

UNIVERSITY OF GUAM
COLLEGE OF NATURAL AND APPLIED SCIENCES
DIVISION OF NATURAL SCIENCES

Spring 2016

CH 100 Inorganic Chemistry - 3 Credit Hour

Instructor: Wai-Chi Lau

Office: SC 303

Email: wclau@uguam.uog.edu

Office Hours: MW 9:30am-11am; T-Th 11am-1:30pm

COURSE OBJECTIVES:

This is an introductory chemistry course designed for beginning students who have not studied chemistry at the college level and who do not expect to pursue an academic major in a core natural science field. In other words, this course is basically chemistry for non-scientists. Topics to be covered include modern chemical principle, theories, and laws pertaining to atomic structure, nature of chemical bond, stoichiometric calculations, and acid-base reactions. CH-100 meets for three hours of lecture per week. The concurrent lab course, CH 100L, also meets for three hours of laboratory per week.

The goals of the introductory chemistry course are:

- * to provide an overview of chemistry for non-specialists;
- * to provide a sound foundation in chemical concepts;
- * to develop skills in the fundamental of stoichiometry and molarity calculations;
- * to study what modern chemistry is and how it applies to a broad range of disciplines
- * to develop a broad understanding of chemistry and chemical reactions
- * to stimulate future interest in chemistry and provide a basis for open-ended inquiry
- * to gain an appreciation of the many ways that chemistry affects the daily lives of everyone

<u>Course Student Learning Outcomes (SLO):</u> Upon completion of the course, students will:	<u>Matching Program Learning Outcome (PLO)</u>	<u>Matching Institutional Learning Outcomes (ILO)</u>	<u>Method of Assessment</u>
Perform measurement calculations involving units conversion, density, and temperature scales with correct significant figures	PLO1 PLO4	ILO1 ILO2	-Assignments - Exams
Understand states of matter, elements, atoms, ions, molecules, compounds	PLO1 PLO4	ILO1 ILO2	-Assignments - Exams
Write names and formulas of elements and compounds, know the rules of nomenclature	PLO1 PLO3	ILO1 ILO3	-Assignments - Exams
Understand types of chemical reactions, including reactions in aqueous solutions	PLO1 PLO4	ILO1	-Assignments - Exams
Calculate chemical quantities and stoichiometric relations	PLO1 PLO4	ILO1 ILO2	-Assignments - Exams
Understand the role of energy in chemistry, including expressions involving specific heat and enthalpy	PLO4	ILO1 ILO2	-Assignments - Exams
Describe atomic structure and electron configuration. Be introduced to selected topics such as chemical bonding, gases, solutions, acids and bases, and equilibrium	PLO4	ILO1 ILO2	- Assignments - Final and Topic exams

Chemistry Program Learning Outcomes

PLO 1: Demonstrate the knowledge of fundamental concepts of chemistry and its relevance to the scientific method and other fields in science

PLO 2: Demonstrate the skills to make observations, experimentation, collect and collate data, analyze and interpret data in a safe chemical environment

PLO 3: Demonstrate the ability to clearly articulate, formulate, and communicate scientific information using computer, written and oral communication skills

PLO 4: Demonstrate critical thinking, problem solving skills and the ability to use chemical knowledge and mathematical skills to identify, evaluate, analyze, synthesize, and integrate data and abstract ideas in solving problems

PLO 5: Demonstrate the knowledge and skills in advanced instrumentation, applications, interpretation, and experimental design to address scientific queries in chemistry, industry, the environment, health, and related fields

PLO 6: Demonstrate a sense of exploration and research approach that enables students to pursue lifelong learning in chemistry

PLO 7: Demonstrate interaction skills and teamwork

Institutional Expected Student Learning Outcomes

Some of the expected fundamental knowledge, skills, and values that the University of Guam student will have demonstrated upon completion of any degree are:

ILO1: Mastery of critical thinking and problem solving

ILO2: Mastery of quantitative analysis

ILO3: Effective oral and written communication

ILO4: Understanding and appreciation of culturally diverse people, ideas and values in a democratic context

ILO5: Responsible use of knowledge, natural resources, and technology

ILO6: An appreciation of the arts and sciences

ILO7: An interest in personal development and lifelong learning

Textbook: Introductory Chemistry: A Foundation 8th Edition by Steven S. Zumdahl (Author), Donald J. DeCoste (Author)

Topics will include:

Chemistry: An Introduction
Measurements and Calculations
Matter
Chemical Foundations: Elements, Atoms, and Ions
Nomenclature
Chemical Reactions: An Introduction
Reactions in Aqueous Solutions
Chemical Composition
Chemical Quantities
Energy
Modern Atomic Theory
Chemical Bonding
Gases
Liquids and Solids
Solutions
Acids and Bases

METHODS OF EVALUATION:

Three monthly exams and a final exam will be given. Grades will be based on:

A	=	90% and above
B	=	80% to 89%
C	=	70% to 79%
D	=	60% to 69%
F	=	below 60%

Special Needs: UOG Disability Policy

The University of Guam complies with the Americans with disabilities Act of 1990 and the rehabilitation Act of 1993. Any student who may require an accommodation under such provisions should contact the ADA office prior to the commencement of the semester. The instructor should be presented with appropriate documentation and contacted in his office for discussing the details of accommodations as soon as possible and no later than the end of the first week of classes. No retroactive accommodations will be provided in this class.

UNIVERSITY OF GUAM
COLLEGE OF NATURAL AND APPLIED SCIENCES
DIVISION OF NATURAL SCIENCES
Spring 2016

CH 100L Inorganic Chemistry Laboratory- 1 Credit Hour

Instructor: Wai-Chi Lau

Office: SC 303

Email: wclau@uguam.uog.edu

Office Hours: MW 9:30am-11am; T-Th 11am-1:30pm

COURSE OBJECTIVES:

Chemistry is a laboratory science and a laboratory experience is an integral component of chemistry courses. The goals of this laboratory course are 1) to acquaint students with a variety of chemical reaction types; 2) to familiarize the students with a variety of laboratory techniques; 3) to synthesize the chemical knowledge learned in the classroom and be able to apply those to realistic laboratory situations.

<u>Course Student Learning Outcomes (SLO):</u> Upon completion of the course, students will	<u>Matching Program Learning Outcomes (PLO)</u>	<u>Matching Institutional Learning Outcomes (ILO)</u>	<u>Method of Assessment</u>
Use safety knowledge and skills to conduct experiments	PLO1 PLO2 PLO7	ILO1 ILO5 ILO7	Laboratory practical exam
Conduct experiment from a given procedure, collect, analyze and interpret data	PLO2	ILO1 ILO2	Laboratory reports
Apply precision and accuracy in measurements and calculations	PLO4 PLO5	ILO2	Laboratory reports

Relate the experimental observations to chemical concepts	PLO1 PLO4	ILO1	-Laboratory reports
Solve quantitative and qualitative problems in chemistry	PLO4	ILO1 ILO2	-Laboratory written exam
Write clear laboratory reports using standard scientific reporting method	PLO3	ILO3	-Laboratory reports
Use standard computer technology to present and analyze data	PLO3 PLO5	ILO3 ILO5	- Laboratory reports
Collaborate with peers in learning chemistry	PLO7	ILO7	- Laboratory reports

Chemistry Program Learning Outcomes

PLO 1: Demonstrate the knowledge of fundamental concepts of chemistry and its relevance to the scientific method and other fields in science

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ILO6: An appreciation of the arts and sciences

ILO7: An interest in personal development and lifelong learning

REQUIRED LAB TEXT:

Foundations of Chemistry in the Laboratory, 13th Edition, by Morris Hein, Leo R. Best, and Robert L. Miner, Brooks/Cole Publishing Co., 2011.

