

**NEW COURSE PROPOSAL****Courses must be submitted by November 5, 2007, to make the next catalog production**DATE (*Change if modified*) 10/18/07  
PROGRAM AREA(S) CHEMISTRY**1. Catalog Description of the Course.** [Follow accepted catalog format.]**Prefix(es)** (Add additional prefixes if cross-listed) **CHEM Course No. 420****Title: ADVANCED INORGANIC CHEMISTRY Units: 3**

- Prerequisites CHEM 314 and CHEM 371  
 Corequisites  
 Consent of Instructor Required for Enrollment

**Description** (Do not use any symbols ): Structure and bonding of inorganic compounds, survey of the chemistry of metal and non-metal elements, coordination compounds, organometallic compounds, mechanisms and reactions, and their applications in catalysis and solid state materials.

**Grading Scheme:**

- A-F Grades  
 Credit/No Credit  
 Optional (Student Choice)

**Repeatability:**

- Repeatable for a maximum of \_\_\_\_\_ units  
 Total Completions Allowed \_\_\_\_\_  
 Multiple Enrollment in Same Semester

**Lab Fee Required:** **Mode of Instruction/Components** (*Hours per Unit are defaulted*).

	Units	Hours per Unit	Benchmark Enrollment	Graded Component	CS & HEGIS # (Filled in by the Dean)
Lecture	3	1	18	<input checked="" type="checkbox"/>	_____
Seminar	_____	1	_____	<input type="checkbox"/>	_____
Laboratory	_____	3	_____	<input type="checkbox"/>	_____
Activity	_____	2	_____	<input type="checkbox"/>	_____
Field Studies	_____	_____	_____	<input type="checkbox"/>	_____
Indep Study	_____	_____	_____	<input type="checkbox"/>	_____
Other Blank	_____	_____	_____	<input type="checkbox"/>	_____

The following two lines will be filled out internally based on the Mode of Instruction data directly above.

3 hours lecture per week (*Use 2<sup>nd</sup> line only if necessary*)  
 \_\_\_\_\_ hours blank per week

**Course Attributes:**

**General Education Categories:** All courses with GE categories notations (including deletions) must be processed at 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**  
**Meets University Language Requirement**

  
  

- American Institutions, Title V Section 40404:  Government  US Constitution  US History  
Refer to website, Exec Order 405, for more information: <http://senate.csuci.edu/comm/curriculum/resources.htm>  
 Service Learning Course

**3. Justification and Requirements for the Course.** (Make a brief statement to justify the need for the course)

A. Justification:

*Inorganic Chemistry is one of the four major subdisciplines of Chemistry and is a significant component of the Graduate Record Examination (GRE) in Chemistry. This elective is needed to prepare students for graduate work in Chemistry as well as for careers in industry.*

B. Degree Requirement:  Requirement for the Major/Minor  
 Elective for the Major/Minor

**Note: Submit Program Modification if this course changes your program.**

**4. Learning Objectives.** (Bullets, will occur upon carriage return)

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

- Outline the development of the field of inorganic and organometallic chemistry
- Describe how molecular shape, electronic structure, thermodynamics, kinetics, and intermolecular interactions affect the reactivity of inorganic molecules and their types of reactions.
- Analyze experimental and observational data of the properties and reactions of metal and non-metal elements
- Analyze experimental and observational data of the properties, synthesis, and reactions of inorganic and organometallic complexes.
- Interpret, discuss, and evaluate a primary literature article

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

- I. Atomic Structure
  - o Orbitals
  - o Ionization energy and electron affinity
- II. Covalent Molecular Structures
  - o Geometries and symmetry point groups
  - o Valence bond theory
  - o Molecular orbital theory
- III. Main Group Elements
  - o Structure, physical properties, acid-base character of the elements and their compounds
  - o Synthesis and reactivities of the elements and their compounds
- IV. Transition Elements and Coordination Chemistry
  - o Ligands, coordination number and stereochemistry
  - o Ligand field and molecular orbital theories
  - o Electronic and magnetic properties
  - o Spectroscopy
  - o Thermodynamics and kinetics of synthesis and reactivity
  - o Lanthanides and actinides
- V. Organometallic Chemistry
  - o Carbonyl, hydrocarbon and carbocyclic ligands
  - o 18 electron rule, coordinative saturation/ unsaturation
  - o Synthesis and properties
  - o Patterns of reactivity
  - o Catalysis
- VI. Applications of Inorganic Compounds
  - o Solid state materials
  - o Environmental and atmospheric chemistry

Does this course overlap a course offered in your academic program? YES  NO

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

Does this course overlap a course offered in another academic area? YES  NO

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

Signature of Academic Chair(s) of the other academic area(s) is required on the signature sheet below.

**6. Cross-listed Courses** (Please note each prefix in item No. 1)

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

Prefix for cross-listed discipline(s):

B. Department responsible for staffing:

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

- Duward Shriver and Peter Atkins, *Inorganic Chemistry & Solutions Manual*, W. H. Freeman, 2006
- Michael E. Hagerman, R. Chris Schnabel, Kandalam Ramanujachary, and Steven H. Strauss, *Inorganic Chemistry*, W.H. Freeman & Company; 4<sup>th</sup> Edition, 2006.
- Geoffrey W. Rayner-Canham and Tina Overton, *Descriptive Inorganic Chemistry*, Palgrave Macmillan; 4<sup>th</sup> Edition, 2006
- Earnshaw and Norman Greenwood, *Chemistry of the Elements*, Butterworth-Heinemann; 2<sup>nd</sup> Edition, 1997
- Catherine Housecroft and Alan G. Sharpe, *Inorganic Chemistry*, Prentice Hall; 3<sup>rd</sup> Edition, 2007

**8. List Faculty Qualified to Teach This Course.**

- Phil Hampton

**9. Effective Date**

A. First semester offered: Fall 2008

**10. New Resources Required. YES  NO**

If YES, list the resources needed and obtain signatures from the appropriate programs/units on the sheet below.

- A. Computer (data processing), audio visual, broadcasting needs, other equipment)
  
- B. Library needs
  
- C. Facility/space needs

**11. Will this new course alter any degree, credential, certificate, or minor in your program? YES  NO**

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

Catalog deadline for New Minors and Programs (including modifications): October 15, 2007, preceding year.

Catalog deadline for Course Proposals and Modifications: November 9, 2007, of preceding year.

Last day to submit any work to be considered for the academic year: April 15<sup>th</sup>.

Phil Hampton

Proposer of Course

10/8/07

Date

# Approval Sheet

## Program/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.

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 Learning and 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

Dean of Faculty		
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Signature

Date