

WACO, TEXAS

COURSE SYLLABUS AND INSTRUCTOR PLAN

GENERAL INORGANIC CHEMISTRY I CHEM 1411.01

Dr. Otsmar J. Villarroel

AN EQUAL OPPORTUNITY INSTITUTION

Fall 2014

General Inorganic Chemistry I, [Fall/2014]

Course Description:

Fundamental principles of chemistry for majors in the sciences, health sciences and engineering; topics include measurements, fundamental properties of matter, states of matter, chemical reactions, chemical stoichiometry, periodicity of elemental properties, atomic structure, chemical bonding, molecular structure, solutions, properties of gases, and an introduction to thermodynamics and descriptive chemistry. Basic laboratory experiments supporting theoretical principles; introduction of scientific method, experimental design, data collection and analysis, and preparation of laboratory reports.

Prerequisites and/or Corequisites:

Credit for, or concurrent enrollment in, MATH 1314 or equivalent, or consent of division chair. Semester Hours 4 (3 lecture /4 lab)

Instructor Information:

Instructor Name: Otsmar J. Villarroel MCC E-mail: OVillarroel@mclennan.edu Office Phone Number: 254-299-8163 Office Location: FOB 207 Office/Teacher Conference Hours: Tuesdays and Thursdays 9:30 am – 11 am. Fridays only by appointment.

Required Text & Materials:

Title: Chemistry: A Molecular Approach Author: Nivaldo J. Tro Edition: Third Edition Publisher: Pearson Learning Solutions ISBN: 9780321976222

Title: Laboratory Manual (1411 & 1412) Author: Joe D. Zajicek Publisher: MCC shop

McGraw-Hill Connect access code. It can be purchased online through a link provided by your instructor.

Research Notebook

Handheld, non-programmable scientific calculator.

Other materials needed included notebook, Scantron forms with letters (form No. 882-E), black ink gel pens (fine or medium point – not bold), #2 pencils. Course materials are

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posted on Blackboard system, and students are responsible for these – and for checking for new postings before each class and lab meeting.

MCC Bookstore Website

Methods of Teaching and Learning: .

The course consists of lecture and laboratory. The lecture will be a mix of power point presentations, problems worked on the whiteboard and discussion. It is vital that you read the text BEFORE the lecture on that chapter. This will greatly improve your understanding of the topic and therefore your grade. You are responsible for the information presented in the text even if it is not covered in lecture.

Successful completion of this course will require the student be capable of algebraic manipulation of symbolic equations. It is strongly recommended that the student take adequate lecture notes and study outside of class. Work out some of the questions at the end of each assigned chapter, without assistance, if possible. If any material is unclear to the student, it is highly recommended to consult with the instructor as soon as possible. Do not wait until the last minute to request help. If you follow the suggestions given, you should do well. In case you still have trouble even after following these suggestions, avail yourself of the free tutorial service provided here. The laboratory portion offers hands on experience in the laboratory experimentation. The student's review of the written explanation of the lab experiment will enhance the learning experience. Students may be required to work individually or in groups. Your grade will be calculated based on your performance in the classroom (participation, exams, quizzes), online homework, and lab performance (lab reports). See Course Grading Information for more details.

Core Objectives and Assessments:

<u>**Critical Thinking:**</u> Students' critical thinking abilities will be assessed through written lecture exams and/or lab reports.

<u>Communication</u>: Students will be required to research a topic relevant to the semester's coursework for presentation to a group of peers and faculty. Communication is also evaluated through testing, reporting of lab results and embedded research projects that require formalized reports.

Empirical/Quantitative: Students will be required to perform chemistry calculations on lecture exams and during weekly lab experiments and exercises. Emphasis is given to mathematical descriptions of the topics covered since this course is focused on the science and engineering student. Students are required to collect data and determine the implications the collected data set has in relation to the environment and the world around them.

Teamwork: Students will work in teams for each laboratory exercise. Each member of the team will carry some responsibility for data collection and/or interpretation.

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Learning Outcomes:

Lecture

Upon successful completion of this course, students will:

- 1. Define the fundamental properties of matter.
- 2. Classify matter, compounds, and chemical reactions.
- 3. Determine the basic nuclear and electronic structure of atoms.
- 4. Identify trends in chemical and physical properties of the elements using the Periodic Table.
- 5. Describe the bonding in and the shape of simple molecules and ions.
- 6. Solve stoichiometric problems.
- 7. Write chemical formulas.
- 8. Write and balance equations.

9. Use the rules of nomenclature to name chemical compounds.

10. Define the types and characteristics of chemical reactions.

- 11. Use the gas laws and basics of the Kinetic Molecular Theory to solve gas problems.
- 12. Determine the role of energy in physical changes and chemical reactions.
- 13. Convert units of measure and demonstrate dimensional analysis skills.