LEARNING TIPS:

You are expected to review and summarize the experimental procedure prior to your arrival to the scheduled lab meeting.

(1) Write a summary of the assigned experiment prior to the lab meeting and show it to your instructor at the starting time of the lab meeting.

(2) Answer any Pre-laboratory questions and as much of the post-lab questions well before the day of performing the experiment and bring these sheets to the scheduled lab meeting; **GET A HEAD START AND DO NOT WAIT UNTIL THE LAST MINUTE TO COMPLETE THESE ASSIGNMENTS.**

(3) **DO NOT FALL BEHIND!**

(4) All completed lab reports are due on the date of performing the lab. For some experiments involving extensive data analysis, completed lab reports are definitely due on the day of the subsequent lab meeting. Your lab report should be stapled and your name indicated on the top of each page. The lab report should have the lab experiment outline/summary, data sheets, answers to pre-lab and post-lab questions. It should be neatly organized and stapled together.

Make a study schedule and work steadily throughout the session. Last minute cramming is unlikely to build a deeper understanding of chemistry, and is usually useless for long-term knowledge.

ATTENDANCE POLICY:

If you miss a lab, you have missed an integral part of the course. Lab make-ups will not be permitted. No credit will be given if you are absent from the lab. Please consult your instructor in case of missing any lab sessions under extenuating circumstances.

METHODS OF EVALUATION:

The lab part of your grade will be determined by completed lab reports, assignments and exercises and a lab final exam. Final lab grades will be based on the results of your pre-lab and post-lab reports (30%), lab practical exam (30%), and a lab written final exam (40%). The performance level for the letter grade in the lab will be as follows:

A = 90% and above

B = 80% to 89%

C = 70% to 79%

D = 60% to 69%

F = below 60%

You must pass the lab and the lecture in order to pass the course.

Special Needs: UOG Disability Policy

The University of Guam complies with the Americans with disabilities Act of 1990 and the rehabilitation Act of 1993. Any student who may require an accommodation under such provisions should contact the ADA office prior to the commencement of the semester. The instructor should be presented with appropriate documentation and contacted in his office for discussing the details of accommodations as soon as possible and no later than the end of the first week of classes. No retroactive accommodations will be provided in this class.

TENTATIVE LAB SCHEDULE- CH 100L

Experiment / Lab Activity

Safety in the Chemistry Lab

Safety Quiz, Lab Techniques; Lab Check-in

Expt. 2: Measurements and Calculations

Expt. 7: Water in Hydrates

Expt. 5: Determination of Specific Heat

Expt. 10 &11: Double and Single-Displacement Reactions

Expt. 12 Acids, Bases, and Salts- Electrical conductivity

Expt. 21: ACID- BASE TITRATION

Expt. 21: More Acid-base Titration

LAB PRACTICAL EXAM

Evaluation of Gas law constant (Special handout)

LAB FINAL WRITTEN EXAM

**THE UNIVERSITY OF GUAM
COLLEGE OF NATURAL AND APPLIED SCIENCE
DIVISION OF NATURAL SCIENCES**

COURSE SYLLABUS

CH102 GENERAL CHEMISTRY I

Instructor: Dr Maika Vuki

Office: Science Building Room 228

Contact number: 735 2781

Email: mvuki@uguam.uog.edu; uguamchemistry@gmail.com

Office hours:TBA

Course description:

General Chemistry I is a general chemistry lecture course designed for students preparing for major in chemistry or biology. The course covers in-depth topics of modern chemical principles; specifically atomic theory, atomic structure, reactivity, nomenclature, chemical bonding, stoichiometry, solution, gases, and thermo-chemistry. Students will also be introduced to measurements and its application to chemistry. CH102 meets for three hours of lecture per week during the fall semester. The laboratory component, CH102L, covers practical applications of theoretical concepts and it must be taken concurrently with the lecture course.

Course Rationale

This course is designed for science majors. To fully appreciate the natural phenomena and technological processes in the present day, a basic understanding of elements and its interaction will be required. This course provides foundational knowledge in chemical science that is necessary to analyze and interpret chemical processes. It deals with simple chemical processes and characteristics that could provide basic skills in interpreting chemical principles. Students who major in Chemistry, Biology, Engineering, Environmental Science and Agriculture should take this course. The course also covers a broad area in chemistry that will provide a solid background that is necessary for the upper level chemistry courses. Some application to everyday life will be discussed to illustrate the critical link of chemistry to technology and education. Teachers for chemistry in middle and high school must complete this course.

Course overall objectives:

The course objectives:

1. to provide a sound knowledge of fundamental concepts in chemistry.
2. to develop an appreciation of chemistry as central science and its relevance in life.

3. to develop problem solving skills in fundamentals of basic chemical concepts using quantitative and qualitative approaches.
4. to communicate basic chemical knowledge and problem solving skills clearly
5. to develop active participation in problem solving exercises in chemistry

<u>Course Student Learning Outcomes (SLO):</u> Upon completion of the course, student will	<u>Matching Program Learning Outcome (PLO)</u>	<u>Matching Institutional Learning Outcomes (ILO)</u>	<u>Method of Assessment</u>
Be able to describe a scientific method and list the essential components of the scientific method	PLO1	ILO3	- Midterm exam -Quizzes -Supplemental practice in laboratory
Be able to use mathematical skills to solve quantitative and numeric problems in chemistry	PLO4	ILO1 ILO2	- Calculation-focused questions on assignments and exams -Pre and Post test
Explain the development and theories of atomic structure and relate to the electronic structure	PLO1	ILO1	- Short-answer questions on Exams, quizzes
Describe the composition of matter at atomic, element, compound, and complex level	PLO1 PLO4	ILO3	- Assignments - Midterm exam -Final exam
Describe the bonding theories and its application to molecular and ionic compounds	PLO1	ILO1	- Short answer questions on midterm exam and assignments
Name and describe the formula of compounds using the chemical nomenclature	PLO1	ILO1	-Midterm exam - Final exam - Quizzes
Write and balance chemical equations	PLO1 PLO4	ILO2	- Assignments - Midterm exam -Final exam - Quizzes
Perform quantitative problem solving using stoichiometric principles	PLO4	ILO2	-Midterm exam -Final exam - Quizzes
Describe the laws governing the behavior of gases and the kinetic model for gases and use these laws for quantitative problem	PLO1	ILO1	- Midterm exam -Final exam

solving			
Describe and quantify the energy in chemical and physical changes	PLO1 PLO4	ILO1 ILO2	- Midterm exam -Final exam
Describe the structure of solutions and solve quantitative problems based on solutions	PLO1 PLO4	ILO1 ILO2	- Midterm exam -Final exam -Pre and post test
Communicate clearly through written, computer, and oral presentations	PLO3	ILO3	- Essay questions on midterm exams -Presentations
Develop good interaction skills and use this to enhance problem solving, critical thinking, communication, and personal development	PLO7	ILO6 ILO7	-Group work on assignments

Chemistry Program Learning Outcomes

PLO 1: Demonstrate the knowledge of fundamental concepts of chemistry and its relevance to the scientific method and other fields in science

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PLO 5: Demonstrate the knowledge and skills in advanced instrumentation, applications, interpretation, and experimental design to address scientific queries in chemistry, industry, the environment, health, and related fields

PLO 6: Demonstrate a sense of exploration and research approach that enables students to pursue lifelong learning in chemistry

PLO 7: Demonstrate interaction skills and teamwork

Institutional Expected Student Learning Outcomes

Some of the expected fundamental knowledge, skills, and values that the University of Guam student will have demonstrated upon completion of any degree are:

ILO1: Mastery of critical thinking and problem solving

ILO2: Mastery of quantitative analysis

ILO3: Effective oral and written communication

ILO4: Understanding and appreciation of culturally diverse people, ideas and values in a democratic context

ILO5: Responsible use of knowledge, natural resources, and technology

ILO6: An appreciation of the arts and sciences

ILO7: An interest in personal development and lifelong learning

Text book:

Chemistry, by Zumdhal & Zumdahl, 9th edition, Brooks Cole, 2014

EXAM DATES:

After every two chapters, a topic exam will be given

Final Exam: Tuesday, Dec 15th 2015: 12-13.50

Examination and Grading Procedure:

The lecture grade will be determined by mid term exams and the final exam at the end of the semester.

