



Course Syllabus

Course Code	Course Title	ECTS Credits
CHEM-106	General Chemistry	8
Prerequisites	Department	Semester
None	Engineering	Fall, Spring
Type of Course	Field	Language of Instruction
Required	Chemistry	English
Level of Course	Lecturer(s)	Year of Study
1 st Cycle	Dr Christou Stavroula	1 st
Mode of Delivery	Work Placement	Corequisites
Face-to-face	N/A	None

Course Objectives:

The main objectives of the course are to:

- to give students an introduction to the basic principles of general chemistry,
- to assist in the development of strong problem-solving skills,
- to help cultivate critical thinking in the approach to learning, and
- to help in the acquisition of sound hands-on practical skills in the chemistry lab.

Learning Outcomes:

After completion of the course students are expected to be able to:

- Use the concept of significant figures in calculations, and in particular apply the rules of significant figures using laboratory measurements and in the analysis of experimental data.
- Explain atomic and molecular structure and discuss the arrangement of atoms or molecules in different forms of matter.
- Utilize qualitatively and quantitatively chemical equations for a variety of chemical reaction types.
- Explain and use the results of quantum mechanics for the electronic structure in atoms and discuss how electronic structure can be employed to explain the periodic trends of various properties.
- Discuss the basic principles of chemical bonding including the application of molecular orbitals in the description of covalent bonding.

- Predict the molecular geometry of polyatomic molecules and molecular ions from the Lewis structure and demonstrate the application of hybrid orbitals in predicting molecular geometry.

Course Content:

- Introduction: Matter and Measurement
- Atoms, Molecules and Ions
- Stoichiometry: Calculations with Chemical Formulas and Equations
- Aqueous Reactions and Solution Stoichiometry
- Electronic Structure of Atoms
- Periodic Properties of Elements
- Basic Concepts of Chemical Bonding
- Molecular Geometry

Laboratory Experiments, Demonstrations and Workshops:

- Laboratory Safety Demonstrations
- Significant Figures – Making Measurements in the Chemistry Laboratory (Workshop)
- Basic Laboratory Techniques
- Graphs in Chemistry (Workshop)
- Experimental Determination of Density
- Double Displacement Reactions and Precipitates
- Acid-Base Titrations (Workshop)
- Determination of Citric Acid Concentration in Fruit Juices
- Estimation of Vitamin C Content in Fruit Juices
- Determination of Acetic Acid Concentration in Vinegar
- Molecular Geometry (Workshop)

Learning Activities and Teaching Methods:

Lectures, Laboratory Practical Sessions, and Assignments.
The course format is 3 h lectures and 2 h laboratory tutorial session per week.

Assessment Methods:

Laboratory Practical Sessions, Tests, Final Examination.

Required Textbooks / Readings:

Title	Author(s)	Publisher	Year	ISBN
Chemistry The Central Science	T.L. Brown, H.E. Lemay, B.E. Bursten, C.J. Murphy	Prentice Hall	2009 11 th Edition	ISBN: 0-13-235848-4
CHEM-105 Laboratory Manual	P.G. Hajigeorgiou	University of Nicosia	2010	

Recommended Textbooks / Readings:

Title	Author(s)	Publisher	Year	ISBN
Chemistry	John E. McMurry, Robert C. Fay, Jordan Fantini	Pearson Prentice Hall, 6th edition	2012	ISBN 10: 0-321-76087-5 ISBN 13: 978-0-321-76087-
General Chemistry	Darrell D. Ebbing, Steven D. Gammon	Houghton Mifflin Company	2009	ISBN-10: 0-618-85748-6 ISBN-13: 978-0-618-85748-7
General Chemistry Principles and Modern Applications	R.H. Petrucci, W.S. Harwood, and F.G.Herring	Prentice Hall	2002 8th Edition	ISBN: 0-13-014329-4