Laboratory

Upon successful completion of this course, students will:

- 1. Use basic apparatus and apply experimental methodologies used in the chemistry laboratory.
- 2. Demonstrate safe and proper handling of laboratory equipment and chemicals.
- 3. Conduct basic laboratory experiments with proper laboratory techniques.
- 4. Make careful and accurate experimental observations.
- 5. Relate physical observations and measurements to theoretical principles.
- 6. Interpret laboratory results and experimental data, and reach logical conclusions.

7. Record experimental work completely and accurately in laboratory notebooks and communicate experimental results clearly in written reports.

8. Design fundamental experiments involving principles of chemistry.

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9. Identify appropriate sources of information for conducting laboratory experiments involving principles of chemistry.

Course Outline or Schedule:

- Week 1 (August 25 and 27) Orientation/ Syllabus. Chapter 1. Lab: Check-in/Safety (August 29)
- Week 2 (September 3) Chapter 1. Lab 1. Development of Laboratory Skills and Errors in Measurements (September 5)
- Week 3 (September 8 and 10) Chapter 1/Chapter 2 Lab 2. Identification of a Substance Based on Physical Properties (September 12)
- Week 4 (September 15 and 17) Chapter 2/Chapter 3 Lab 3. Study of Physica and Chemical Changes (September 19)
- Week 5 (September 22 and 24) Chapter 3. Lab 4. Determining an Empirical Formula (September 26)
- Week 6 (September 30 and October 1). Chapter 4/Exam 1 (Material covered until week 5) Lab 5. Percentage of Water of Hydration (September 3)
- Week 7 (October 6 and 8) Chapter 4. Lab 6. Chemical Activity of Metals (October 10)
- Week 8 (October 13 and 15) Chapter 5. Lab 7. Purity of Sodium Bicarbonate (October 17)
- Week 9 (October 20 and 22) Chapter 6/ Exam 2 (Material covered until week 8) Lab 8. Physical Behavior of Gases (October 24)
- Week 10 (October 27 and 29) Chapter 6/Chapter 7. Lab 9. Molar Mass of a Substance (Vapor Density Method) (October 31)
- Week 11 (November 3 and 5) Chapter 7/Exam 3 (Material covered until week 10) Lab 10. Atomic Mass by Calorimetry (November 7)
- Week 12 (November 10 and 12) Chapter 8 Lab 11. Acid-Bases Titration (November 14)
- Week 13 (November 17 and 19) Chapter 9 Presentations (November 21)
- Week 14 (November 24) Exam 4 (Material covered until week 13)

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Week 15 (December 1 and 3) Chapter 10 Presentations (December 5)

Week 16 (December 8) Final Exam (8:00 am - 10 am).

This schedule is subject to change. You will be informed of any changes to the syllabus by email, blackboard or class announcements.

Course Grading Information: Course Grading Information:

Begging for grade will not be tolerated. However, one more time, if you follow the suggestions given on the **Course Notes and Instructor Recommendations section** (page 3), you should do well. Often, one on one tutoring will help the student grasp the subject matter.

Chapter Exams (4) will count equally for <u>40 %</u> of the course grade. *No exam grade will be dropped*. These are essentially non-cumulative; however due to the way Chemistry builds on former topics, students could be at an advantage if they retain information from past chapters. You must only use the material provided by the instructor during the exams. Exams may contain a combination of multiple choice, short answer questions, as well as problem solving when applicable. These exams will be given in class and must be completed during a period of one hour and thirty minutes. No one coming in late may start an exam after the first person has left and extra time will not be given.

The final will be a comprehensive exam and will be given on the final exam date. It represents <u>15 %</u> of the course grade. *Make up final exam is NOT offered.*

The laboratory portion will make up <u>15%</u>. Eleven labs will be given during the semester. *Make up labs are NOT offered*. <u>However, the lowest lab graded will be dropped</u>. The laboratory grade will be the average of the lab grades (pre-lab questions plus lab report), any pop quizzes given in lab. Failure to comply with safety and other requirements can reduce a grade significantly, or result in a student's receiving a grade of zero for the day's lab. Pre-Lab questions have to be completed prior the students' lab period. *Do not work on the prelab question section the same day of the experiment*. Some questions will require more research besides just reading the lab introduction. Pre-Lab questions will be submitted before going to the laboratory. Failure to complete the Pre-Lab questions may result in the student not being allowed into the lab to perform the lab experiment and will require in the student not getting a grade for that lab. Lab reports are due at the start of the next lab **unless the instructor grants more time**.

Regardless the grade of the others lab assignments, a student will receive automatically a grade of 0 corresponding to the laboratory portion if she/he misses 4 or more lab sessions.