3 Mid term exams = 50%.

Quizzes = 5%.

Assignment: 5%

Pre and Post Test = 10%

Final Exam = 30%.

Bonus Points:

A 5% bonus points will be awarded to perfect attendance. Missing four classes will disqualify the bonus points. Missing one class will be minus 1.5% of bonus point.

Assessment:

Assessment of students learning will be based on topic exams, quizzes, and final exam. A score indicating the total of points gained will be given for each assessment after grading.

Grading:

The final grading for the will be weighted as follows:

A: 90% or above

B: 80 – 89%

C: 70 – 79%

D: 60 – 69%

F: below 60%

Academic Dishonesty: All submitted assignments and laboratory report must be the individual student work. The university's policy on academic misconduct, including cheating and plagiarism will be enforced.

Special needs: Student with Disabilities

If you are a student with a disability who will require special arrangement, please contact the instructor to discuss your requirements. Documentary evidence will be required and you are also required to register with the EEO/ADA Office. Contact number is 735 – 2244/2971/2243.

The course has a rigorous laboratory component designed on using instrumentation. Students who miss more than three laboratory will be excluded from sitting the final exam. This will also apply to late submission of laboratory report. All lab reports must be submitted one week from the completion of experiment.

Tobacco-free/Smoke-free/beetle nut-free Campus

UOG is a tobacco free and beetle nut free campus. Thank you for not using tobacco products and beetle nut on campus, and for helping make UOG a healthy learning and living environment.

Withdrawal from course

Students must follow the withdrawal procedure stipulated in the Undergraduate Catalogue. Withdrawal within the 8 weeks of class session requires the completion of withdrawal form from the Records Office. Withdrawal after 8 weeks of session will require the completion of a Petition to Withdraw from the Records Office. Students failing to withdraw will get an “UW” on their record, which is equivalent to an F grade.

Other information

Students are strongly advised to conduct independent reviews from the questions given at the end of each chapter. The instructor will allocate some lecture sessions for reviews but this will be insufficient. The best way to learn chemistry is to practice solving problems from the exercises given in the textbook. Lastly, do enjoy learning!

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COURSE SYLLABUS

CH 102L -02/03 GENERAL CHEMISTRY I LABORATORY

Instructor: Dr. Maika Vuki
Office: SC 228
Phone: 735-2781
Email: mvuki@ugam.uog.edu
Office Hours: TBA

Course Description

This is the laboratory component of the CH102 lecture. The two courses must be taken concurrently. The laboratory course will introduce students to a number of important techniques of chemical measurements. Students will be taught how to carry out accurate measurements and the proper recording of measured quantities. The mathematical calculation using uncertainties will be discussed.

Course rationale

Laboratory skills is a core component of chemistry. This course covers important skills in quantitative and qualitative analysis in chemistry. It is also a required course for biology and chemistry majors and must be taken concurrently with CH102 lecture.

<u>Course Student Learning Outcomes (SLO):</u> Upon completion of the course, students will	<u>Matching Program Learning Outcome (PLO)</u>	<u>Matching Institutional Learning Outcomes (ILO)</u>	<u>Method of Assessment</u>
Use safety knowledge and skills to conduct experiments and collect data in the laboratory	PLO2	ILO5	Laboratory practical exam
Read and record data correctly	PLO2	ILO2	Laboratory reports
Differentiate the terms accuracy and precision	PLO1	ILO1	Lab written final exam
Apply significant figures in calculations and reporting	PLO2	ILO2	Laboratory reports
Conduct experiment, collect, analyze, and interpret data	PLO2	ILO5	Laboratory portfolio and note book
Apply precision and accuracy in measurements and calculations	PLO2 PLO5	ILO2	Laboratory reports

Relate the experimental observations to chemical concepts	PLO1 PLO4	ILO1	-Laboratory reports - Laboratory portfolio and note book
Solve quantitative and qualitative problems in chemistry	PLO4	ILO1	Laboratory written exam
Write clear laboratory reports using standard scientific reporting method	PLO3	ILO3	Laboratory reports
Use standard computer technology to plot and analyze data	PLO3 PLO5	ILO5	- Laboratory reports - Laboratory portfolio and note book
Collaborate with peers in learning chemistry	PLO7	ILO7	- Laboratory portfolio and note book

Chemistry Program Learning Outcomes

PLO 1: Demonstrate the knowledge of fundamental concepts of chemistry and its relevance to the scientific method and other fields in science

PLO 2: Demonstrate the skills to make observations, experimentation, collect and collate data, analyze and interpret data in a safe chemical environment

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PLO 5: Demonstrate the knowledge and skills in advanced instrumentation, applications, interpretation, and experimental design to address scientific queries in chemistry, industry, the environment, health, and related fields

PLO 6: Demonstrate a sense of exploration and research approach that enables students to pursue lifelong learning in chemistry

PLO 7: Demonstrate interaction skills and teamwork

Institutional Expected Student Learning Outcomes

Some of the expected fundamental knowledge, skills, and values that the University of Guam student will have demonstrated upon completion of any degree are:

ILO1: Mastery of critical thinking and problem solving

ILO2: Mastery of quantitative analysis

ILO3: Effective oral and written communication

ILO4: Understanding and appreciation of culturally diverse people, ideas and values in a democratic context

ILO5: Responsible use of knowledge, natural resources, and technology

ILO6: An appreciation of the arts and sciences

ILO7: An interest in personal development and lifelong learning

REQUIRED LAB TEXT:

Experiments in General Chemistry, 9th Edition, Petrucci, Harwood and Herring. by Thomas Greco, Lyman H. Rickard, Gerald S. Weiss.

Course Content

**CH 102 LABORATORY
TENTATIVE SCHEDULE**

Week 1	Safety in the Chem Lab: Lab Check-in
Week 2	Measurement and Density
Week 3	Formula and Composition of Hydrate
Week 4 A&B)	Gravimetric Analysis: Determination of Sulfate Ion (Expt: 8, Part
Week 5	Stoichiometry of a Reaction
Week 6	Stoichiometry of a Reaction
Week 7	Types of Chemical Reaction
Week 8	Evaluation of Gas Constant
Week 9	Heats of Reaction
Week 10	Titration of Acid and Bases
Week 11	Titration
Week 12	Lab Practical
Week 13	Spectrometric Analysis of Aspirin
Week 14	Lab Review
Week 15	No Lab
Week 16	Lab Theory

METHODS OF EVALUATION:

The lab part of your grade will be determined by completed lab reports, assignments and exercises and a lab final exam. Final lab grades will be based on the results of your pre-lab and post-lab reports (45%) , lab practical exam (30%), and a lab written final exam (20%), portfolio and note book (5%). The performance level for the letter grade in the lab will be as follows:

A	=	90% and above
B	=	80% to 89%
C	=	70% to 79%
D	=	60% to 69%
F	=	below 60%

Academic Dishonesty: All submitted assignments and laboratory report must be the individual student work. The university's policy on academic misconduct, including cheating and plagiarism will be enforced.

