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 124. General Chemistry II Problem-Solving (1)
   One hour of activity per week.
   Co-requisite: CHEM 122
   An instructor/peer-supervised interactive problem-solving session for students in CHEM 122 where students work in small groups on problems related to the content in CHEM 122.

2. **Mode of Instruction.**

	Units	Hours per Unit	Benchmark Enrollment
Lecture			
Seminar			
Laboratory			
Activity	1	1	30

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 an optional problem-solving session for the second semester general chemistry course (CHEM 122), and provides students with an interactive, problem-solving session where students work in small teams to solve problems in chemistry.

   The course is designed to provide the student with a basic knowledge of the following:
   - The scientific method and how it is used to approach scientific problems in chemistry
   - History of the development of the field of chemistry
   - Basic chemical principles relevant to all sub-fields of chemistry

   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:

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 and pH
  - Equilibrium in water
  - Strong and 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
  - Equilibrium and Nearnst
  - Electrolysis
- Inorganic Chemistry
  - Crystals
  - Description of crystal structure
  - Common unit cells
  - Non-crystalline solids
  - Liquids
  - Surface tension
  - Phase diagrams
- Organic Chemistry
  - Saturated and unsaturated hydrocarbons
  - Aromatic compounds
  - Functional groups
  - Alcohols, Esters, Aldehydes and Ketones
  - Organic acids and 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., 1970
Chang, R. *Chemistry*, 7th Ed., 2001
Pertucci, R.H.; Harwood, W.S.; Herring, G. *General Chemistry*, 8th Ed., 2001
Silberberg, M.S. *Chemistryi*, 3rd Ed., 2003
Zumdahl, S.S.; Zumdahl, S. *Chemistry*, 2000

7. List Faculty Qualified to Teach This Course.

Dr. Simone Aloisio, Dr. Philip Hampton

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.

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Proposer of Course Date