Science Division

Class Hours:	Lecture	T, TH	9:35 am – 1:00 am	Location:	MSA 111
	Conference	T, TH	11:10 am – 12:25 am	Location:	MSA 111
	Laboratory	M, W	9:35 am – 11:40 am	Location:	MSA 405

Professor: ***Dr. Abraha Bahta***
Location: **MSB 231/233**
Phone: **287-4236/7222**
Office Hours: **M, W (11:45 am to 12:45 pm); T, TH (3:45 pm to 4:45 pm) + by Appointment**
E-mail: ***bahtaa@.wlac.edu***

Welcome: During the course of the 2014 Fall Semester, you will continue to build upon a body of chemical knowledge you acquired in semesters past when you took other chemistry courses (chem 60, 101, or equivalents). Topics covered in this course are inter-related and the challenge is to learn and discuss how a current topic is connected to previous ones. Thus, you will be tasked with learning how to methodically solve multi-concept problem sets that are often present at the end-of-chapters we are set to cover. Furthermore, you will continue to improve on your scientific writing, reading comprehension, chemical vocabulary and your critical thinking skills by learning to research, collect and evaluate information to solve chemical problems of greater complexities.

In your laboratory exercises, you will learn to apply various appropriate and effective techniques to undertake scientific inquiries and draw conclusions when analyzing physical and chemical processes. The theoretical and conceptual aspects that govern the experiments in this course are very much inter-twined with the lecture components of the course. Throughout the semester, there are going to be extensive discussions of experimental findings. At times, in our efforts to validate concepts presented in the lectures, we shall utilize laboratory time to further understand chemical information extracted from data gathered in the laboratory. The laboratory skills you learn in this course will help you succeed both in your careers and in life. Most importantly, your education is ultimately **YOUR** responsibility. **YOU** determine your level of success. Successful college students are self-motivated and understand the importance of studying the material, coming to class prepared and practicing skills learned. YOU CAN DO IT and Science Division and its staff are here to support your efforts.

Course Description: This course is the second course of a two-semester sequence and the topics covered for this course include: chemical kinetics, chemical equilibrium, the nature of acids and bases, applications of aqueous equilibria, chemical thermodynamics, electrochemistry, and nuclear chemistry. Other topics to be covered include: fundamentals of organic chemistry, coordination chemistry and the chemistry of Representative Elements --- Groups IA through IVA and Groups VA through VIIIA ---, as well as the chemistry of Transition metals.

This course description can be found on the Electronic Curriculum Development (ECD) System found at https://ecd.laccd.edu/. Once you click on "find a course" you will be able to see the official Course Outline of Record.

Prerequisite: As specified in the College Course Catalog – Successful completion of Chem. 101 with a grade of C or better within the last two years.

REQUIRED TEXTS

LECTURE Steven S. Zumdahl, and Susan A. Zumdahl, **CHEMISTRY**, Ninth Edition, Cengage Learning, 2014.

LAB MANUAL J. A. Beran**,** ***Laboratory Manual for Principles of General Chemistry***, Ninth Edition, John Wiley & Sons, Inc., 2011.

OPTIONAL SUPPLEMENTARY MATERIALS

- ***Study Guide*** for **CHEMISTRY**, by Paul B. Kelter. It provides you with a means of self-evaluation in determining how well you understand the materials of each chapter.

- ***Partial Solutions Guide*** for **CHEMISTRY**, by Thomas J. Hummel, Susan A. Zumdahl, and Steven S. Zumdahl. This provides detailed solutions for half of the end-of-chapter exercises. It can be helpful **IF** you look at the solutions only **AFTER** you try the exercises by yourself.

- ***Complete Solutions Guide*** for **CHEMISTRY**, by Thomas J. Hummel et al. It provides detailed solutions for all of the end-of-chapter exercises in **CHEMISTRY**. I have placed a copy on **reserve** in the **library.**

- ***Solving Equilibrium problems with Applications to Qualitative Analysis***, by Steven S. Zumdahl. It provides thorough, step-by-step procedures for solving equilibria related problems.