Special needs: Student with Disabilities

If you are a student with a disability who will require special arrangement, please contact the instructor to discuss your requirements. Documentary evidence will be required and you are also required to register with the EEO/ADA Office. Contact number is 735 – 2244/2971/2243.

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**THE UNIVERSITY OF GUAM
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COURSE SYLLABUS

CH103-01 GENERAL CHEMISTRY II (SPRING 2016)

Meetings: MW 9:30 – 10:50 am

Room: SC200

Instructor: Dr. Tedros Bezabeh

Office: SC203

Contact number: 671-7352784

Email: bezabeht@triton.uog.edu

Office hours: M 2:00 – 4:00 pm, T 2:00 - 4:00 pm, Th 2:00 – 4:00 pm

Course description:

General Chemistry II is a one-semester course for students preparing for majoring in chemistry or biology. The course is a continuation of CH102 in establishing sound knowledge in fundamental concepts in chemistry. The knowledge gained from CH102 will be built upon and new topics will be introduced. Topics covered include properties of solution, chemical kinetics, chemical equilibrium, acids and bases, acid-base and some common equilibria, thermodynamics, electrochemistry, and nuclear chemistry. CH103 meets for three hours of lecture per week.

Course rationale:

With the rapid advance in technology and science, there is a natural demand to understand the world we live in and to enhance our ability to use its resources efficiently. Chemistry is at the core of what society is built upon. This course will provide knowledge in basic principles that govern chemical processes in biological, industrial, environmental, health, etc. in order for student to appreciate the relevance. It also sets a sound foundation for advanced courses in chemistry.

Course overall objectives:

The goals of the Introduction to Chemistry course are:

The course objectives:

1. to provide a sound knowledge of fundamental concepts in chemistry.
2. to develop an appreciation of chemistry as central science and its relevance in life.
3. to develop problem solving skills in fundamentals of basic chemical concepts using quantitative and qualitative approaches.
4. to communicate basic chemical knowledge and problem solving skills clearly
5. to develop active participation in problem solving exercises in chemistry

<u>Course Student Learning Outcomes (SLO):</u> Upon completion of the course, students will	<u>Matching Program Learning Outcome (PLO)</u>	<u>Matching Institutional Learning Outcomes (ILO)</u>	<u>Method of Assessment</u>
Explain the different types of solution processes and perform stoichiometric calculations of solution-based reactions	PLO1 PLO2 PLO4	ILO1 ILO2	- In class and online assignments - Quantitative questions on exams - Supplemental practice in laboratory
Perform calculations on physical quantities (e.g. osmotic pressure, freezing point depression and boiling point elevation)	PLO4	ILO2	- In class and online assignments - Supplemental practice in laboratory
Describe the rate laws and perform calculations based on the zero, first and second order rate laws	PLO4	ILO2	- Final and Topic exams - Online assignments - Supplemental practice in laboratory
Relate the rate law to the reaction mechanism	PLO4	ILO1	- Final and Topic exams
Describe the chemical equilibrium process and its significance	PLO1 PLO4	ILO1	- Topic exam - Theoretical and application questions - quizzes
Perform equilibrium calculations using equilibrium constant relationships	PLO2 PLO4	ILO2	- Final and Topic exams - Online assignments - Supplemental practice on laboratory
Explain the different theories of acids and bases	PLO1	ILO1	- Short answer questions on topic exam
Perform stoichiometric and equilibrium calculations for acid-base properties	PLO4	ILO2	- Final and Topic exams - In class and online assignments - Supplemental practice in laboratory
Explain the buffer solutions and perform pKa and pH calculations of buffer	PLO1 PLO4	ILO2	- Final and Topic exams - In class and online assignments - Supplemental practice in laboratory
Apply the equilibrium concepts and calculations to insoluble compounds	PLO1 PLO4	ILO2	- Final and Topic exam
Describe entropy concept and its application to free energy and equilibrium constant, perform calculation of entropy, free energy and equilibrium constant	PLO1 PLO2 PLO4	ILO1 ILO2	- Final and Topic Exams - In class assignments - Supplemental practice in laboratory

Describe electrode potentials, explain how it is measured, and perform electrode potential calculations for redox reactions	PLO1 PLO5	ILO1 ILO2	- In class and online assignments
Explain the radioactivity phenomenon and modern application in energy production and science technology	PLO3 PLO5	ILO1	- Topic exam

Chemistry Program Learning Outcomes

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PLO 7: Demonstrate interaction skills and teamwork

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ILO2: Mastery of quantitative analysis

ILO3: Effective oral and written communication

ILO4: Understanding and appreciation of culturally diverse people, ideas and values in a democratic context

ILO5: Responsible use of knowledge, natural resources, and technology

ILO6: An appreciation of the arts and sciences

ILO7: An interest in personal development and lifelong learning

Text book

Text: Chemistry, by Zumdhal, 9th edition, 2010

Examination and Grading Procedure:

The lecture grade will be determined by topic-term exams and the final exam at the end of the semester. The topic term exams will be worth a total of 45%. There will be 4 topic exams with each exam being administered after the completion of two chapters. Students

can drop the topic exam in which they have the lowest score. Students are required to take all these exams and no make-ups will be given. If you are unable to attend any of these exams, the instructor must be notified prior to the examination and evidence must be provided in the form of certificate or letter.

Quizzes and assignments

Short quizzes will be routinely given during the semester to test student's general ability in understanding lecture material. Pop quizzes are un-announced. This will be approximately 10-15 minutes duration and scores will be counted towards 10% of the course assessment.

Moodle - Online

All resources such as lecture notes, online sources and activities such as assignments, quizzes will be made available on moodle. You are required to open a moodle account and get the pass key from the instructor.

Final Exam

The end of semester final exam will be based on the materials covered in the course. The final exam assessment score will be 30%

Final Exam Date: May 16th 10:00 – 11:50 AM.

Summary of assessment scores:

Topic Exams (3):	45%
Quiz:	10%
Pre-Post Test:	10%
Final Exam:	30%
Assignments:	5%
Total:	100%

Grading:

The final grading for the will be weighted as follows:

- A: 90% or above
- B: 80 – 89%
- C: 70 – 79%
- D: 60 – 69%
- F: below 60%

Attendance Policy:

Lectures and laboratory are compulsory. Missed lectures will have points deducted from full attendance whereas missing laboratory session will result in zero point for that

particular experiment. If you are going to be absent, the instructor must be notified in advance and evidence must be produced. Make up laboratory may be scheduled at the discretion of the instructor.

Withdrawal from course:

Students must follow the withdrawal procedure stipulated in the Undergraduate Catalogue. Withdrawal within the 8 weeks of class session requires the completion of withdrawal form from the Records Office. Withdrawal after 8 weeks of session will require the completion of a Petition to Withdraw from the Records Office. Students failing to withdraw will get an “UW” on their record, which is equivalent to an F grade.

Other Information:

Email queries will be accepted and assignment may be submitted through email but must be with prior approval of the instructor.

Use of scientific calculator is required for the course but no preprogrammed data or equation is permitted in exam or laboratory classes. Use of cell phones during exams is not allowed. Students are allowed to use only material provided by the instructor (periodic table, scrap paper) during exams.

Academic Dishonesty:

All submitted assignments and laboratory report must be the individual student work. The university’s policy on academic misconduct, including cheating and plagiarism will be enforced.

Special needs: Student with Disabilities

If you are a student with a disability who will require special arrangement, please contact the instructor to discuss your requirements. Documentary evidence will be required and you are also required to register with the EEO/ADA Office. Contact number is 735 – 2244/2971/2243.

