

## Nikou, Roshan

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**From:** Graduate.Council.Web.Site@www.uky.edu  
**Sent:** Wednesday, November 07, 2007 7:58 AM  
**To:** Nikou, Roshan  
**Cc:** Price, Cleo  
**Subject:** Investigator Report

AnyForm User: www.uky.edu  
AnyForm Document: <http://www.research.uky.edu/gc/GCInvestigatorReport.html>  
AnyForm Server: www.uky.edu (/www/htdocs/AnyFormTurbo/AnyForm.php)  
Client Address: 76.177.3.99

College/Department/Unit: = CHE450G  
Category:\_ = Change  
Date\_for\_Council\_Review: = 11/8/2007  
Recommendation\_is:\_ = Approve  
Investigator: = Kert Viele  
E-mail\_Address = viele@ms.uky.edu  
1\_\_Modifications: = None  
2\_\_Considerations: = Proposal is quite straightforward. Chemistry is dividing a lecture/lab course into lecture and lab components to provide more efficient use of lab time.  
3\_\_Contacts: = John Selengue in Chemistry...again, no issues found. Proposal also moved through Undergraduate Council with no changes.  
4\_\_Additional\_Information: = This proposal seems straightforward and reasonable.

This should be viewed concurrently with CHE410G.

Chemistry is dividing the lecture and laboratory components of CHE450G into CHE410G (lecture) and CHE412G (lab). The motivation is that the laboratory section has been difficult to manage at the beginning of the semester, thus this new system should allow more efficient use of lab time.

There is a very minor change in prereqs. It now says \"a 400+ physical chemistry\" where previously it specified physical chemistry courses by number.

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**UNIVERSITY OF KENTUCKY**  
**APPLICATION FOR CHANGE IN EXISTING COURSE: MAJOR & MINOR**

1. Submitted by College of Arts and Sciences Date February 12, 2007  
Department/Division offering course Chemistry
2. Changes proposed:  
(a) Present prefix & number CHE 450G Proposed prefix & number CHE 412G  
(b) Present Title Practical Inorganic Chemistry  
New Title Inorganic Chemistry Laboratory  
(c) If course title is changed and exceeds 24 characters (Including spaces), include a sensible title (not to exceed 24 characters) for use on transcripts:  
Inorg Chem Lab  
(d) Present credits: 4 Proposed credits: 2  
(e) Current lecture: laboratory ratio 1:1 Proposed: 0:1  
(f) Effective Date of Change: (Semester & Year) Fall 2008
3. To be Cross-listed as: \_\_\_\_\_  
Prefix and Number \_\_\_\_\_ Signature: Department Chair \_\_\_\_\_
4. Proposed change in Bulletin description:  
(a) Present description (including prerequisite(s)):  
A combined lecture and laboratory course that will acquaint the student with the synthesis, characterization and properties of inorganic and organometallic compounds of both main-group and transition elements. Lecture, two hours; laboratory, six hours per week. Prereq: CHE 231 and CHE 232; prereq or concur: CHE 440G or CHE 446G.  
(b) New description:  
A laboratory course that will acquaint the student with the synthesis, characterization and properties of inorganic and organometallic compounds of both main-group and transition elements. Laboratory, six hours per week.  
(c) Prerequisite(s) for course as changed: Prereq: CHE 410G; prereq or concur: a physical chemistry course at or above the 400 level.
5. What has prompted this proposal?  
CHE 412G will serve as partial fulfillment of the inorganic chemistry requirement set for chemistry majors by the Committee on Professional Training of the American Chemical Society. Presently, the Department offers a combined lecture/laboratory course, CHE 450G (Practical Inorganic Chemistry, 4 credit hours), for full fulfillment of the requirement for BS majors. Because most students have had no inorganic chemistry coursework beyond General Chemistry (CHE 105-107), they are unprepared to undertake laboratory work at the beginning of the semester. Thus, it is difficult for instructors to provide enough theoretical foundation for laboratory work at the beginning of the semester. Converting CHE 450G into separate lecture (CHE 410G, 2 credit hours) and laboratory (CHE 412G, 2 credit hours) solves this problem. CHE 410G will normally be taken during the spring semester of a chemistry major's Junior year, and will be a prerequisite for CHE 412G that is normally taken during the fall semester of the Senior year. In addition, CHE 410G will serve as a stand-alone course in intermediate-level inorganic chemistry that can be used as a Major Field Option for BA chemistry majors, additional 300+ physical science hours for chemistry minors and other science majors, and as an introduction to inorganic chemistry for graduate students from other departments. An application to establish CHE 410G as a new course is being submitted along with this application.
6. If there are to be significant changes in the content or teaching objectives of this course, indicate changes:  
The lecture content of CHE 450G is being moved to CHE 410G, whereas CHE 412G will retain the laboratory content. The teaching objective is to introduce students to experimental methods in inorganic chemistry. This will include laboratory skills, critical thinking, conscientious maintenance of a laboratory notebook, and professional communication of results in written lab reports and oral discussions.
7. What other departments could be affected by the proposed change?  
Some undergraduate and graduate students from other physical (PHY, GEO) and biological (BIO) science departments, as well as engineering (CME) may choose to take this course. The change will not affect their degree programs.