COURSE STUDENT LEARNING OUTCOMES (SLOs):

Upon successful completion of this course you will be able to demonstrate a firm understanding of:

- a skillful use of: (i) *Le Systeme International d'Unites* (SI Units) as well as the English System for scientific measurements; (ii) exponential notations and significant digits in calculations involving both linear and nonlinear functions; (iii) quadratic equations (iv) natural and common logarithmic functions and (v) graphing techniques for data analysis

- the existence of an infinite set of concentrations of products and reactants that satisfy an equilibrium expression, irrespective of the type of equilibrium system studied: (i)

homogeneous equilibria, (ii) heterogeneous equilibria, (iii) acid-base equilibria, (iv) solubility equilibria, or (v) complex ion equilibria

- the Henderson-Hasselbalch equation and its application in the determination and preparation of buffered solutions of desired pH
- the thermodynamic properties of chemical reactions in terms of change in Gibbs free energy and relate the signs (+/-) of delta H, delta S and delta G to the spontaneity of a process at different temperatures
- the potential of an electrochemical cell dependence on the differences in energies of reactants and products; and that a cell may be constructed from two solutions of the same type of electrolyte at different concentrations
- the process of electrolysis and its commercial uses
- nuclear stability and the kinetics of radioactive decay
- the chemistry of the representative elements
- the fundamentals of coordination chemistry
- the chemistry of hydrocarbons and hydrocarbon derivatives

Course SLOs are located on the West Los Angeles College SLO website. You can visit at http://www.wlac.edu/slo/course_slos.html. Follow the link on the page to the course SLO listing. Locate Science Division on the tabs at the bottom of the window. Click on the tab and locate your course. Besides the CSLOs (Course Student Learning Outcomes), included, for your reference, are also the ISLOs (Institutional Student Learning Outcomes) and the PSLOs (Program Student Learning Outcomes.

Program SLOs

1. Utilize an appropriate and effective scientific methodology to analyze physical and chemical processes in the workplace and in everyday living. (Theme: Scientific process).

2. Explain and analyze the chemical world—as chemistry is a basic science with connections to many careers.

3. Research and interpret scientific literature.

Institutional SLOs (**A, B, C, D, F** and **H)**

A. Critical Thinking: Analyze problems by differentiating fact from opinions, using evidence, and using sound reasoning to specify multiple solutions and their consequences.

B. **Communication:** Effectively communicate thought in a clear, well-organized manner to persuade, inform, and convey ideas in academic, work, family and community settings.

C. **Quantitative Reasoning:** Identify, analyze, and solve problems that are quantitative in nature.

D. **Self-awareness/Interpersonal Skills:** Apply self-assessment and reflection strategies to interpersonal, work, community, career, and educational pathways.

F. Technical Competence: Utilize the appropriate technology effectively for informational, academic, personal, and professional needs.
H. Ethics: Practice and demonstrate standards of personal and professional integrity, honesty and fairness; apply ethical principles in submission of all college work.

EVALUATION AND GRADING GUIDELINES
To ensure that you are keeping up with the readings, and as a means of re-enforcing learning of the lecture and lab materials, various forms of evaluations are employed:

- Frequent quizzes
- Midterm Exams
- Comprehensive Final Exam

The exams will primarily consist of some combination of multiple choice, fill-in, drawing, computation, and short answer questions. All students are responsible for taking all exams. You will be expected to provide SCAN-TRON # 882-ES answer sheets and a No. 2 soft lead pencil. All exams must be taken on the scheduled day and time. No make-up exams will be given for any reason. If a student misses midterm exam, for an excused absence with **a proper documentation**, the **lowest percentage** exam score from **all the other exams** given during the semester (including the final) will be used as the score for the missed exam. A **second missed exam** will be given a score of **zero** for that exam. If a student is absent (excused) for the final exam, he/she will be given an **incomplete**, as long as the student is in good standing going into the final. The incomplete can be made-up by taking the final within a year.
The course will be allotted **1000 POINTS.** The chart below will serve as a guideline on how all points awarded to you in the course are allocated and the **final letter grades** will be assigned according to the percentages shown in the chart.

GRADING

Assignment Category	# of Assign.	Points/Assignment	Total Points	% of Total Grade
Quizzes	**7**	**BEST 5 (40 PTS/)**	**200**	**20%**
Laboratory Reports	**13-15**	**Variant****	**300**	**30%**
Mid-Term	**3**	**100**	**300**	**30%**
Final	**1**	**200**	**200**	**20%**
Grand Total			**1000**	**100%**
880 - 1000 = **A**	770-879 = **B**	650 - 769 = **C**	540 - 649 = **D**	539 and below = **F**

****** Included in this syllabus is also a separate **Laboratory Scoring Guide**. The lab scores will eventually have to be rescaled to 300 points to fit into the overall grading rubric.