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**THE UNIVERSITY OF GUAM
COLLEGE OF NATURAL AND APPLIED SCIENCE
DIVISION OF NATURAL SCIENCES**

COURSE SYLLABUS

CH103 GENERAL CHEMISTRY II

Instructor: Dr Maika Vuki
Office: Science Building Room 228
Contact number: 735 2781
Email: mvuki@uguam.uog.edu
Office hours: M,W: 11-12, 2-3; T 9-11

Course description:

General Chemistry II is a one-semester course for students preparing for majoring in chemistry or biology. The course is a continuation of CH102 in establishing sound knowledge in fundamental concepts in chemistry. The knowledge gained from CH102 will be built upon and new topics will be introduced. Topics covered include properties of solution, kinetics, chemical equilibrium, acids and bases, acid-base and some common equilibria, thermodynamics, electrochemistry, nuclear chemistry. CH103 meets for three hours of lecture per week.

Course rationale

With the rapid advance in technology and science, there is a natural demand to understand the world we live in and to enhance our ability to use its resources efficiently. Chemistry is at the core of what society is built upon. This course will provide knowledge in basic principles that govern chemical processes in biological, industrial, environmental, health, etc. in order for student to appreciate the relevance. It also sets a sound foundation for advanced courses in chemistry.

Course overall objectives:

The goals of the Introduction to Chemistry course are:

The course objectives:

1. to provide a sound knowledge of fundamental concepts in chemistry.
2. to develop an appreciation of chemistry as central science and its relevance in life.
3. to develop problem solving skills in fundamentals of basic chemical concepts using quantitative and qualitative approaches.
4. to communicate basic chemical knowledge and problem solving skills clearly
5. to develop active participation in problem solving exercises in chemistry

<u>Course Student Learning Outcomes (SLO):</u> Upon completion of the course, students will	<u>Matching Program Learning Outcome (PLO)</u>	<u>Matching Institutional Learning Outcomes (ILO)</u>	<u>Method of Assessment</u>
Explain and interpret phase diagram	PLO1	ILO1	-Assignments - Short answers on quizzes -Pre and Post-test
Calculate solution composition, describe the different types of solution	PLO1	ILO1	-Assignments - Short answer questions on exams
Explain the different types of solution processes and perform stoichiometric calculations of solution-based reactions	PLO1 PLO2 PLO4	ILO1 ILO2	- In class and online assignments - Quantitative questions on exams -Supplemental practice in laboratory
Perform calculations on physical quantities (e.g. osmotic pressure, freezing point depression and boiling point elevation)	PLO4	ILO2	- In class and online assignments - Supplemental practice in laboratory
Describe the rate laws and perform calculations based on the zero, first and second order rate laws	PLO4	ILO2	- Final and Topic exams - Online assignments - Supplemental practice in laboratory
Relate the rate law to the reaction mechanism	PLO4	ILO1	- Final and Topic exams
Describe the chemical equilibrium process and its significance	PLO1 PLO4	ILO1	- Topic exam - Theoretical and application questions quizzes
Perform equilibrium calculations using equilibrium constant relationships	PLO2 PLO4	ILO2	- Final and Topic exams - Online assignments - Supplemental practice on laboratory
Explain the different theories of acids and bases	PLO1	ILO1	- Short answer questions on topic ex
Perform stoichiometric and equilibrium calculations for acid-base properties	PLO4	ILO2	- Final and Topic exams - In class and online assignments - Supplemental practice in laboratory
Explain the buffer solutions and perform pKa and pH calculations of buffer	PLO1 PLO4	ILO2	- Final and Topic exams - In class and online assignments - Supplemental practice in laboratory
Apply the equilibrium concepts and calculations to insoluble compounds	PLO1 PLO4	ILO2	- Final and Topic exam

Describe entropy concept and its application to free energy and equilibrium constant, perform calculation of entropy, free energy and equilibrium constant	PLO1 PLO2 PLO4	ILO1 ILO2	- Final and Topic Exams - In class assignments - Supplemental practice in laboratory
Describe electrode potentials, explain how it is measured, and perform electrode potential calculations for redox reactions	PLO1 PLO5	ILO1 ILO2	- In class and online assignments
Explain the radioactivity phenomenon and modern application in energy production and science technology	PLO3 PLO5	ILO1	- Topic exam

Chemistry Program Learning Outcomes

PLO 1: Demonstrate the knowledge of fundamental concepts of chemistry and its relevance to the scientific method and other fields in science

PLO 2: Demonstrate the skills to make observations, experimentation, collect and collate data, analyze and interpret data in a safe chemical environment

PLO 3: Demonstrate the ability to clearly articulate, formulate, and communicate scientific information using computer, written and oral communication skills

PLO 4: Demonstrate critical thinking, problem solving skills and the ability to use chemical knowledge and mathematical skills to identify, evaluate, analyze, synthesize, and integrate data and abstract ideas in solving problems

PLO 5: Demonstrate the knowledge and skills in advanced instrumentation, applications, interpretation, and experimental design to address scientific queries in chemistry, industry, the environment, health, and related fields

PLO 6: Demonstrate a sense of exploration and research approach that enables students to pursue lifelong learning in chemistry

PLO 7: Demonstrate interaction skills and teamwork

Institutional Expected Student Learning Outcomes

Some of the expected fundamental knowledge, skills, and values that the University of Guam student will have demonstrated upon completion of any degree are:

ILO1: Mastery of critical thinking and problem solving

ILO2: Mastery of quantitative analysis

ILO3: Effective oral and written communication

ILO4: Understanding and appreciation of culturally diverse people, ideas and values in a democratic context

ILO5: Responsible use of knowledge, natural resources, and technology

ILO6: An appreciation of the arts and sciences

ILO7: An interest in personal development and lifelong learning

Text book

Text: Chemistry, by Zumdhal, 9th edition, 2014

Examination and Grading Procedure:

The lecture grade will be determined by topic-term exams and the final exam at the end of the semester. The topic-term exams will be worth a total of 45%. There will be 4 topic exams with each exam being administered after the completion of two chapters. Students can drop the lowest topic exam score out of the four. Students are required to take all these exams and no make-ups will be given. If you are unable to attend any of these exams, the instructor must be notified prior to the examination and evidence must be provided in the form of certificate or letter.

Quiz and assignments

Quizzes will be given during the semester for every chapter to test student's general ability in understanding lecture material. This will be approximately 10-15 minutes duration and scores will be counted towards 5% of the course assessment.

Moodle - Online

All resources such as lecture notes, online sources and activities such as assignments, quizzes will be made available on moodle. You are required to open a moodle account and get the pass key from the instructor.

Final exam

The end of semester final exam will be based on the materials covered in the course. The final exam assessment score will be 30%

Final Exam Date: May 19th 12-13.50

Summary of assessment scores

Topic Exams (3):	45%
Quiz:	5%
Assignments:	5%
Pre-Post Test:	10%
Final Exam:	30%
Total:	100%

Grading:

The final grading for the will be weighted as follows:

A: 90% or above

B: 80 – 89%

C: 70 – 79%

D: 60 – 69%
F: below 60%

Academic Dishonesty: All submitted assignments and laboratory report must be the individual student work. The university's policy on academic misconduct, including cheating and plagiarism will be enforced.

Withdrawal from course:

Students must follow the withdrawal procedure stipulated in the Undergraduate Catalogue. Withdrawal within the 8 weeks of class session requires the completion of withdrawal form from the Records Office. Withdrawal after 8 weeks of session will require the completion of a Petition to Withdraw from the Records Office. Students failing to withdraw will get an "UW" on their record, which is equivalent to an F grade.

