

DIM-SAP-167 General Chemistry

SEMESTER:	Fall
CREDITS:	7.5 ECTS (lecture 4.5 credits + laboratory 3.0 credits)
LANGUAGE:	English
DEGREES:	SAPIENS program

Course overview

DIM-SAP-167 provides students with an introduction to chemistry.

This course is designed for science and engineering students, and it focuses on the fundamental principles and laws underlying chemical action.

General Chemistry Laboratory allows students to gain familiarity with laboratory techniques and apparatus and reinforces and supplements the lecture materials.

After taking this course, students will understand the fundamental principles and applications of:

- States of matter
- Chemical bonding
- Nomenclature
- Periodicity
- Chemical reactions
- Thermodynamics
- Stoichiometry
- Gas laws
- Atomic and molecular structure

Prerequisites

None

Course contents

Theory:

- Unit 1:** Matter, energy, and measurement.
- Unit 2:** Atoms, molecules, and ions.
- Unit 3:** Chemical reactions and reaction stoichiometry.
- Unit 4:** Reactions in aqueous solution.
- Unit 5:** Thermochemistry.
- Unit 6:** Electronic structure of atoms.
- Unit 7:** Periodic properties of the elements.
- Unit 8:** Basic concepts of chemical bonding.
- Unit 9:** Molecular geometry and bonding theories.
- Unit 10:** Gases.

Laboratory:

- Lab 1:** For your safety.
- Lab 2:** Cross-linking polyvinyl alcohol with sodium borate.
- Lab 3:** Preparation and viscosity of biodiesel from vegetable oil.
- Lab 4:** Chemical formulas and reactions.
- Lab 5:** Acetic acid content of vinegar.
- Lab 6:** Chemistry of recycling aluminum.
- Lab 7:** Synthesis of alum from clay.
- Lab 8:** Enthalpy of neutralization.
- Lab 9:** Issues in water quality.
- Lab 10:** Molecular modeling.
- Lab 11:** Generating hydrogen gas.

Lab 12: Quantification of vitamin C present in a pharmaceutical product.

Textbook

- Chemistry the Central Science by Brown, LeMay, Bursten, Murphy, Woodward, Stoltzfus (Pearson/Prentice Hall). The 12th edition on this textbook is sufficient to both study for this class and to do the homework assignments.
- General Chemistry Laboratory and Notebook by Philip N. Borer, Kendall/Hunt Publishing Company. Bring the manual to every lab session.
- Lecture notes will be posted as PDF files on the course website.

Grading I – Regular assessment

EXAMS AND HOMEWORK (60 %)	LAB (40 %)
In-class exams 60 %	Pre-lab quizzes 10 %
Homework 20 %	Post-lab reports 60 %
Final exam 15 %	Lab technique 15 %
Class participation 5 %	Lab exam 15 %

Exams

Exams are held during the regular class period. Most questions will be problems similar to previously assigned homework and tutorial exercises. Each exam will focus on specific chapters as noted in the syllabus.

A calculator is needed to complete exams in Chemistry. However, only scientific calculators are allowed. All programmable and graphing calculators, cell phones, tablets, and smart watches are prohibited.

A minimum of 45% of the possible marks in theory exams must be obtained in order to receive a passing grade. If less than 45% is obtained, students are permitted to a reassessment of the failed modules by completing a piece of work at the end of the term. This report or essay will be focused on the exercises and contents included in the course and it will be submitted by email.

If the student passes the task, the total mark awarded will be capped at the minimum pass mark which is 5.0 (exam + homework + lab).

Homework

Each week a new problem set assignment will be posted on the course website. All the students must complete their homework and hand it on time. Homework must be completed by each student and must represent an individual work.

Class participation

Class participation depends on attendance. However, attendance alone does not imply a full class participation grade. The class participation grade is based on the general attitude of the student towards the class, and especially on the quality of his/her input. Doing the readings and/or the homework does not imply a passing participation grade.

Pre-Lab Quizzes

They must be done individually in the lab. Reference to the lab manual and notes are allowed.

Post-Lab Reports

Observations and data for all experiments must be carefully recorded. Post-lab reports are in the lab manual and must be turned in one week after the lab. A deduction of 10 points will be made for Post-Labs one day late and assignments later than two days after it is due will receive a grade of zero.

Lab Technique

This grade will be determined by the observation of the participation and laboratory technique, preparedness, punctuality, attention to safety and cleanup of lab space.

Lab exam

It is a written examination that occurs during the lab class on the last week of classes. Students are allowed to bring a calculator, a periodic table and a double-sided note sheet. The students are expected to attend every lab class; a missed lab will count as a grade of zero. Medical absences will be excused based on written advice from the Health Center. A student who misses a session may request permission to attend a make-up lab session during the final "make-up week" of the term. If the student has missed more than 2 lab sessions, he or she will either need to accept a zero for the missed sessions.

Grading II – Retake

For those students not passing the course according the ordinary assessment system, a retake exam will be offered. In this case, the final grade will be determined by:

Retake Grade = 0.60 * (Retake exam) + 0.04 * (Pre-lab quizzes) + 0.12 * (Homework) + 0.24 * (Post-lab reports).