CLASS POLICIES

Attendance
Because class discussions and conference drills are an integral part of this course, attendance is mandatory. Up to 3 absences are allowed. After that, you could be dropped. Students are expected to attend every class meeting, to arrive on time and stay throughout the class period; **furthermore,** 3 tardies = 1 absence. Thus, students **may be dropped** from class for a variety of reasons: **3 absences, excessive tardiness**, (or a combination of absences and tardiness that add to 3 absences), and **a no show during the first day of class.**

Preparedness
You are expected to arrive on time. You will come to each class session prepared. You will have your books, notebooks, handouts, pens/pencils, any work that is due, and you will be prepared to participate in topical discussions.

Contacting Me
E-mail is the best and quickest way to contact me. Thanks to modern technology, my e-mail is linked to my phone. **If you have a problem, do not let it snowball. Contact me immediately.** You are expected to ask questions and obtain help from your instructor via email and/or during office hours.

Recording Devices
State law in California prohibits the use of any electronic listening or recording device in a classroom without prior consent of the instructor and college administration. Any student who needs to use electronic aids must secure my consent. If granted, a notice of consent shall be forwarded to the Vice President of Academic Affairs for approval (WLAC College Catalog). A link to the Catalog is provided:
http://www.wlac.edu/academics/pdf/WLAC_12-14Catalog_Policies.pdf

CAMPUS RESOURCES
If you are having problems, don't let them snowball. Come and talk with me and check out some of the campus resources available to you.

Office of Disabled Student Programs and Services (DSP&S)
Student Services Building (SSB) 320, tel (310) 287-4450.
West Los Angeles College recognizes and welcomes its responsibility to provide an equal educational opportunity to all disabled individuals. The Office of Disabled Students Programs and Services (DSP&S) has been established to provide support services for all verified disabled students pursuing a college education. DSP&S students may qualify for: priority registration, registration assistance, special parking permits, sign language interpreters and assistive technology (WLAC College Catalog).

Instructional Support (Tutoring) & Learning Skills Center
Heldman Learning Resources Center (HLRC) | (310) 287-4486

Improve your math fundamentals and chemistry knowledge with convenient, self-paced computer-aided courses in the Learning Skills Center. Increase your knowledge and learning success: sign up for tutoring in various college subjects (WLAC College Catalog).

Library Services

Heldman Learning Resources Center (HLRC) | (310) 287-4269 & (310) 287-4486

The WLAC Library provides instruction on how to use the online catalog, periodical and research databases. In addition to a large collection of books, periodicals and videos, the WLAC Library has course textbooks which students may use while in the Library. Web access is available in LIRL as well as meeting rooms. The upper floors provide a beautiful view ideal for study (WLAC College Catalog).

COLLEGE POLICIES

Academic Integrity

Each student is expected to do his/her own work on all assignments, lab write-ups, examinations, etc. This is the narrative on **WLAC Policy on Student Academic Honesty** (Adopted by the WLAC Academic Senate June 2006): West Los Angeles College is committed to preparing students to compete confidently and effectively in a rapidly changing, information-driven, technological global community. Students are expected to be honest and ethical. No acceptable rationale for dishonesty can be based on physical, emotional or learning challenges.

The college expects that students to do their own academic work. Students are expected to mentally isolate themselves while taking quizzes and examinations. All responses ought to be based upon studied and memorized information, unless specifically instructed to use reference materials and/or specified notes.

Acceptable academic conduct does not include cheating, plagiarism or any other unethical academic behavior. It is the students' responsibility to know what conduct is academically honest. The following list includes some examples of academic dishonesty:

Plagiarism

- Submitting someone else's scholarly work, such as essays or term papers, as your own.
- Submitting someone else's artistic work as your own. (examples include musical compositions, computer programs, photographs, paintings, drawings)
- Copying, in part or in full, someone else's assignment.
- Including in your work without proper citation the ideas or language of another author.
- Including in your work without proper citation information downloaded from the Internet.