Special needs: Student with Disabilities

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Other Information:

Email queries will be accepted and assignment may be submitted through email but must be with prior approval of the instructor.

Use of scientific calculator is required for the course but no preprogrammed data or equation is permitted in exam or laboratory classes. Use of cell phones during exams is not allowed. Students are allowed to use only material provided by the instructor (periodic table, scrap paper) during exams.

UNIVERSITY OF GUAM
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DIVISION OF NATURAL SCIENCES

COURSE SYLLABUS

CH103L-01 GENERAL CHEMISTRY II LABORATORY (SPRING 2016)

Meetings: W 2:00 – 4:50 pm

Room: SC230

Instructor: Dr. Tedros Bezabeh

Office: SC203

Phone: 671-7352784

Email: bezabeht@triton.uog.edu

Office Hours: M 2:00 – 4:00 pm, T 2:00 - 4:00 pm, Th 2:00 – 4:00 pm

- Catalog Description:** This course is a continuation of CH 102-102L with further study of reactions and stoichiometric problems. The periodic table is studied with emphasis on physical and chemical group properties. Kinetics, Chemical Equilibrium, thermochemistry, electrochemistry, are applied with respect to data gathering and simple deduction. It includes three hours of lecture weekly. The lab, CH 103L, MUST be taken concurrently with CH103 lecture. Prerequisites: CH 102-102L, and MA 161a or MA 161b or MA 165 or higher level, or placement at this level. (CH 100-100L may be substituted for CH 102-102L by program consent). Co-requisite: CH 103
- Course Content:** The following topics will be covered in CH 103L; Chemical bonding, compositions and physical properties of solutions, chemical kinetics, principles of chemical equilibrium, solution equilibria (acids and bases/solubility and precipitation/complex ion formation), thermodynamics, spontaneous change and equilibrium, electrochemistry, nuclear chemistry
- Rationale for the Course:** CH 103L complements lecture component and are continuation of core General Chemistry; a foundational course for the natural science majors and minors.

<u>Course Student Learning Outcomes (SLO):</u> Upon completion of the course, students will	<u>Matching Program Learning Outcomes (PLO)</u>	<u>Matching Institutional Learning Outcomes (ILO)</u>	<u>Method of Assessment</u>

Use safety knowledge and skills to conduct experiments	PLO1 PLO2 PLO7	ILO1 ILO5 ILO7	Laboratory practical exam
Conduct experiment from a given procedure, collect, analyze and interpret data	PLO2	ILO1 ILO2	Laboratory portfolio and note book
Apply precision and accuracy in measurements and calculations	PLO4 PLO5	ILO2	Laboratory reports
Relate the experimental observations to chemical concepts	PLO1 PLO4	ILO1	-Laboratory reports - Laboratory portfolio and note book
Solve quantitative and qualitative problems in chemistry	PLO4	ILO1 ILO2	Laboratory written exam
Write clear laboratory reports using standard scientific reporting method	PLO3	ILO3	Laboratory reports
Use standard computer technology to present and analyze data	PLO3 PLO5	ILO3 ILO5	- Laboratory reports - Laboratory portfolio and note book
Collaborate with peers in learning chemistry	PLO7	ILO7	- Laboratory portfolio and note book

Chemistry Program Learning Outcomes

PLO 1: Demonstrate the knowledge of fundamental concepts of chemistry and its relevance to the scientific method and other fields in science

PLO 2: Demonstrate the skills to make observations, experimentation, collect and collate data, analyze and interpret data in a safe chemical environment

PLO 3: Demonstrate the ability to clearly articulate, formulate, and communicate scientific information using computer, written and oral communication skills

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PLO 6: Demonstrate a sense of exploration and research approach that enables students to pursue lifelong learning in chemistry

PLO 7: Demonstrate interaction skills and teamwork

Institutional Expected Student Learning Outcomes

Some of the expected fundamental knowledge, skills, and values that the University of Guam student will have demonstrated upon completion of any degree are:

ILO1: Mastery of critical thinking and problem solving

ILO2: Mastery of quantitative analysis

ILO3: Effective oral and written communication

ILO4: Understanding and appreciation of culturally diverse people, ideas and values in a democratic context

ILO5: Responsible use of knowledge, natural resources, and technology

ILO6: An appreciation of the arts and sciences

ILO7: An interest in personal development and lifelong learning

Text book

Experiments in General Chemistry, 9th Edition, Petrucci, Harwood, Herring and Madura. by Thomas Greco, Lyman H. Rickard, Gerald S. Weiss; Pearson (2007)

Course Content

CH 103 LABORATORY TENTATIVE SCHEDULE SP2016

Week 1	1/18	No Lab
Week 2	1/25	Safety in the Chem Lab/Locker check in/Pre-Test
Week 3	2/1	Molecular Model/Bonding I
Week 4	2/8	Colligative properties
Week 5	2/15	Acid - base titration
Week 6	2/22	A Kinetic Study of an Iodine Clock Experiment
Week 7	2/29	Determination of Equilibrium Constant (2 weeks)
Week 8	3/7	Determination equilibrium constant
Week 9	3/14	Redox Titration (2 weeks)
Week 10	3/21	Spring break (no Lab)
Week 11	3/28	Redox Titration
Week 12	4/4	Lab practical exam
Week 13	4/11	Voltaic cells
Week 14	4/18	Lab Review

Week 15	4/25	Lab Theory Exam
Week 16	5/2	ACS Exam (Bonus)
Week 17	5/9	Post-Test

METHODS OF EVALUATION:

The lab part of your grade will be determined by completed lab reports, assignments and exercises, a lab final exam, lab portfolio and note book. Final lab grades will be based on the following:

Lab reports:	50%
Lab practical exam:	20%
Lab written final exam:	20%
Laboratory portfolio and note book:	10%
Total:	100%

The performance level for the letter grade in the lab will be as follows:

A	=	90% and above
B	=	80% to 89%
C	=	70% to 79%
D	=	60% to 69%
F	=	below 60%

IMPORTANT NOTES:

You are expected to review the experimental procedure prior to our lab meeting.

- (1) Write an outline for the assigned experiment prior to the lab meeting;
- (2) Answer all of the Pre-laboratory questions;
- (3) Lab reports are due one week after completing the experiment. There are two types of reports: Full – Write Up or Fill –In Sheet. The Full-Write Up will require all components of the report to be written whereas the Fill-In will only require completion of the data and results sheet in the lab manual. The instructor will inform you on what type of report will be required for each lab experiment.
- (4) Lab reports are due one week after completing the practical work/experiment. Lab reports handed in late (up to one week after the due date) will have an automatic deduction of 10 points. Lab reports that are late by more than a week (but not more than 2 weeks) will have deductions of 25 points. Any lab report that is late by more than 2 weeks **WILL NOT BE ACCEPTED**.
- (5) A lab grading rubric will be issued at the start of each lab to guide report writing.
- (6) Plagerism using online and previous work or work of other students will not be tolerated. An automatic zero will be given and further disciplinary action may be taken.

(7) Make a study schedule and work steadily throughout the semester. Last minute cramming is unlikely to build a deeper understanding of chemistry, and is usually useless for long-term knowledge. The key to making a good laboratory report is PREPARATION.

(8) Laboratory note book (bound exercise book) is REQUIRED.

(9) Laboratory portfolio for compilation of all your lab reports. This will be graded at the end of the semester.

GET A HEAD START AND **DO NOT** WAIT UNTIL THE LAST MINUTE TO COMPLETE THESE ASSIGNMENTS. DO NOT FALL BEHIND!

