

CALIFORNIA STATE UNIVERSITY CHANNEL ISLANDS

COURSE MODIFICATION PROPOSAL

Courses must be submitted by October 15, 2014, and finalized by the end of the fall semester to make the next catalog (2015-16) production

DATE (CHANGE DATE EACH TIME REVISED): 9/29/2014, 10/7/14

PROGRAM AREA(S): **CHEMISTRY** COURSE NO: **371**

Directions: All sections of this form must be completed. Use YELLOWED areas to enter data. All documents are stand-alone sources of course information.

1. Indicate Changes and Justification for Each. *[Mark an X by all change areas that apply.]*

<input type="checkbox"/> Course title	<input type="checkbox"/> Course Content
<input type="checkbox"/> Prefix/suffix	<input type="checkbox"/> Course Learning Outcomes
<input type="checkbox"/> Course number	<input type="checkbox"/> References
<input type="checkbox"/> Units	<input type="checkbox"/> GE
<input type="checkbox"/> Staffing formula and enrollment limits	<input type="checkbox"/> Other <input type="checkbox"/>
<input checked="" type="checkbox"/> Prerequisites/Corequisites	<input type="checkbox"/> Reactivate Course
<input type="checkbox"/> Catalog description	
<input type="checkbox"/> Mode of Instruction	

Justification:

(Please provide justification(s) for each marked item above). Be as brief as possible but use as much space as necessary.]:

We are adjusting the pre-requisites to adjust to content students need to succeed.

2. Course Information.

[Follow accepted catalog format. Add additional prefixes if cross-listed.]

OLD

Prefix CHEM Course# 371
 Title **PHYSICAL CHEMISTRY I** Units (3)
 3 hours lecture per week
 hours per week

x Prerequisites: CHEM 122, CHEM 250 with grades of C or better. PHYS 101 or PHYS 201, and MATH 150.

☐ Consent of Instructor Required for Enrollment
 Corequisites: ☐

Catalog Description (Do not use any symbols):

This course is designed to introduce thermodynamics and kinetics. Areas covered will include the laws of thermodynamics, changes in state, chemical equilibrium, gas kinetic theory, rates of reactions, and experimental methods used to determine chemical reaction rates.

General Education Categories: ☐

Grading Scheme (Select one below):

x A – F

☐ Credit/No Credit
☐ Optional (Student's Choice)

Repeatable for up to ☐ units

Total Completions ☐

Multiple Enrollment in Same Semester Y/N ☐

Course Level:

x Undergraduate
☐ Post-Baccalaureate
☐ Graduate

NEW

Prefix CHEM Course# 371
 Title **PHYSICAL CHEMISTRY I** Units (3)
 3 hours lecture per week
☐ hours ☐ per week

x Prerequisites: CHEM 250, PHYS 100 or 200 with grades of C or better. MATH 151 with a grade of C or better, or concurrent enrollment.

☐ Consent of Instructor Required for Enrollment
 Corequisites: ☐

Catalog Description (Do not use any symbols):

This course is designed to introduce thermodynamics and kinetics. Areas covered will include the laws of thermodynamics, changes in state, chemical equilibrium, gas kinetic theory, rates of reactions, and experimental methods used to determine chemical reaction rates.

General Education Categories: ☐

Grading Scheme (Select one below):

x A – F

☐ Credit/No Credit
☐ Optional (Student's Choice)

Repeatable for up to ☐ units

Total Completions ☐

Multiple Enrollment in Same Semester Y/N ☐

Course Level:

x Undergraduate
☐ Post-Baccalaureate
☐ Graduate

3. Mode of Instruction (Hours per Unit are determined by CSU Policy)

Hegis Code(s) _____
 (Provided by the Provost Office)

Existing**Proposed**

	Units	Hours Per Unit	Default Section Size	Graded		Units	Hours Per Unit	Default Section Size	Graded	CS No. (filled out by Provost Office)
Lecture	<u>3</u>	<u>1</u>	<u>45</u>	<u>x</u>	Lecture	<u>3</u>	<u>1</u>	<u>45</u>	x	
Seminar		<u>1</u>			Seminar		<u>1</u>			
Lab		<u>3</u>			Lab		<u>3</u>			
Activity		<u>2</u>			Activity		<u>2</u>			
Field Studies					Field Studies					
Indep Study					Indep Study					
Other blank					Other blank					
Online					Online					

4. Course Attributes:

General Education Categories: All courses with GE category notations or changes (including deletions) must be submitted to the GE website: <http://summit.csuci.edu/geapproval>. Upon completion, the GE Committee will forward your documents to the Curriculum Committee.

A (English Language, Communication, Critical Thinking)

- A-1 Oral Communication
- A-2 English Writing
- A-3 Critical Thinking

B (Mathematics, Sciences & Technology)

- B-1 Physical Sciences
- B-2 Life Sciences – Biology
- B-3 Mathematics – Mathematics and Applications
- B-4 Computers and Information Technology

C (Fine Arts, Literature, Languages & Cultures)

- C-1 Art
- C-2 Literature Courses
- C-3a Language
- C-3b Multicultural

D (Social Perspectives)**E (Human Psychological and Physiological Perspectives)****UDIGE/INTD Interdisciplinary**

Meets University Writing Requirement (Graduation Writing Assessment Requirement)

Meets University Language Requirement

American Institutions, Title V Section 40404: Government US Constitution US History

Regarding Exec Order 405, for more information: <http://senate.csuci.edu/comm/curriculum/resources.htm>

Service Learning Course (Approval from the Center for Community Engagement must be received before you can request this course attribute).


Online Course (Answer YES if the course is ALWAYS delivered online).