Cheating

- Consulting concealed notes during a quiz, test or exam.

- Using unauthorized prepared materials during a quiz, test or exam.
- Receiving information or answers from another individual during a quiz, test or exam.
- Copying information or answers from a classmate's paper.
- Using electronic devices that have not been authorized by the instructor during a quiz, test or exam.
- Inventing data for a laboratory experiment or case study.
- Submitting work prepared previously for another course.
- Talking during a quiz, test, or exam.

Other examples of academic dishonesty:

- Providing your work for someone else to copy.
- Allowing a fellow student to use answers on your paper during a quiz, test or exam.
- Passing information to a fellow student during a quiz, test or exam.
- Purposely allowing a classmate to copy your original work product, such as answers to assignments, lab reports, term papers, etc.
- Stealing tests or examinations.
- Removing tests or exams from a campus facility without the permission of the instructor.

Violators of the WLAC Policy on Student Academic Honesty are subject to disciplinary action. Depending upon the seriousness of the violation, the disciplinary action may be any or all of the following:

- The instructor may warn the student that the conduct is a violation of the WLAC Policy on Student Academic Honesty.
- The instructor may give a zero score or an "F" grade for the assignment or exam. In the case of assignments which are not averaged into the course grade (such as extra credit assignments) the penalty may be the subtraction of the points the assignment is worth.
- The instructor may report in writing the academic dishonesty incident to the Office of Student Services to be placed in the student's disciplinary file.
- ♦ The instructor may send a written report to the Office of Student Services about the student's violation of the Standards of Student Conduct (LACCD Board Rule 9803.12), and request that the college initiate disciplinary action leading to the suspension of the student from the college or the expulsion of the student from the college and the entire

district as authorized by LACCD Board Rule 91101.11b. In all instances, the student has the right of due process when charged with a violation of the Standards of Student Conduct. Details of the Student Grievance Procedure may be found in the West Los Angeles College catalog and in the Schedule of Classes in the section on student conduct.

CLASSROOM ETIQUETTE AND CONDUCT

It is very simple! Get to class on time, every time and stay the whole time. When you arrive to class, make sure you have used the restroom, had a chance to eat, check your messages, etc. Walking in and out is rude and disruptive. If you need to leave early, or have some other problem, you need to notify me in advance. In the event that you are more than **ten minutes late**, **stay out** the whole period. Disrupting the class while lecture is in progress is unacceptable. Furthermore, while lecture is in progress should you, for any reason leave the classroom; you are not to come back. It is absolutely unacceptable to disrupt the class by being in-and-out of the classroom during the lecture. Bathroom runs should be taken care of prior to coming to class. You might wish to control your liquid in-take in accordance to class duration. [If a **medical condition** exists that mandates the student to go to the bathroom frequently, the student needs to discuss the situation with me privately.]

Cell Phones, iPods, etc.

Turn them off and put them away when class begins! Although it may not seem possible, you can survive without talking and texting on your cell phone, or listening to your iPod for 75-90 minutes. Talking and texting on cell phones not only distract you, but they are a distraction for me and your peers. If you are expecting a 'very important, i. e. more important than being in class, phone call', then by all means stay away from class and wait for it! Surely, we all have loved ones we want to engage in a conversation over the phone. I am certain family members and friends can wait for the calls for 75-90 minutes, particularly you if have informed them that you will be in class during such and such time. Common courtesy dictates that a beeper or a ringing cell phone should not disrupt the classroom. According to District code 9803.15, disruption of classes or college activities is prohibited and will not be tolerated. Should that happen, you will be asked to leave the classroom; and there will be a-three-way conference that includes the Dean of academic affairs, and me (the instructor) before you are allowed to return to the classroom.

The WLAC Science Division has also adopted the following Policy on Student Conduct in Classroom:

1. Be honest and ethical; follow the rules described in the college's policy on academic honesty.
2. Arrive before the start of class; wait until the previous class has been dismissed before entering the classroom.