ATTENDANCE POLICY:

If you miss a lab, you have missed an integral part of the course. Lab make-ups will NOT be permitted. No credit will be given if you are absent from the lab. If you miss more than 75% of the laboratory you will be disqualified from sitting the final exam for both the lecture and laboratory components.

Withdrawal from course:

Students must follow the withdrawal procedure stipulated in the Undergraduate Catalogue. Withdrawal within the 8 weeks of class session requires the completion of withdrawal form from the Records Office. Withdrawal after 8 weeks of session will require the completion of a Petition to Withdraw from the Records Office. Students failing to withdraw will get an “UW” on their record, which is equivalent to an F grade.

Other Information:

The above lab schedule is tentative and may be changed by the instructor; changes will be announced in class or by email.

Use of scientific calculator is required for the course but no preprogrammed data or equation is permitted in exam or laboratory classes. Use of cell phones during exams is not allowed. Students are allowed to use only material provided by the instructor (periodic table, scrap paper) during exams.

Academic Dishonesty: All submitted assignments and laboratory report must be the individual student work. The university’s policy on academic misconduct, including cheating and plagiarism will be enforced.

Special needs: Student with Disabilities

If you are a student with a disability who will require special arrangement, please contact the instructor to discuss your requirements. Documentary evidence will be required and you are also required to register with the EEO/ADA Office. Contact number is 735 – 2244/2971/2243.

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DIVISION OF NATURAL SCIENCES

COURSE SYLLABUS

CH103L-03 GENERAL CHEMISTRY II LABORATORY (SPRING 2016)

Meetings: F 11:00 am – 1:50 pm

Room: SC230

Instructor: Dr. Tedros Bezabeh

Office: SC203

Phone: 671-7352784

Email: bezabeht@triton.uog.edu

Office Hours: M 2:00 – 4:00 pm, T 2:00 - 4:00 pm, Th 2:00 – 4:00 pm

- Catalog Description:** This course is a continuation of CH 102-102L with further study of reactions and stoichiometric problems. The periodic table is studied with emphasis on physical and chemical group properties. Kinetics, Chemical Equilibrium, thermochemistry, electrochemistry, are applied with respect to data gathering and simple deduction. It includes three hours of lecture weekly. The lab, CH 103L, MUST be taken concurrently with CH103 lecture. Prerequisites: CH 102-102L, and MA 161a or MA 161b or MA 165 or higher level, or placement at this level. (CH 100-100L may be substituted for CH 102-102L by program consent). Co-requisite: CH 103
- Course Content:** The following topics will be covered in CH 103L; Chemical bonding, compositions and physical properties of solutions, chemical kinetics, principles of chemical equilibrium, solution equilibria (acids and bases/solubility and precipitation/complex ion formation), thermodynamics, spontaneous change and equilibrium, electrochemistry, nuclear chemistry
- Rationale for the Course:** CH 103L complements lecture component and are continuation of core General Chemistry; a foundational course for the natural science majors and minors.

<u>Course Student Learning Outcomes (SLO):</u> Upon completion of the course, students will	<u>Matching Program Learning Outcomes (PLO)</u>	<u>Matching Institutional Learning Outcomes (ILO)</u>	<u>Method of Assessment</u>

Use safety knowledge and skills to conduct experiments	PLO1 PLO2 PLO7	ILO1 ILO5 ILO7	Laboratory practical exam
Conduct experiment from a given procedure, collect, analyze and interpret data	PLO2	ILO1 ILO2	Laboratory portfolio and note book
Apply precision and accuracy in measurements and calculations	PLO4 PLO5	ILO2	Laboratory reports
Relate the experimental observations to chemical concepts	PLO1 PLO4	ILO1	-Laboratory reports - Laboratory portfolio and note book
Solve quantitative and qualitative problems in chemistry	PLO4	ILO1 ILO2	Laboratory written exam
Write clear laboratory reports using standard scientific reporting method	PLO3	ILO3	Laboratory reports
Use standard computer technology to present and analyze data	PLO3 PLO5	ILO3 ILO5	- Laboratory reports - Laboratory portfolio and note book
Collaborate with peers in learning chemistry	PLO7	ILO7	- Laboratory portfolio and note book

Chemistry Program Learning Outcomes

PLO 1: Demonstrate the knowledge of fundamental concepts of chemistry and its relevance to the scientific method and other fields in science

PLO 2: Demonstrate the skills to make observations, experimentation, collect and collate data, analyze and interpret data in a safe chemical environment

PLO 3: Demonstrate the ability to clearly articulate, formulate, and communicate scientific information using computer, written and oral communication skills

PLO 4: Demonstrate critical thinking, problem solving skills and the ability to use chemical knowledge and mathematical skills to identify, evaluate, analyze, synthesize, and integrate data and abstract ideas in solving problems

PLO 5: Demonstrate the knowledge and skills in advanced instrumentation, applications, interpretation, and experimental design to address scientific queries in chemistry, industry, the environment, health, and related fields

PLO 6: Demonstrate a sense of exploration and research approach that enables students to pursue lifelong learning in chemistry

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Some of the expected fundamental knowledge, skills, and values that the University of Guam student will have demonstrated upon completion of any degree are:

ILO1: Mastery of critical thinking and problem solving

ILO2: Mastery of quantitative analysis

ILO3: Effective oral and written communication

ILO4: Understanding and appreciation of culturally diverse people, ideas and values in a democratic context

ILO5: Responsible use of knowledge, natural resources, and technology

ILO6: An appreciation of the arts and sciences

ILO7: An interest in personal development and lifelong learning

Text book

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Course Content

CH 103 LABORATORY TENTATIVE SCHEDULE SP2016

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Week 3	2/1	Molecular Model/Bonding I
Week 4	2/8	Colligative properties
Week 5	2/15	Acid - base titration
Week 6	2/22	A Kinetic Study of an Iodine Clock Experiment
Week 7	2/29	Determination of Equilibrium Constant (2 weeks)
Week 8	3/7	Determination equilibrium constant
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Week 10	3/21	Spring break (no Lab)
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You are expected to review the experimental procedure prior to our lab meeting.

- (1) Write an outline for the assigned experiment prior to the lab meeting;
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- (5) A lab grading rubric will be issued at the start of each lab to guide report writing.
- (6) Plagerism using online and previous work or work of other students will not be tolerated. An automatic zero will be given and further disciplinary action may be taken.

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COURSE SYLLABUS

CH 103L-01/03 GENERAL CHEMISTRY LABORATORY (SPRING 2016)

Instructor: Dr. Tedros Bezabeh

Office: SC203

Phone: 671-7352784

Email: bezabeht@triton.uog.edu

Office Hours: M 2:00 – 4:00 pm, T 2:00 - 4:00 pm, Th 2:00 – 4:00 pm

- Catalog Description:** This course is a continuation of CH 102-102L with further study of reactions and stoichiometric problems. The periodic table is studied with emphasis on physical and chemical group properties. Kinetics, Chemical Equilibrium, thermochemistry, electrochemistry, are applied with respect to data gathering and simple deduction. It includes three hours of lecture weekly. The lab, CH 103L, MUST be taken concurrently with CH103 lecture. Prerequisites: CH 102-102L, and MA 161a or MA 161b or MA 165 or higher level, or placement at this level. (CH 100-100L may be substituted for CH 102-102L by program consent). Co-requisite: CH 103
- Course Content:** The following topics will be covered in CH 103L; Chemical bonding, compositions and physical properties of solutions, chemical kinetics, principles of chemical equilibrium, solution equilibria (acids and bases/solubility and precipitation/complex ion formation), thermodynamics, spontaneous change and equilibrium, electrochemistry, nuclear chemistry
- Rationale for the Course:** CH 103L complements lecture component and are continuation of core General Chemistry; a foundational course for the natural science majors and minors.

