following:

Cheating, complicity, fabrication and falsification, forgery, and plagiarism. Cheating involves copying another student's paper, exam, quiz or use of technology devices to exchange information during class time and/or testing. It also involves the unauthorized use of notes, calculators, and other devices or study aids. In addition, it also includes the unauthorized collaboration on academic work of any sort. Complicity, on the other hand, involves the attempt to assist another student to commit an act of academic dishonesty. Fabrication and falsification, respectively, involve the invention or alteration of any information (data, results, sources, identity, and so forth) in academic work. Another example of academic dishonesty is forgery, which involves the duplication of a signature in order to represent it as authentic. Lastly, plagiarism involves the failure to acknowledge sources (of ideas, facts, charges, illustrations and so forth) properly in academic work, thus falsely representing another's ideas as one's own." - p. 39, CCC Student Policy Manual.

### **Laboratory Outline:**

#### **Objectives:**

1. To introduce the students to laboratory experimentation
2. To increase the student's knowledge of the capabilities and limitations of measurements
3. To familiarize students with a variety of chemical reactions and the equations used to describe them
4. To give students laboratory experience in collecting and processing data

#### **Lab Rules:**

1. Don't come to the lab late. Wear protective goggles at all times in the laboratory work areas
2. Children are not allowed to stay in the laboratory
3. No drinking or eating is allowed in the laboratory

4. Wear a laboratory apron to protect your clothing
5. After completing the experiment, clean and put away your glassware and equipment  
Clean your work area and make sure that the gas and water are turned off
6. Dispose insoluble waste such as filter paper, litmus paper, matches in the wastebasket, and not in the sink. Dispose broken glass in the broken glasses boxes. Use dust pan and brush to clean the broken glass area. Dispose all other solid chemicals as directed by your instructor. Empty nontoxic liquids into the sink and wash them down with water. Pour all the toxic liquids into the waste bottles provided in the hoods
7. Do not take reagent bottles to your laboratory work area. Use test tubes, beakers, or paper to obtain chemicals from the dispensing area. Take small quantities of reagents. You can always get more if you run short
8. Check carefully the label on each reagent bottle to be sure you have the correct reagent. The names of many substances appear similar at first glance
9. To avoid possible contamination, never return unused chemicals to the reagent bottles
10. Do not insert medicine droppers into reagent bottles. Instead pour a little of liquid into a small beaker and use it
11. Try to be neat in your work; if you spill something, clean it up immediately. Ask for help, if needed
12. Wash your hands anytime you get chemicals on them and at the end of the laboratory period
13. Keep the balance and the area around it clean. Do not place chemicals directly on the balance pans; place a piece of weighing paper or a small container on the pan first, and then weigh your material. Never weigh an object while it is hot
14. Do not heat graduate cylinders, burettes, pipettes, or bottles with a burner flame
15. Do not look down into the open end of a test tube in which the contents are being heated or in which a reaction is being conducted
16. Do not perform unauthorized experiments
17. Every student should do the experiment individually unless otherwise indicated by the instructor

#### Lab Reports:

1. Study the experiment carefully before coming to class, so that you don't have to spend a lot of time finding out what the experiment is all about. You must complete all pre-lab needed tasks of each experiment before you come to the lab.
2. Points will be deducted if you let someone copy your data or any part of the report.
3. The report must be clear, clean, and neat. The pages must be named and stapled together in a numerical order. It should include the following:

#### A. Cover sheet:

The *cover sheet* should appear as follows

Course #: \_\_\_\_\_ Section #: \_\_\_\_\_

Name of the Experiment: \_\_\_\_\_

Your Name: \_\_\_\_\_ Date performed: \_\_\_\_\_ Date submitted: \_\_\_\_\_

**B. Abstract:** A brief summary (not more than 5 sentences) of the experiment which includes *what* you did, the *method used* and a brief statement regarding *your results* or lack of. (1 pt)

**C. Methods:** A narrative of the experimental procedure in your own words. Known procedures need not be rewritten. Rather the references need to be cited and any modifications done to the published method stated. (2 pts.)

**D. Results:** A brief narrative of the experimental results. (2 pts.)

**E. Discussion:** Discuss the relationship between your experimental results and the expected results. Give plausible reasons (not limited to experimental errors) for any differences. Include the relevance of the results and your experience doing this experiment in relation to the stated objectives. (3 pts.)

**F. References:** List your sources. For example: Handbook of Chemistry and Physics, the proper citation of the handbook, texts or websites. (2 pts.)

**G. Figures, Tables, Data, Spectra:** This section includes your tabulated data and results, calculations, graphs, and spectra. (2 pts.)

**H. Answer to questions:** Pre and Post Laboratory questions (3 pts.)

**Note:** Laboratory performance points are included in the scores. Failure to follow correct laboratory techniques or laboratory safety protocols will reduce your score.