3. Whenever you arrive to class late, open the door *quietly*, enter *quietly*, and close the door *quietly* so as not to disturb the class in session. Then, take a seat near the door, on the side or at the back of the classroom. Never walk in front of the instructor.
4. Do not eat or drink beverages in the classroom.
5. No gum chewing.
6. Sharpen pencils before class starts. Do not sharpen pencils during lecture.
7. Listen carefully when directions and announcements are being given. You are responsible for all information announced whether or not you were absent, tardy, or not paying attention.
8. Turn off or mute cell phones before entering the classroom.
9. Do not answer cell phones during class.
10. Do not leave the classroom during the lecture. Wait until the class is dismissed.
11. No talking during lecture. Do not chat with your classmates at any time during lecture, including during the time your instructor is putting information on the chalkboard.
12. Raise your hand and wait for recognition by the instructor to ask a question during lecture.
13. During the class, do not interrupt the instructor with personal questions. Wait until the class has been dismissed.

LECTURE SCHEDULE

Weeks/Date			**PROBLEMS (FOR CONFERENCE)**
1.	Feb 10, 12	Intro. remarks; Math review: **Appendices**: **A1.1-A1.4** Exponential Notation, Logarithms, Graphing Functions, Solving Quadratic Equations	
		CHAP. 12 Sections 1-7: Chemical Kinetics: Reaction Rates and their Governing Laws, Reactions Mechanisms	**P 591:** 20,23,26,29, 31, 53, 65
2.	Feb 17, 19	**CHAP. 12** cont'd.	
	FEB 19	**THURSDAY QUIZ #1**	
3.	Feb 24, 26	**CHAP**. **13**: 13.1-13.7 Homogeneous and Heterogeneous Equilibria	**P 643:** 17,24,26,30, 36,41,51,58, 59,67,72,73

	FEB 26	**THURSDAY** **QUIZ #2**	
4.	March 03, 05	**CHAP. 13** cont'd.	
	MARCH 05	**THURSDAY** **FIRST MIDTERM EXAMINATION**	
5.	March 10, 12	**CHAP. 14**: 14.1-14.8, 14.11 Acid-Base Equilibria	**P 701:** 26,27,31,35, 38,39,43,45, 63,73,105,127
6.	March 17, 19	**CHAP. 14** cont'd; **CHAP. 15** 15.1-15.8	
	MARCH 19	**THURSDAY** **QUIZ #3**	
7.	March 24, 26	**CHAP. 15** continued-- More Acid-Base Equilibria	**P 752:** 23,25,27,30, 32,39,40,49, 54,59,60,79, 81, 82, 89,100
		CHAP. 16 Solubility & Complex Ion Equilibria	**P 781:** 19-113(ODD)
	MARCH 26	**THURSDAY** **QUIZ #4**	
8.	**MARCH 31**	**TUESDAY** **CESAR CHAVEZ DAY** **COLLEGE CLOSED**	
	APRIL 02	**THURSDAY** **SECOND MIDTERM EXAMINATION**	
9.	**APRIL 6-10**	**SPRING BREAK** **COLLEGE CLOSED**	
10.	April 14, 16	**CHAP. 17.1 – 17.8** Thermodynamics	**P 822:** 21,23,24,31, 33,42,44,45
11.	April 21, 23	**CHAP 17** cont'd	
		CHAP. 18 17.1-17.4, 17.7 Electrochemistry	**P 879:** 15,16,19,31 32,37
	APRIL 23	**THURSDAY** **QUIZ #5**	
12.	April 28, 30	**CHAP. 17** cont'd.	
	APRIL 30	**THURSDAY** **QUIZ #6**	
13.	May 05, 07	**CHAP. 22** Intro. Organic Chemistry	**P 1091:** 13-16, 19-24, 37-41, 45-70
	MAY 07	**THURSDAY** **THIRD MIDTERM EXAMINATION**	

14.	May 12, 14	**CHAP. 21** Coordination Chemistry		**P 1071:** 5-9, 21, 22, 30, 33, 41-46
15.	May 19, 21	**CHAP. 18**	Nuclear chemistry	
	MAY 21	**THURSDAY**	**QUIZ # 7**	
16.	May 26, 28	Nuclear Chemistry Cont'd		
17.	June 01 - 06	**FINALS WEEK**		

FINAL EXAM WEDNESDAY, JUNE 03, 2015
TIME 10:15 AM – 12:45 PM

LABORATORY SCHEDULE

Lab. Manual: J. A. Beran**,** ***Laboratory Manual for Principles of General Chemistry***, Ninth Edition, John Wiley & Sons, Inc., 2011.