UNIVERSITY OF KENTUCKY

APPLICATION FOR CHANGE IN EXISTING COURSE: MAJOR & MINOR

- 8. Is this course applicable to the requirements for at least one degree or certificate at the University of Kentucky?
9. Will changing this course change the degree requirements in one or more programs?
10. Is this course currently included in the University Studies Program?
11. If the course is 400G or 500 level, include syllabi or course statement showing differentiation for undergraduate and graduate students in assignments, grading criteria, and grading scales.
12. Is this a minor change?
13. Within the Department, who should be consulted for further information on the proposed course change?

Name: John Selegue Phone Extension: 257-3484

Signatures of Approval:

Approval signature lines with dates and signatures: Date of Approval by Department Faculty (2/8/07), Date of Approval by College Faculty (2/20/07), Date of Approval by Undergraduate Council (10-2-07), etc.

\*If applicable, as provided by the Rules of the University Senate.

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The Minor Change route for courses is provided as a mechanism to make changes in existing courses and is limited to one or more of the following:

- a. change in number within the same hundred series;
b. editorial change in description which does not imply change in content or emphasis;
c. editorial change in title which does not imply change in content or emphasis;
d. change in prerequisite which does not imply change in content or emphasis;
e. cross-listing of courses under conditions set forth in item 3.0;
f. correction of typographical errors. [University Senate Rules, Section III - 3.1]

ARTS AND SCIENCES  
EDUCATIONAL POLICY COMMITTEE  
INVESTIGATOR REPORT

INVESTIGATING AREA: Natural & Math. Sci. COURSE, MAJOR, DEGREE or PROGRAM: CHE 412G/450G.

DATE FOR EPC REVIEW: 2/20/07 CATEGORY: NEW, CHANGE, DROP

INSTRUCTIONS: This completed form will accompany the course application to the Graduate/Undergraduate Council(s) in order to avoid needless repetition of investigation. The following questions are included as an outline only. Be as specific and as brief as possible. If the investigation was routine, please indicate this. The term "course" is used to indicate one course, a series of courses or a program, whichever is in order. Return the form to Leonidas Bachas Associate Dean, 275 Patterson Office Tower for forwarding to the Council(s). ATTACH SUPPLEMENT IF NEEDED.

1. List any modifications made in the course proposal as submitted originally and why. **No modifications were made.**
2. If no modifications were made, review considerations that arose during the investigation and the resolutions. **The proposal to convert CHE 450G to the lab-only course, CHE 412G, was considered to be eminently reasonable because of the creation of the stand-alone lecture course, CHE 410G, which contains the lecture portion of CHE 450G.**
3. List contacts with program units on the proposal and the considerations discussed therein. **None**
4. Additional information as needed. **None**
5. A&S Area Coordinator Recommendation:

APPROVE, APPROVE WITH RESERVATION, OR DISAPPROVE

6. A&S Education Policy Committee Recommendation:

APPROVE, APPROVE WITH RESERVATION, OR DISAPPROVE

7. Phil N Bonner Date: 3/07/07  
A&S Educational Policy Committee, **Phil Bonner**

File: \InvestigatorRpt

OCT 17 2007

February 8, 2007

Dear Colleagues:

CHE 450G (Practical Inorganic Chemistry, 4 credit hours) fulfills the inorganic chemistry requirement set for chemistry majors by the Committee on Professional Training of the American Chemical Society for our Bachelor of Science majors. CHE 450G is a combined laboratory/lecture course that is not serving our students well. Because most students have had no inorganic chemistry coursework beyond General Chemistry (CHE 105–107), they are unprepared to undertake laboratory work at the beginning of the semester. Thus, it is difficult for instructors to provide enough theoretical foundation for laboratory work at the beginning of the semester. Students don't find the course satisfying, and very few BA students choose it as a Major Field Option.

