

CALIFORNIA STATE UNIVERSITY CHANNEL ISLANDS

COURSE MODIFICATION PROPOSAL

Courses must be submitted by October 15, 2013, and finalized by the end of the fall semester to make the next catalog (2014-15) production

DATE (CHANGE DATE EACH TIME REVISED): 10/14/2013

PROGRAM AREA(S): CHEMISTRY

Directions: All of sections of this form must be completed for course modifications. 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 then please follow-up your X's with justification(s) for each marked item. Be as brief as possible but, use as much space as necessary.]

- | | |
|---|---|
| <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 checked="" type="checkbox"/> Mode of Instruction | |

Justification: We are adding CHEM 250 as a pre-requisite for this course. We find students need it. Cap adjusted to mirror PCHEM I.

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 blank per week

x Prerequisites: CHEM 122 with a grade 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 blank 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

3. Mode of Instruction (Hours per Unit are defaulted)

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

| <u>Existing</u> | | | | | <u>Proposed</u> | | | | | |
|-----------------|----------------------|----------------|----------------------|----------------------|-----------------|----------------------|----------------|----------------------|----------------------|---------------------------------------|
| | 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> | x | Lecture | <u>3</u> | <u>1</u> | <u>45</u> | x | <input type="text"/> |
| Seminar | <input type="text"/> | <u>1</u> | <input type="text"/> | <input type="text"/> | Seminar | <input type="text"/> | <u>1</u> | <input type="text"/> | <input type="text"/> | <input type="text"/> |
| Lab | <input type="text"/> | <u>3</u> | <input type="text"/> | <input type="text"/> | Lab | <input type="text"/> | <u>3</u> | <input type="text"/> | <input type="text"/> | <input type="text"/> |
| Activity | <input type="text"/> | <u>2</u> | <input type="text"/> | <input type="text"/> | Activity | <input type="text"/> | <u>2</u> | <input type="text"/> | <input type="text"/> | <input type="text"/> |
| Field Studies | <input type="text"/> | | <input type="text"/> | <input type="text"/> | Field Studies | <input type="text"/> | | <input type="text"/> | <input type="text"/> | <input type="text"/> |
| Indep Study | <input type="text"/> | | <input type="text"/> | <input type="text"/> | Indep Study | <input type="text"/> | | <input type="text"/> | <input type="text"/> | <input type="text"/> |
| Other blank | <input type="text"/> | | <input type="text"/> | <input type="text"/> | Other blank | <input type="text"/> | | <input type="text"/> | <input type="text"/> | <input type="text"/> |
| Online | <input type="text"/> | | <input type="text"/> | <input type="text"/> | Online | <input type="text"/> | | <input type="text"/> | <input type="text"/> | <input type="text"/> |

4. Course Attributes:

General Education Categories: All courses with GE category notations (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 for further processing.

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 an elective for students in the Chemistry major, and may be taken by some other science majors, who are interested in physical chemistry for their profession or post-graduate studies. This course will be an upper-division elective for students wanting to receive a degree in chemistry, or an elective for the minor in chemistry.

- 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.

- 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

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 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
 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.*

- List cross-listed courses (Signature of Academic Chair(s) of the other academic area(s) is required).
- List each cross-listed prefix for the course:
- Program responsible for staffing:

9. References. [Provide 3-5 references]

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

10. Tenure Track Faculty qualified to teach this course.

Aloisio, Gillespie, Hampton

11. Requested Effective Date or First Semester offered: Fall 2014

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.

Priority deadline for New Minors and Programs: **October 1, 2013** of preceding year.

Priority deadline for Course Proposals and Modifications: **October 15, 2013**.

Last day to submit forms to be considered during the current academic year: **April 15th**.

Simone Aloisio

10/14/2013

Proposer(s) of Course Modification

Date

Type in name. Signatures will be collected after Curriculum approval.

Approval Sheet

Course:

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.

| | | |
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| Program Chair | | |
|---------------|--|--|

Signature

Date

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| Program Chair | | |
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Signature

Date

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| Program Chair | | |
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Signature

Date

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| General Education Chair | | |
|-------------------------|--|--|

Signature

Date

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| Center for Intl Affairs Director | | |
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Signature

Date

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| Center for Integrative Studies Director | | |
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Signature

Date

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| Center for Multicultural Engagement Director | | |
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Signature

Date

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| Center for Civic Engagement and Service Learning Director | | |
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Signature

Date

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| Curriculum Chair | | |
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Signature

Date

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| AVP | | |
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Signature

Date