5. Justification and Requirements for the Course. *[Make a brief statement to justify the need for the course]*

OLD

This course is required 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.

x Requirement for the Major/Minor


 Elective for the Major/Minor

 Free Elective

NEW

This course is required 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.

x Requirement for the Major/Minor

 Elective for the Major/Minor

 Free Elective

Submit Program Modification if this course changes your program.

6. Student Learning Outcomes. (List in numerical order. Please refer to the Curriculum Committee's "Learning Outcomes" guideline for measurable outcomes that reflect elements of Bloom's Taxonomy: <http://senate.csuci.edu/comm/curriculum/resources.htm>. The committee recommends 4 to 8 student learning outcomes, unless governed by an external agency (e.g., Nursing).

Upon completion of the course, the student will be able to:

OLD

- Analyze, both qualitatively and quantitatively, how molecular shape, electronic structure, thermodynamics, kinetics, and intermolecular interactions are interrelated in Physical Chemistry.

- Calculate the properties of an ideal and a real gas.

- Relate work, heat and entropy to the laws that govern thermodynamics.

- Apply the laws of thermodynamics to chemical reactions.

- Explain phase change diagrams for pure substances and simple mixtures.

- Derive the laws that relate thermodynamics to chemical equilibrium.

- Determine the effect of changing surrounding conditions to chemical equilibrium.

- Describe different electrochemical reactions quantitatively.

- Apply the laws of thermodynamics and equilibrium to electrochemical reactions.

- Explain collision theory of kinetics.

- Determine rate laws for simple and complex chemical reactions.

- Describe ion transport and molecular diffusion

- Determine rate laws for simple surface reactions

- Identify experimental methods used to determine reaction rates

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NEW

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- Calculate the properties of an ideal and a real gas.

- Relate work, heat and entropy to the laws that govern thermodynamics.

- Apply the laws of thermodynamics to chemical reactions.

- Explain phase change diagrams for pure substances and simple mixtures.

- Derive the laws that relate thermodynamics to chemical equilibrium.

- Determine the effect of changing surrounding conditions to chemical equilibrium.

- Describe different electrochemical reactions quantitatively.

- Apply the laws of thermodynamics and equilibrium to electrochemical reactions.

- Explain collision theory of kinetics.

- Determine rate laws for simple and complex chemical reactions.

- Describe ion transport and molecular diffusion

- Determine rate laws for simple surface reactions

- Identify experimental methods used to determine reaction rates

7. Course Content in Outline Form. (Be as brief as possible, but use as much space as necessary)

OLD

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 Chatelier's Principle Electrochemical reactions

Kinetics Collisions of gases Ion transport and molecular

diffusion Rate Laws Complex Reactions Reaction dynamics

Kinetics at a surface

NEW

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 Chatelier's Principle Electrochemical reactions

Kinetics Collisions of gases Ion transport and molecular

diffusion Rate Laws Complex Reactions Reaction dynamics

Kinetics at a surface

Does this course content overlap with a course offered in your academic program? Yes ☐ No ☒

If YES, what course(s) and provide a justification of the overlap.

Does this course content overlap a course offered in another academic area? Yes ☐ No ☒

If YES, what course(s) and provide a justification of the overlap.

Overlapping courses require Chairs' signatures.

8. Cross-listed Courses (Please note each prefix in item No. 1) *Beyond three disciplines consult with the Curriculum Committee.*

A. List cross-listed courses (Signature of Academic Chair(s) of the other academic area(s) is required).

B. List each cross-listed prefix for the course:

C. Program responsible for staffing:

9. References. *[Provide 3-5 references. For references more than 10 years old, provide a one-sentence explanation of relevance.]*

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

NEW Atkins, P.W. *Physical Chemistry*, Oxford University Press, 9th Ed. 2009 Levine, I.N. *Physical Chemistry*, McGraw-Hill, 6th Ed. 2008 Engal, T. Reid, P. *Physical Chemistry*, Prentice Hall, 3rd Ed. 2012

10. Tenure Track Faculty qualified to teach this course.

Aloisio, Gillespie

11. Requested Effective Date or First Semester to be offered: Fall 2015

12. New Resource Requested: Yes ☐ No ☒

If YES, list the resources needed.

A. Computer Needs (data processing, audio visual, broadcasting, other equipment, etc.)

B. Library Needs (streaming media, video hosting, databases, exhibit space, etc.)

C. Facility/Space/Transportation Needs:

D. Lab Fee Requested: Yes ☐ No ☐ (Lab fee requests should be directed to the Student Fee Committee)

E. Other.

13. Will this course modification alter any degree, credential, certificate, or minor in your program? Yes ☐ No ☒

If, YES attach a program update or program modification form for all programs affected.

Deadline for New Minors and Programs: **October 1, 2014.**

Deadline for Course Proposals and Modifications, and for Program Modifications: **October 15, 2014.**

Last day to submit forms to be considered during the current academic year: **April 1, 2015.**

Simone Aloisio

9/29/14

Type in name(s). Signatures will be collected after Curriculum approval.

Approval Sheet

Course Prefix and number: CHEM 371

If your course has a General Education Component or involves Center affiliation, the Center will also sign off during the approval process.

Multiple Chair fields are available for cross-listed courses.

The CI program review process includes a report from the respective department/program on its progress toward accessibility requirement compliance. By signing below, I acknowledge the importance of incorporating accessibility in course design.

Program Chair		
Signature		Date
Program Chair		
Signature		Date
Program Chair		
Signature		Date
General Education Chair		
Signature		Date
Center for Intl Affairs Director		
Signature		Date
Center for Integrative Studies Director		
Signature		Date
Center for Multicultural Engagement Director		
Signature		Date
Center for Civic Engagement and Service Learning Director		
Signature		Date
Curriculum Chair		
Signature		Date
AVP		
Signature		Date