The inorganic chemistry division is requesting that the course be broken up into separate lecture (CHE 410G, 2 credit hours, Inorganic Chemistry – changed from “Intermediate Inorganic Chemistry” as in the previous draft, since there is no “Basic Inorganic Chemistry” course) and laboratory (CHE 412G, 2 credit hours, Inorganic Chemistry Laboratory) courses to solve this problem. CHE 410G will normally be taken during the spring semester of a chemistry major's Junior year, and will be a prerequisite for CHE 412G that will normally be taken during the fall semester of the Senior year. The CHE 410G–412G sequence will continue to fulfill the ACS inorganic chemistry requirement. In addition, CHE 410G will serve as a stand-alone course in intermediate-level inorganic chemistry that can be used as a Major Field Option for BA chemistry majors, additional 300+ physical science hours for chemistry minors and other science majors, and as an introduction to inorganic chemistry for graduate students from other departments. The pair of courses fits cleanly into our BS curriculum; in fact, replacing a four-hour course with a two-hour course in the fall semester of a student's senior year may make scheduling easier. We anticipate that CHE 410G may become a popular Major Field Option for BA chemistry majors and elective for student from other departments.

A question arose about whether the change to CHE 410G and 412G will affect the content of CHE 510 (Advanced Inorganic Chemistry) and CHE 514 (Descriptive Inorganic Chemistry). The situation in Inorganic Chemistry is simply becoming more like those in Organic, Analytical and Physical, with both undergraduate and graduate course offerings. A brief overview in CHE 410G would not prevent an undergraduate from choosing CHE 510 or 514 as a major field option. In fact, it would serve as a good bridge between CHE 107 and the graduate courses. No changes in CHE 510 or 514 content are anticipated.

Documents to request these changes are attached (with revised file names):

1. An application to establish CHE 410G as a new course (CHE410new.doc).
2. An application to convert CHE 450G to CHE 412G (CHE450412.doc).
3. A request for a change in the program for the degree of Bachelor of Science in Chemistry, Chemistry Option, with CHE 115 as the (old) General Chemistry lab course (BSChem410115.doc).

4. A request for a change in the program for the degree of Bachelor of Science in Chemistry, Chemistry Option, with CHE 111-113 as the General Chemistry lab sequence (BSChem410111.doc).
5. A request for a change in the program for the degree of Bachelor of Science in Chemistry, Biochemistry Option, with CHE 111-113 as the General Chemistry lab sequence (BSChemBio410.doc).

Please look over these documents in order to discuss them at the February 8, 2007, faculty meeting. If we start the change moving along this month, we may be able to start CHE 410G in Spring 2008. Please send any comments and concerns to me.

Jack Selegue



## PROPOSED SYLLABUS

CHE 412G: Inorganic Chemistry Laboratory  
Department of Chemistry  
University of Kentucky

**Instructor:**

**Office hours:**

**Teaching Assistant:**

**Lab:** Monday 1:00 – 3:50 p.m.  
Wednesday 1:00 – 3:50 p.m. (CP-114)

**Required textbook:**

G. S. Girolami, T. B. Rauchfuss, R. J. Angelici *Synthesis and Technique in Inorganic Chemistry*, 3rd Ed.

**Optional textbooks:**

Z. Szafran; R. M. Pike; M. M. Singh *Microscale Inorganic Chemistry: A Comprehensive Laboratory Experience*

**Goals of the course:**

This course is intended to familiarize the student with many of the important concepts and useful techniques in the preparation and characterization of inorganic (including organometallic) compounds. The laboratory work will include three components: a group of required "core" experiments, two "development" experiments and one multi-part "independent" experiment. The independent experiment will include a brief presentation during the last week of classes.