<u>Course Student Learning Outcomes (SLO):</u> Upon completion of the course, students will	<u>Matching Program Learning Outcomes (PLO)</u>	<u>Matching Institutional Learning Outcomes (ILO)</u>	<u>Method of Assessment</u>
Use safety knowledge and skills to conduct experiments	PLO1 PLO2 PLO7	ILO1 ILO5 ILO7	Laboratory practical exam
Conduct experiment from a given procedure, collect, analyze and interpret data	PLO2	ILO1 ILO2	Laboratory portfolio and note book

Apply precision and accuracy in measurements and calculations	PLO4 PLO5	ILO2	Laboratory reports
Relate the experimental observations to chemical concepts	PLO1 PLO4	ILO1	-Laboratory reports - Laboratory portfolio and note book
Solve quantitative and qualitative problems in chemistry	PLO4	ILO1 ILO2	Laboratory written exam
Write clear laboratory reports using standard scientific reporting method	PLO3	ILO3	Laboratory reports
Use standard computer technology to present and analyze data	PLO3 PLO5	ILO3 ILO5	- Laboratory reports - Laboratory portfolio and note book
Collaborate with peers in learning chemistry	PLO7	ILO7	- Laboratory portfolio and note book
Present seminar using computer technology	PLO1 PLO5	ILO3	- Seminar

Chemistry Program Learning Outcomes

PLO 1: Demonstrate the knowledge of fundamental concepts of chemistry and its relevance to the scientific method and other fields in science

PLO 2: Demonstrate the skills to make observations, experimentation, collect and collate data, analyze and interpret data in a safe chemical environment

PLO 3: Demonstrate the ability to clearly articulate, formulate, and communicate scientific information using computer, written and oral communication skills

PLO 4: Demonstrate critical thinking, problem solving skills and the ability to use chemical knowledge and mathematical skills to identify, evaluate, analyze, synthesize, and integrate data and abstract ideas in solving problems

PLO 5: Demonstrate the knowledge and skills in advanced instrumentation, applications, interpretation, and experimental design to address scientific queries in chemistry, industry, the environment, health, and related fields

PLO 6: Demonstrate a sense of exploration and research approach that enables students to pursue lifelong learning in chemistry

PLO 7: Demonstrate interaction skills and teamwork

Institutional Expected Student Learning Outcomes

Some of the expected fundamental knowledge, skills, and values that the University of Guam student will have demonstrated upon completion of any degree are:

ILO1: Mastery of critical thinking and problem solving

ILO2: Mastery of quantitative analysis

ILO3: Effective oral and written communication

ILO4: Understanding and appreciation of culturally diverse people, ideas and values in a democratic context

ILO5: Responsible use of knowledge, natural resources, and technology

ILO6: An appreciation of the arts and sciences

ILO7: An interest in personal development and lifelong learning

Text book

Experiments in General Chemistry, 9th Edition, Petrucci, Harwood, Herring and Madura. by Thomas Greco, Lyman H. Rickard, Gerald S. Weiss; Pearson (2007)

Course Content

CH 103 LABORATORY TENTATIVE SCHEDULE SP2016

Week 1	1/18	No Lab
Week 2	1/25	Safety in the Chem Lab/Locker check in/Pre-Test
Week 3	2/1	Molecular Model/Bonding I
Week 4	2/8	Colligative properties
Week 5	2/15	Acid - base titration
Week 6	2/22	pH Titration (Hand out)
Week 7	2/29	A Kinetic Study of an Iodine Clock Experiment
Week 8	3/7	Determination of Equilibrium Constant (2 weeks)
Week 9	3/14	Determination equilibrium constant
Week 10	3/21	Spring break (no Lab)
Week 11	3/28	Redox Titration
Week 12	4/4	Lab practical exam
Week 13	4/11	Voltaic cells
Week 14	4/18	Lab Review
Week 15	4/25	Lab Theory Exam
Week 16	5/2	Post-Test
Week 17	5/9	Final Exam Review

METHODS OF EVALUATION:

The lab part of your grade will be determined by completed lab reports, assignments and exercises, a lab final exam, lab portfolio and note book. Final lab grades will be based on the following:

Lab reports:	50%
Lab practical exam:	20%
Lab written final exam:	20%
Laboratory portfolio and note book:	10%
Total:	100%

The performance level for the letter grade in the lab will be as follows:

A	=	90% and above
B	=	80% to 89%
C	=	70% to 79%
D	=	60% to 69%
F	=	below 60%

IMPORTANT NOTES:

You are expected to review the experimental procedure prior to our lab meeting.

- (1) Write an outline for the assigned experiment prior to the lab meeting;
- (2) Answer all of the Pre-laboratory questions;
- (3) Lab reports are due one week after completing the experiment. There are two types of reports: Full – Write Up or Fill –In Sheet. The Full-Write Up will require all components of the report to be written whereas the Fill-In will only require completion of the data and results sheet in the lab manual. The instructor will inform you on what type of report will be required for each lab experiment.
- (4) Lab reports are due one week after completing the practical exercise. Lab reports handed in late (up to one week after the due date) will have an automatic deduction of 10 points. Lab reports that are late by more than a week (but less than 2 weeks) will have deductions of 25 points. Any lab report that is late by more than 2 weeks **WILL NOT BE ACCEPTED.**
- (5) A lab grading rubric will be issued at the start of each lab to guide report writing.
- (6) Plagerism using online and previous work or work of other students will not be tolerated. An automatic zero will be given and further disciplinary action may be taken.
- (7) Make a study schedule and work steadily throughout the semester. Last minute cramming is unlikely to build a deeper understanding of chemistry, and is usually useless for long-term knowledge. The key to making a good laboratory report is PREPARATION.
- (8) Laboratory note book (bound exercise book) is **REQUIRED.**

(9) Laboratory portfolio for compilation of all your lab reports. This will be graded at the end of the semester.

GET A HEAD START AND **DO NOT** WAIT UNTIL THE LAST MINUTE TO COMPLETE THESE ASSIGNMENTS.
DO NOT FALL BEHIND!

ATTENDANCE POLICY:

If you miss a lab, you have missed an integral part of the course. Lab make-ups will NOT be permitted. No credit will be given if you are absent from the lab. If you miss more than 75% of the laboratory you will be disqualified from sitting the final exam for both the lecture and laboratory components.

Withdrawal from course:

Students must follow the withdrawal procedure stipulated in the Undergraduate Catalogue. Withdrawal within the 8 weeks of class session requires the completion of withdrawal form from the Records Office. Withdrawal after 8 weeks of session will require the completion of a Petition to Withdraw from the Records Office. Students failing to withdraw will get an “UW” on their record, which is equivalent to an F grade.

Other Information:

The above lab schedule is tentative and may be changed by the instructor; changes will be announced in class or by email.

Use of scientific calculator is required for the course but no preprogrammed data or equation is permitted in exam or laboratory classes. Use of cell phones during exams is not allowed. Students are allowed to use only material provided by the instructor (periodic table, scrap paper) during exams.

Academic Dishonesty: All submitted assignments and laboratory report must be the individual student work. The university’s policy on academic misconduct, including cheating and plagiarism will be enforced.

Special needs: Student with Disabilities

If you are a student with a disability who will require special arrangement, please contact the instructor to discuss your requirements. Documentary evidence will be required and you are also required to register with the EEO/ADA Office. Contact number is 735 – 2244/2971/2243.

Tobacco-free/Smoke-free/beetle nut-free Campus

UOG is a tobacco free and beetle nut free campus. Thank you for not using tobacco products and beetle nut on campus, and for helping make UOG a healthy learning and living environment.