Week/Date		Lab #	Experiments
1.	Feb 09, 11	Check-in Handout Handout	Lab. Safety Video Graphing Data and Curve Fitting/Excel Tutorial Graphical Analysis
2.	Feb 16, 18	Exp. ***23***	Factors Affecting Reaction Rates
	FEB 16	**NO LAB**	**PRESIDENTS' DAY COLLEGE CLOSED**
3.	Feb 23, 25	Exp. ***24***	A Rate Law and Activation Energy
4.	March 02, 04	**Handout**	Absorption Spectrum of Cobalt(II) chloride
5.	March 09 11	Exp. ***16*** Exp. ***34***	Le Cha^tellier's Principle; Buffers An Equilibrium Constant
6.	March 16, 18	**Handout**	K_a Determination of a Weak Acid
7.	March 23, 25	Exp. ***18*** **Handout**	Potentiometric Analysis Titrations and pH Curves
8.	March 30 April 01	Exp. **35**	Spectroscopic Metal Ion Analysis

9.	April 06-10	**SPRING BREAK**	COLLEGE CLOSED
10.	April 13, 15	Exp. ***22***	Molar Solubility & common Ion Effect
11.	April 20, 22	Exp. ***26***	Borax Dissolution & its Thermodynamic Properties
12.	April 27, 29	**Lecture**	Qualitative Analysis
13.	May 04, 06	**Handout**	Qual continued
14.	May 11, 13	**Handout**	Qual continued
15	May 18	**Handout**	Qual concludes
	20	**Exp *32***	Galvanic Cells/the Nernst Equation
16.	May 27	**LAB CHECK OUT**	
	MAY 25	**MEMORIAL DAY**	**COLLEGE CLOSED**

SOME PERTINENT NOTES:

Solving Problems:
The suggested exercises, given on the lecture schedule of the syllabus or on the drill handouts provided to you, are designed to cover most of the important concepts presented in this course, and their applications. You will find that you need to practice on more exercises than are given on the "**suggested**" list in order to gain acceptable mastery of the material. There is no substitute for a determined and perhaps lengthy effort to work out a problem on your own. You should not seek help until you have done at least some work on the exercise yourself.

Working in the Laboratory:
Each student can actually perform most of the experiments to be undertaken for the course individually; however, it is advantageous to work in pairs as a team. Such teamwork can provide an opportunity for valuable discussion of the salient features of an experiment. Therefore, with the exception of the qualitative analysis projects, you are encouraged to work with **a partner** (not partners); but each one must record the data collected contemporaneously (you don't wait for the partner to e-mail you the data later!!). It is an individual responsibility to record data gathered as a team. It is not uncommon to pair-up students whose partners (from a previous experiment) would be absent the next lab session. In such instances, for that particular lab, you work with the new partner.

Before you arrive in the laboratory to perform a given experiment, it is essential that you study the experiment carefully with special emphasis on the method, the experimental

setup and design, and the procedure. As part of your preparation, before reporting to the laboratory classroom you are encouraged to answer the questions and problems about the scheduled experiment by referring to the Pre-laboratory Assignment section. This pre-laboratory report is due on the scheduled day for performing the experiment.

Safety:

Experimental work is subject to hazards of many kinds, of which every person working in a laboratory should be aware. Once one is aware of the hazards involved in an experimental procedure, one's instinct for self-preservation usually provides a sufficient motivation for finding ways of avoiding them. Certain specific hazards will be pointed out in connection with individual experiments. A separate handout on safety will be distributed during check in. You will also view a safety video during check-in.

Recording of Experimental Data:

Besides filling in your data into the simplified report sheets in your lab manual, it is required that you purchase a bound **laboratory notebook**. You can record *everything relevant* (***data, calculations, notes*** *and* ***comments, literature surveys, flow charts,*** *and even some* ***graphs***) directly in this notebook. Your laboratory notebook is not a lab report; it is a day-to-day record of your activities in the lab. This is where you describe experiments as you do them and note observations as you make them. This will help you to have an accurate record of what you did and what you observed in the laboratory, thus a great resource when the time comes to writing your laboratory reports.

