

CALIFORNIA STATE UNIVERSITY CHANNEL ISLANDS

NEW COURSE PROPOSAL

PROGRAM: BIOLOGICAL AND PHYSICAL SCIENCES

- 1. Catalog Description of the Course.** *[Include the course prefix, number, full title, and units. Provide a course narrative including prerequisites and corequisites. If any of the following apply, include in the description: Repeatability (May be repeated to a maximum of ___ units); time distribution (Lecture ___ hours, laboratory ___ hours); non-traditional grading system (Graded CR/NC, ABC/NC). Follow accepted catalog format.]*

CHEM 121. GENERAL CHEMISTRY I (4)

Three hours of lecture and three hours of lab per week.

Prerequisite: A passing score on the Chemistry Placement Examination or CHEM 105

An introductory chemistry course which provides an overview of the chemical and physical behavior of matter with a focus on qualitative and quantitative general inorganic, physical, and analytical chemistry. Lab fee required.

GenEd: B1

- 2. Mode of Instruction.**

	Units	Hours per Unit	Benchmark Enrollment
Lecture	3	1	36
Seminar			
Laboratory	1	3	18/section
Activity			

- 3. Justification and Learning Objectives for the Course.** (Indicate whether required or elective, and whether it meets University Writing, and/or Language requirements) *[Use as much space as necessary]*

This course is the first semester of a two-semester sequence that is generally an admission requirement for medical, veterinary, dental, or pharmacy schools. This course is a Category B1 general education course and is required for the B.S. degrees in Biology and in Environmental Science and Resource Management. It is also prerequisite for CHEM 122, which is required for a large number of chemistry and biology courses.

Students who successfully complete this course will be able to:

- Evaluate a scientific measurement and distinguish between scientific data
- Describe matter and energy in terms of the units and terminology that is used by modern scientists
- Identify stoichiometric relationships and balance chemical equations
- Explain the structure of an atom in terms of its basic parts and properties
- Explain the interaction between electrons and light quantitatively
- Describe the properties of electrons and how they relate to chemical reactivity
- Identify the chemical properties of elements based on their periodic trends
- Explain the nature of the different types of chemical bonds in molecules
- Evaluate the properties of a gas phase species
- Explain simple kinetics of reactions
- Rationalize chemical reactivity in terms of the thermodynamic properties of reactants and products

- 4. Is this a General Education Course**

YES

NO

If Yes, indicate GE category:

A (English Language, Communication, Critical Thinking)	
B (Mathematics & Sciences)	X
C (Fine Arts, Literature, Languages & Cultures)	
D (Social Perspectives)	
E (Human Psychological and Physiological Perspectives)	

- 5. Course Content in Outline Form.** *[Be as brief as possible, but use as much space as necessary]*

Scientific Measurement

The scientific method
SI units and the metric system
Significant Figures
Scientific Notation
Unit Conversion
Mass and Energy Units

Matter and Energy

States of Matter
Pure substances and mixtures
Atoms and Molecules
Temperature
Physical properties
Chemical Properties

Stoichiometry

The mole
Avagadro's Number
The chemical equation
Balancing chemical equations
Mole-to-Mass conversion
Solutions
Dilutions

Atoms and Elements

Names and Symbols
The nuclei of atoms
X-rays
Nuclear chemistry
Radioactivity
Fission and Fusion

Electrons and Photons

Particle-Wave duality
Electron arrangement in atoms
Intro to quantum theory
The photoelectron effect
Atomic spectra
The uncertainty principle
Atomic Orbitals
Valence

The Periodic Table

History of the periodic table
Metals and non-metals
Periodic trends
Main group elements
Transition metals
Electron affinity
Ionization

The Chemical Bond

Ionic bonds
Covalent bonds
Electronegativity
Lewis structures
Resonance
Oxidation number of atoms
The shape of molecules
Polarity
Hydrogen bonding

Gases

Pressure and temperature
Partial pressure
Ideal gas equation

Kinetic theory of gasses and Boltzmann distribution

Chemical Kinetics

Collision Theory

Factors influencing reaction rates

First-order reactions

Higher-order reactions

Mechanisms of reactions

Catalysis

Chain reactions

Chemical Thermodynamics

Heat and work

Heat capacity

Entropy

State Functions

Reversible and irreversible changes

Standard state

Enthalpy of reaction

Enthalpy of formation

Bond-dissociation and formation

6. References. [Provide 3 - 5 references on which this course is based and/or support it.]

Pauling, L. *General Chemistry*, 3rd Ed., Dover, 1970

Chang, R. *Chemistry*, 7th Ed., McGraw Hill, 2001

Pertucci, R.H.; Harwood, W.S.; Herring, G. *General Chemistry*, 8th Ed., Prentice Hall, 2001

Burns, R.A.A. *Fundamentals of Chemistry*, 8th Ed., Prentice Hall, 2001

Zumdahl, S.S.; Zumdahl, S. *Chemistry*, Houghton Mifflin, 2000

7. List Faculty Qualified to Teach This Course.

Dr. Philip Hampton, Dr. Simone Aloisio

8. Frequency.

a. Projected semesters to be offered: Fall X Spring Summer

9. New Resources Required.

None.

10. Consultation.

Attach consultation sheet from all program areas, Library, and others (if necessary)

11. If this new course will alter any degree, credential, certificate, or minor in your program, attach a program modification.

Simone Aloisio

1/8/03

Proposer of Course

Date