\*This is a lab course and as such you will need to satisfactorily complete labs in addition to maintaining the letter grade in order to pass this course.

**List of Lectures/Topics:**

- Chapter 1: The Chemical World
- Chapter 2: Measurement and Problem Solving
- Chapter 3: Matter and Energy
- Chapter 4: Atoms and Elements
- Chapter 5: Molecules and Compounds
- Chapter 6: Chemical Composition
- Chapter 7: Chemical Reactions
- Chapter 8: Quantities in Chemical Reactions
- Chapter 9: Electrons in Atoms and the Periodic Table
- Chapter 10: Chemical Bonding
- Chapter 11: Gases
- Chapter 12: Liquids, Solutions, and Intermolecular Forces
- Chapter 13: Solutions
- Chapter 14: Acids and Bases

**List of Experiments:** (Thursdays only)

Check-In & Lab Safety Quiz/Information

**Expt #    Topic**

1. Laboratory Techniques
  2. Measurements
  3. Freezing Points – Graphing Data
  4. Calorimetry and Specific Heat
  5. Preparation and Properties of Oxygen
  6. Water in Hydrates
  7. Properties of Solutions
  8. Double Displacement Reactions
  9. Single Displacement Reactions
- Clean up and lab checkout

**Tentative Schedule (Spring 2013)**

Below is a tentative schedule of lecture topics, labs, quizzes, and exams. The schedule/list of topics and lab experiments are subject to change. Students will be notified of changes, if any.

Week	Day	Date	Lecture Topic/Quiz/Exam/Lab
1	Tuesday	1/15	Introduction of the Course/Gen. Chemistry
	Thursday	1/17	Background Assessment/Review
2	Tuesday	1/22	Ch 1: The Chemical World Ch 2: Measurement and Problem Solving
	Thursday	1/24	Lab 1 Laboratory Techniques / Measurements

<b>3</b>	Tuesday	1/29	Quiz 1 (Ch 1-2) Ch 3: Matter and Energy
	Thursday	1/31	Lab 2: Energy and Specific Heat (Lab Manual, Page 15)
<b>4</b>	Tuesday	2/5	Quiz 2 (Ch 3) Ch 4: Atoms and Elements
	Thursday	2/7	Lab 3: Freezing and Melting Points (Lab Manual, Page 25)
<b>5</b>	Tuesday	2/12	Quiz 3 (Ch 4) Ch 5: Molecules and Compounds
	Thursday	2/14	Lab 4: Molecular Geometry and Shape
<b>6</b>	Tuesday	2/19	Quiz 4 (Ch 5) Ch 6: Chemical Composition
	Thursday	2/21	Lab 5: Water in Hydrates (Ref: Hein's Arena)
<b>7</b>	Tuesday	2/26	Exam 1 (Ch 1-6) Ch. 7: Chemical Reactions
	Thursday	2/28	Lab 6: Single Displacement Reactions (Ref: Hein's Arena)
<b>8</b>	Tuesday	3/5	Quiz 5 (Ch 7) Ch 8: Quantities in Chemical Reactions
	Thursday	3/7	Lab 7: Double Displacement Reactions (Ref: Hein's Arena)
<b>9</b>	Tuesday	3/12	Chapter 8 contd.
	Thursday	3/14	Lab 8: Identification of Ions
<b>10</b>	Tuesday	3/19	Quiz 6 (Ch 8) Ch 9: Electrons in Atoms and the Periodic Table
	Thursday	3/21	Lab 9: Empirical Formulas.
<b>11</b>	<b>Mon-Sun</b>	<b>3/25-3/31</b>	<b>Spring Break</b>
<b>12</b>	Tuesday	4/2	Exam 2 (Ch 7-9) Ch 10: Chemical Bonding
	Thursday	4/4	Quiz 7: (Ch 10) Ch 11: Gases (Gas Laws)
<b>13</b>	Tuesday	4/9	Ch 11. contd. (Problem solving)
	Thursday	4/11	Quiz 8 (Ch 11) Ch 12: Liquids, Solutions, and Intermolecular Forces Take home quiz
<b>14</b>	Tuesday	4/16	Quiz 9 (Ch 12) Ch 13: Solutions
	Thursday	4/18	Ch. 13 contd. Flame /Ignition test (Demo)
<b>15</b>	Tuesday	4/23	Quiz 10 (Ch 13) Ch 14: Acids and Bases Lab Demo/Acids, Bases, reactions

	Thursday	4/25	Ch 14. contd. (pH calculations)
<b>16</b>	Tuesday	4/30	Exam 3 (Ch 11-14) Quiz 11 (Take Home) due Study Guide /Review
	Thursday	5/2	Practice for Exit Exam / Review /Questions/Answers
<b>17</b>	Tuesday	5/7	Final Exam (Comprehensive)
	Thursday	5/9	Exit Exam (1 hr)