

NEW COURSE PROPOSAL

PROGRAM: MULTIPLE PROGRAMS/ CHEMISTRY

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 372. PHYSICAL CHEMISTRY LABORATORY I (1)

Three hours laboratory per week.

Prerequisite: CHEM 371 (or concurrent registration)

This course is designed to introduce experimental physical chemistry including measurement of thermodynamic and kinetic properties. Lab fee required.

2. **Mode of Instruction.**

	Units	Hours per Unit	Benchmark Enrollment
Lecture			
Seminar			
Laboratory	1	3	18
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 required for Chemistry majors, and may be taken by other science majors, who are interested in physical chemistry for their profession or graduate studies. This course will be an upper-division requirement for chemistry majors, or an elective for the minor in chemistry, or for the biochemistry option.

Students who successfully complete this course will be able to:

- Interpret experimental data related to molecular shape, electronic structure, thermodynamics, kinetics, and intermolecular interactions
- Describe the scientific method and how it is applied to physical chemistry
- Measure the properties of an ideal and a real gas.
- Determine the relationship between thermodynamic properties and experimental observation.
- Experimentally determine phase change diagrams of pure substances and simple mixtures.
- Construct electrochemical cells.
- Analyze experimental kinetic data to determine rate laws.

4. **Is this a General Education Course**
If Yes, indicate GE category:

YES

NO

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

Thermodynamics

Perfect and real gasses

Work and Heat

Conservation of Energy

Entropy

Gibbs Free Energy

Changes of State

Phase diagrams for pure substances and simple mixtures

Thermodynamics of mixtures
The Phase Rule
Chemical Reactions
Spontaneity
Le Chatlier's Principle
Electrochemical reactions
Kinetics
Collisions of gases
Ion transport and molecular diffusion
Rate Laws
Complex Reactions
Reaction dynamics
Kinetics at a surface

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

Atkins, P.W. *Physical Chemistry*, Oxford University Press, 7th Ed. 2001
Levine, I.N. *Physical Chemistry*, Mc Graw-Hill, 5th Ed. 2001
McQuarrie, D.A.; Simon, J.D. *Physical Chemistry*, University Science Books, 1st Ed. 1997

7. List Faculty Qualified to Teach This Course.

Dr. Simone Aloisio, Dr. Phil Hampton

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 12-16-03
Proposer of Course Date