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 122. GENERAL CHEMISTRY II (4)
   Three hours of lecture and three hours of lab per week.
   Prerequisites: CHEM 121 with a grade of C or better
   An introductory chemistry course which provides an overview of the chemical and physical behavior of matter with a focus on quantitative general inorganic, physical, and analytical chemistry including kinetics and thermodynamics of reactions, gas phase and solution equilibria, and qualitative aspects of radiochemistry, organic chemistry, and polymer 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.

   Students who successfully complete this course will be able to:
   - Describe chemical equilibrium both qualitatively and quantitatively
   - Explain solubility of material in aqueous solutions and be familiar with non-aqueous solutions
   - Solve problems dealing with acid-base chemistry
   - Describe oxidation-reduction chemistry qualitatively and in terms of equilibrium
   - Evaluate problems involving complex equilibrium (e.g. solubility in acidic solution)
   - Identify the most common crystal structures of chemicals
   - Describe the chemistry of common inorganic species
   - Identify different types of organic species
   - Explain the differences between basic categories of biologically important chemicals

4. **Is this a General Education Course** **(YES)** **NO**
   If Yes, indicate GE category:B1

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]*

Chemical Equilibrium
- Vapor pressure
- Melting and boiling
- Gas Phase Equilibrium
- Equilibrium and temperature
- Le Chatlier's principle

Solutions
- Solvents and Solutes
- Water
- Solubility
- Solubility and equilibrium
- Solubility product
- Henry's Law
- Freezing and melting of solutions
- Raoult's Law
- Common Ion Effect
- Complex Ions

Acids and Bases
- Hydronium ions
- Equilibrium in water
- pH
- Strong acids and bases
- Weak acids and bases
- Equilibrium of weak acids and bases
- Acid-base titrations
- Buffers
- Polyprotic acids and bases

Oxidation and Reduction
- Oxidation-Reduction half reactions
- Balancing Redox reactions
- Redox reactions in acidic and basic solutions
- Electrical cells
- Standard state potentials
- Nearnst Equation
- Equilibrium and Nearnst
- Electrolysis

Inorganic Chemistry
- Crystals
- Description of crystal structure
- Common unit cells
- Non-crystalline solids
- Liquids
- Surface tension
- Phase diagrams
- Non-metallic elements and their compounds
- Main group metals
- Transition metals

Organic Chemistry
- Saturated hydrocarbons
- Unsaturated hydrocarbons
- Aromatic compounds
- Functional groups
- Alcohols and Esters
- Aldehydes and Ketones
- Organic acids
- Amines

Biochemistry
- Carbohydrates
- Lipids
- Amino acids and Proteins

Nucleic acids and DNA
Vitamins

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 _____ Spring __X___ 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