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Lab reports and research notebook must be in permanent ink. Felt-tip pens, erasable ink, and pencils are not allowed. A <u>minimum</u> of 10 points is deducted for failure to follow these guidelines. <u>One point is deducted</u> for <u>each</u> error in significant figures or units. Changes to data may only be made by drawing <u>one</u> line through the information to be changed. <u>One point is deducted</u> for <u>each</u> instance in which a student writes over or obscures in any way, previously recorded data. Do NOT use correction fluid or tape. Be careful how you tear the pages out of the lab book. Papers with frayed edges <u>lose 5</u> <u>points</u>. Lab report pages must be stapled together or you will <u>lose 5 points</u>.

To get credit for lab, students must avoid wearing the following to lab: Shorts, sleeveless shirts, short skirts, sandals, flip-flops, canvas shoes, high heels (these usually do not sufficiently cover the foot), dangling jewelry, scarves, etc. that might get into the chemicals or the burner flame. All long hair must be tied back. The use of googles in lab is mandatory. Students not following these regulations will not be admitted into lab under any circumstances and will receive a grade of zero for that lab.

The use of the research notebook in the lab is <u>MANDATORY</u>. It represents 5 % of your grade. Data and observations must be written directly into your research notebook in black pen. Do NOT use the lab report sheet to collect data and observations. You <u>CANNOT</u> write data (such as weights, measurements, etc.) on scratch paper. Failure to follow the above rules will result in a grade of zero for that lab's day. You must show your research notebook at the end of each lab session to be signed by your instructor. Research notebook is a key component of the course. It counts as extra credit for students who are on the borderline between two grades at the end of the semester. Any student on the borderline with good research notebook (and all the experiments signed by your instructor) will receive the higher of the two grades. Your lab notebook must include the following information:

1) Up-to-date Table of Contents

2) Your notes from preparation before coming to lab. Students should study the lab experiment before coming to lab, and should find it helpful to make notes in advance of beginning the experiment, such as "begin boiling 200 mL of deionized water in a 400 mL beaker," etc. The notebook provides you a place to write notes to yourself on how you will conduct the experiment.

3) Pre-lab lecture notes. This section should contain the date, the name of the experiment, and your notes from the pre-lab. Contents should include:

a) Safety instructions given in pre-lab lecture

b) Any changes from the directions in the lab textbook

c) Additional information providing background on chemicals, etc

d) Calculations methods

4) Data, observations, calculations, etc.

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There will be homework exercise problems to be turned in and graded. It represents <u>15%</u> of vour total grade. The purpose of these is to encourage students to keep up with the material. Homework questions are designed to challenge you to gain a deeper understanding of the course material. Homework problems will be assigned for each chapter on the Mastering Chemistry system. You will need to log into Mastering Chemistry system to complete or review your homework assignments. The homework is designed to help you master concepts that will be evaluated on the exams.

Research Paper: It should range from 2000 to 3000 words in length. Each student will be assigned a topic (the name of some person in the history of chemistry), on which he/she must write an original paper based on the person's life or on some incident in chemistry with which he/she is involved. It must be original in content. It must use careful writing style, adhering to the rules of grammar and organization. A guideline which includes detailed instruction to write this paper and a grading rubric will be posted on Blackboard. This assignment is due on the 8th week. <u>It represents 5 % of your grade.</u>

PowerPoint Presentation: This assignment is designed to present the topic from the assigned paper. The presentation should be 8-10 min. It must be well constructed, including an introduction, a body in which information is presented, and a conclusion. PowerPoint as a visual aid must be incorporated into the presentation. An image must be included. Font size should be between 24 and 28. A grading rubric for expectation regarding the presentation will be posted on blackboard. <u>It represents 5 % of your grade.</u>

Work that is not easily readable will be not graded. Mathematical solutions must be written in and easily followed format and should be appropriately commented.

Your grade will be calculated using the following breakdown:

Exams 40% Lab Grade 15% Research Notebook 5 % Homework 15% Presentation/Paper 5 % Research Paper 5 % Final 15%

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Your course letter grade will be based on the following scale: 90.0% or more is an A; 80.0 % or more is a B; 70.0 % or more is a C; 60.0 % or more is a D; below 60.0% of the total results in a F.

Work that is not easily readable or without name will be not be graded. Mathematical solutions must be written in an easily followed format and should be appropriately commented.

If you wish to dispute a grade or have a grade changed, please contact me as soon as possible. It will be discussed during the scheduled office hours.

Cheating will not be tolerated in any form. Any student knowing of cheating and not reporting it to the instructor will also be considered to be in violation of the course's honesty policy. Cheating on an assignment or exam will result in the student being assigned a grade of 0 (zero) on the assignment/exam and the Student Discipline Coordinator will be notified by the instructor. Further action may be taken by the Student Discipline Coordinator.

Late Work, Attendance, and Make Up Work Policies:

Assignments are not accepted late (including online homework), unless an excuse is granted by the instructor due to a serious, proven emergency. Unexcused late assignments receive a grade of zero. All students are requested to adhere to the schedule, and must understand that they are responsible for the academic consequences of their absences.

