

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, 10/07/14

PROGRAM AREA(S): **CHEMISTRY** COURSE NO: **373**

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.]*

- | | |
|---|---|
| ☐ Course title | ☐ Course Content |
| ☐ Prefix/suffix | ☐ Course Learning Outcomes |
| ☐ Course number | ☐ References |
| ☐ Units | ☐ GE |
| ☐ Staffing formula and enrollment limits | ☐ Other ☐ |
| ☒ Prerequisites/Corequisites | ☐ Reactivate Course |
| ☐ Catalog description | |
| ☐ 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# 373
 Title **PHYSICAL CHEMISTRY II** 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):
 Introduction to quantum mechanics, atomic and molecular structure, spectroscopy, and statistical mechanics.

General Education Categories: ☐
 Grading Scheme (Select one below):
☒ 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:
☒ Undergraduate
☐ Post-Baccalaureate
☐ Graduate

NEW

Prefix CHEM Course# 373
 Title **PHYSICAL CHEMISTRY II** Units (3)
 3 hours lecture per week
☐ hours ☐ per week

x Prerequisites: CHEM 250, PHYS 101 or 201, and MATH 151 with grades of C or better.
☐ Consent of Instructor Required for Enrollment
 Corequisites: ☐

Catalog Description (Do not use any symbols):
 Introduction to quantum mechanics, atomic and molecular structure, spectroscopy, and statistical mechanics.

General Education Categories: ☐
 Grading Scheme (Select one below):
☒ 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:
☒ Undergraduate
☐ Post-Baccalaureate
☐ Graduate

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

Existing

Hegis Code(s) _____

(Provided by the Provost Office)

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 now required for the BS Chemistry Option. Our current and proposed program language reflects this, so its not a change.

x Requirement for the Major/Minor

☐ Elective for the Major/Minor

☐ Free Elective

NEW

This course is now required for the BS Chemistry Option. Our current and proposed program language reflects this, so its not a change.

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 (Big Ideas in Chemistry) are interrelated in Physical Chemistry.
- Describe classical mechanics and quantum mechanics as they apply to chemical systems.
- Calculate quantities using quantum mechanical principles
- Derive the atomic structure and spectroscopic properties of atoms using quantum mechanical principles.
- Derive the molecular orbitals for small molecules.
- Identify the symmetry elements of a molecule and its influence on electronic structure and electronic spectra.
- Discuss the rotational, vibrational, and electronic spectra of molecules

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

NEW

- Analyze, both qualitatively and quantitatively, how molecular shape, electronic structure, thermodynamics, kinetics, and intermolecular interactions (Big Ideas in Chemistry) are interrelated in Physical Chemistry.
- Describe classical mechanics and quantum mechanics as they apply to chemical systems.
- Calculate quantities using quantum mechanical principles
- Derive the atomic structure and spectroscopic properties of atoms using quantum mechanical principles.
- Derive the molecular orbitals for small molecules.
- Identify the symmetry elements of a molecule and its influence on electronic structure and electronic spectra.
- Discuss the rotational, vibrational, and electronic spectra of molecules

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

OLD

Quantum theory: principles, techniques, and applications
Atomic structure and atomic spectra Molecular structure
Symmetry: description and consequences
Rotational and vibrational spectra Electronic transitions
Magnetic resonance Statistical thermodynamics Statistical thermodynamics

NEW

Quantum theory: principles, techniques, and applications
Atomic structure and atomic spectra Molecular structure
Symmetry: description and consequences
Rotational and vibrational spectra Electronic transitions
Magnetic resonance Statistical thermodynamics Statistical thermodynamics

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

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 x

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*, 7th Ed. 2001 Levine, I.N. *Physical Chemistry*, 5th Ed. 2001 McQuarrie, D.A.; Simon, J.D. *Physical Chemistry* 1st Ed. 1997

NEW Atkins, P.W. *Physical Chemistry*, Oxford University Press, 9th Ed. 2009 Levine, I.N. *Physical Chemistry*, Mc-Graw-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, Awad, Gillespie, Hampton

11. Requested Effective Date or First Semester to be offered: Spring 2016

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

9/29/2014

Proposer(s) of Course Modification

Date

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

Approval Sheet

Course Prefix and number: CHEM 373

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		
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Signature

Date

Program Chair		
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Signature

Date

Program Chair		
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Signature

Date

General Education Chair		
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Signature

Date

Center for Intl Affairs Director		
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Signature

Date

Center for Integrative Studies Director		
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Signature

Date

Center for Multicultural Engagement Director		
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Signature

Date

Center for Civic Engagement and Service Learning Director		
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Signature

Date

Curriculum Chair		
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Signature

Date

AVP		
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Signature

Date