Good notebook keeping would undoubtedly facilitate the production of excellent lab reports. You must avoid at all times recording on odd scraps of paper such incidental data as weights, barometer readings, and temperatures with the idea of copying them into the notebook at a later time. If anything must be copied from another source (***calibration chart, reference book, etc.***), identify it with an appropriate reference. Be careful to record what you have done or what you have seen and not what you think you should have done or what you think you should have seen. Particularly, care should be taken to separate the actual observation from the interpretation of observations.

The notebook should not be a neatly copied reiteration of the laboratory procedure. Neatness, spelling, punctuation and grammar are not central issues in the notebook, but it should be possible for someone else to repeat your work by reading your account. I will read your notebook periodically in order to see whether you are keeping up with your work, whether you understand what you are doing, and whether you are recording everything you need.

LABORATORY REPORTS:

(I). For the **experiments** that are assigned from your **laboratory manual,** each one contains a formatted ***Pre-laboratory Assignment*** and ***Report Sheet*** sections. With the help of your laboratory notebook, you should be able to organize your observations and data to write reports that fit the format. As part of your report you will have to answer all pre-lab

questions and specified questions from those that appear at the end of the ***Report Sheet*** in your lab manual.
(II). All other work, from **handouts**, must be recorded and evaluated in a well-organized and readable fashion, so that anyone unfamiliar with the experiments can easily follow the presentation and thereby obtain a clear idea as to what was actually done and what results were obtained.
The lab report from the handout assignments must be typed or word processed. They should include tables and illustrations where necessary. Such lab reports must contain the following sections: **title page, abstract, introduction, results discussion, conclusion, experimental section, and references**.

(III) **Qualitative Analysis Report:** This report must incorporate the following:

- An introduction to the methodology employed in the experiments you have undertaken.
- A grand generalized ***flow chart*** [Use Power Point] that outlines the overall scheme for the qualitative analysis of the five analytical groups. This group separation scheme should include as much detail as possible.
- Schematic diagrams in the form of specific ***flow charts*** detailing the procedures of each project you carryout in the laboratory.
- A list of the cations you find in each project of your general unknown. For every cation that you believe is in your test solution, with the help of a balanced equation(s), discuss the ***specific tests*** (confirmatory reaction(s) used for the detection of the cation.

Consider the silver ion analysis, as a modular example:
When you are trying to determine the presence or absence of a silver ion in your sample, the presence of a white precipitate (which silver chloride is) would only be considered preliminary result since many precipitates initially look just like silver chloride; you would need to establish a confirmatory diagnostic protocol that would certify your finding is indeed correct. In this particular instance, a necessary confirmatory test involves a two-step procedure: (i) the addition of aqueous ammonia to the precipitate, if indeed AgCl, would cause the precipitate to dissolve to form a colorless solution due to the formation of a complex ion with ammonia:

$$AgCl(s) + 2NH_3(aq) \text{ ------> } [Ag(NH_3)_2]^+ + Cl^-$$

and (ii) the subsequent re-precipitation of the white AgCl by the addition of excess acid, via the following reaction:

$$[Ag(NH_3)_2]^+ + Cl^- + 2H^+ \text{ -------> } AgCl(s) + 2NH_4^+$$

This would be a final verification that the original precipitate was silver chloride.

- A few paragraphs as concluding remarks about any aspects of the projects.

*****Below is a "***Laboratory Scoring Guide***' for your record**:**

	POINTS/LAB	**Lab #**	**Experiments**
1	60	**Handout**	Graphical Data Analysis
2	60	Exp**. *23***	Factors Affecting reaction rate
3	90	Exp**. *24***	Determination of a Rate Law
4	60	Handout	Absorption Spectrum of Cobalt(II) chloride
5	60	Exp. ***16***	Le Cha^tellier's Principle; Buffers
6	90	Exp**. *34***	An Equilibrium Constant
7	60	**Handout**	K_a Determination of a Weak Acid
8	60	Exp. ***18***	Potentiometric Analysis
9	90	**Handout**	Titrations and pH Curves
10	60	Exp. ***22***	Molar Solubility & common Ion Effect
11	60	Exp**. *26***	Borax Dissolution & its Thermodynamic Properties
12	60	Exp**. *35***	Spectroscopic Metal Ion Analysis
13	390	**Handout**	Qualitative Analysis
14	300	Notebook	legible and intelligible

TOTAL: 810 + 390 +300 = 1500