<u>Make up exams are not offered</u> unless there is a college approved, documented excused absence which has to be presented before your instructor next time you attend to the lecture (or lab). ONLY one make up exam per student will be offered during the semester.

There will be not being a makeup test for the final exam.

Per MCC policy, if a student's absences reach 25 % of the total contact hours in this course (4 lectures) the student must officially withdraw from the course in order to receive a W, before October 30, 2014. If you are dropped after the official drop date, you will receive a grade of F. Each absence will count toward attendance requirement. A student is considered absent to class after 10 minutes the class begins, no excuses will be accepted for tardiness. Students, whether present or absent, are responsible for all material presented or assigned for a course and will be held accountable for such materials in the determination of course grades.

<u>Make up labs are NOT offered.</u> The top ten lab grades will be counted toward your final grade. Lab reports are due at the start of the next lab. *Fifteen points (15) is deducted*

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your scored for each day a lab report is late (including weekends). It is your responsibility to attend the prelab lecture. A student missing (or considered absent) the prelab lecture regardless of the reason will not be allowed to begin the experiment receiving a grade of zero for the day's lab.

Student Behavioral Expectations or Conduct Policy:

If there is any evidence of cheating on any homework, quiz, test, or final, you will receive a zero for that item and cannot make it up or replace it and it cannot be dropped. The result of a second offence will be failing grade in the course. Tobacco and tobacco product use is prohibited inside college buildings. This includes smokeless products as well as cigarettes, pipes, and cigars.

Safety equipment must be worn at all times: long pants/skirt (covering at least the top half of the calf), apron or lab coat, hair back, safety goggles, and, if necessary, gloves. No open-toed shoes, shoes with holes in them, shoes that leave the top of the foot exposed, hats of any sort, shorts, food or drink are allowed. Anyone acting in an unsafe manner will be warned once. If seen without safety equipment or acting improperly a second time, they will be asked to leave the laboratory. They will be allowed to return in 30 minutes to finish their work, if they can. If they are asked to leave more than once for any given experiment, they will receive a zero for that experiment's lab report. Safety is the MOST important part of lab. Students must abide by the general safety regulations as described in the chemistry 1411 laboratory manual.

Please read and abide to the General Conduct Policy in the Highlander Guide.

MCC Academic Integrity Statement:

The Center for Academic Integrity defines academic integrity as "a commitment, even in the face of adversity, to five fundamental values: honesty, trust, fairness, respect, and responsibility. From these values flow principles of behavior that enable academic communities to translate ideals into action." Individual faculty members determine their class policies and behavioral expectations for students. Students who commit violations of academic integrity should expect serious consequences. For further information about student responsibilities and rights, please consult the McLennan website and your Highlander Student Guide.

MCC Attendance Policy:

Regular and punctual attendance is expected of all students, and each instructor will maintain a complete record of attendance for the entire length of each course, including online and hybrid courses. Students will be counted absent from class meetings missed, beginning with the first official day of classes. Students, whether present or absent, are responsible for all material presented or assigned for a course and will be held accountable for such materials in the determination of course grades.

Please refer to the Highlander Guide for the complete policy.

ADA Statement:

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In accordance with the requirements of the Americans with Disabilities Act (ADA), and the regulations published by the United States Department of Justice 28 C.F.R. 35.107(a), MCC's designated ADA coordinators, Dr. Drew Canham – Vice President, Student Success and Mr. Gene Gooch - Vice President, Finance and Administration shall be responsible for coordinating the College's efforts to comply with and carry out its responsibilities under ADA. Students with disabilities requiring physical, classroom, or testing accommodations should contact Ms. Renee Jacinto, Disabilities Specialist, Student Services Center, Student Development Department, Room 211 or at 299-8122 or disabilities@mclennan.edu.

TITLE IX

"No person in the United States shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity receiving Federal financial assistance." Legal Citation: Title IX of the Education Amendments of 1972, and its implementing regulation at 34 C. F. R. Part 106 (Title IX)

In accordance with the requirements of the Title IX Education Amendments of 1972 MCC's designated Title IX Coordinator, Al Pollard – Vice President, Program Development/EEO Officer and Deputy Coordinator, Drew Canham – Vice President, Student Success shall be responsible for coordinating the College's effort to comply with and carry out its responsibilities under Title IX.

Contact information

Al Pollard, Title IX Coordinator Vice President, Program Development McLennan Community College Administration Building, Room 417 1400 College Drive 254-299-8669 FAX 254-299-8654 apollard@mclennan.edu Drew Canham, Title IX Deputy Coordinator Vice President, Student Success McLennan Community College Administration Building, Room 408 1400 College Drive 254-299-8692 FAX 254-299-8654 dcanham@mclennan.edu