**Components of the grade:**

**Undergraduate students**

Lab reports and presentation	
a) Core experiments (5)	30%
b) Developmental experiments (2)	20%
c) Independent experiment (1)	15%
Laboratory technique/notebook	10%
Lab quizzes (3)	15%
Final examination	10%
Total	100%

**Graduate students**

Lab reports and presentation	
a) Core experiments (5)	25%
b) Developmental experiments (2)	15%
c) Independent experiment (1)	15%
Laboratory technique/notebook	10%
Lab quizzes (3)	15%
Pre-lab documents and presentations	10%
Final examination	10%
Total	100%

**Grading scale for undergraduate students:**

A = 89.6 – 100.0%; B = 79.6 – 89.5%; C = 69.6 – 79.5%; D = 59.6 – 69.5%; E ≤ 59.5%.

**Grading scale for graduate students:**

A = 89.6 – 100.0%; B = 79.6 – 89.5%; C = 64.6 – 89.5%; E ≤ 64.5%.

Plus/minus grading is not used in this course.

**Differentiation between undergraduate and graduate students**

Each graduate student enrolled in CHE 412G will be required to prepare, for at least two experiments, a pre-lab document and a pre-lab lecture. Each document will require the use of supplementary readings, including a search of the chemical literature. The pre-lab documents and lectures will be distributed to the class prior to the experiments. The grading scale for graduate students will

include evaluations of their written and oral presentations in addition to the experimental work, lab reports and examinations assigned to undergraduates.

### **Laboratory Procedures:**

Every effort has been made to minimize the hazards associated with these experimental procedures. However, some precautions on the part of the experimenter are still required, and laboratory safety is a primary concern. Therefore, safety goggles or glasses must be worn (and this means over the eyes) in the lab at all times, even when performing seemingly innocuous tasks. Additional safety rules are provided on the accompanying handout.

Since all students must use many of the same supplies, common equipment should be handled with great care. Failure to leave such equipment clean and in good repair will result in a 10 – 25% penalty on the lab report for that experiment, depending on the severity of the infraction. Routine breakage of the equipment in one's lab drawer will be handled through use of the standard departmental "Chemical Breakage" card.

### **Lab Reports:**

Although the primary purpose of this course is to familiarize the student with modern inorganic laboratory methods, a related goal is to educate the student in the effective communication of his/her results (as well as their interpretation) to others. Lab reports are to be presented in standard American Chemical Society format. The use of a recent paper from *J. Am. Chem. Soc.*, *Inorg. Chem.* or *Organometallics* as a model is strongly encouraged; instructions to authors are included in the first issue of each ACS journal each year. Reports should be word-processed. Reports need not be lengthy – for example, 5 pages (double-spaced) plus data tables, spectra, and figures should be sufficient for a core experiment.

Lab reports will be due one week after the completion of the experiment and will be subject to a 10% per day late penalty after that date. Lab notebooks will be checked periodically at the discretion of the instructor or teaching assistant. Quizzes and the final exam will cover lecture material as well as procedures used in the core experiments.

### **Format:**

**Abstract:** A summary of what was accomplished. Rarely includes specific numerical data.

**Introduction:** A brief statement of purpose or goal. Some background material may be appropriate, but this section will probably be considerably shorter and less detailed (i.e., little or no reference to original literature) than in most journal articles.

**Experimental:** Detailed description of how the experiment was actually performed. Include weights, reaction times, yields, characterization data (i.e., m.p., IR peak positions), etc. Be sure to identify solvents and/or reference compounds.

**Results:** This section will contain your experimental data, without extensive interpretation. Refer to data tables, spectra, or figures that will be included at the end of your report.

**Discussion:** This section is usually the most important one in your report (less so for a simple synthetic procedure). It should contain your interpretation of the experimental results, along with any necessary justification. For example, based on your observations, you may wish to comment on proposed reaction mechanism or potential sources of error. You may also want to provide answers to some of the questions that follow the experimental procedure in the textbook. If desired, the latter two sections can be combined into a single "Results and Discussion" section.

**Conclusion:** A summary of your major results. This might be quite similar to your abstract, but will include more data. It may speculate about improvements or amendments to the experiment.

**References:** Use standard *J. Am. Chem. Soc.* format. Footnotes will also be included in this section. Extensive reference to the original literature is not required, but reference to a particular paper implies that the student has read and understood the original literature report, not simply a summary of it in the textbook.

**Tables:** These should be clear, uncluttered, titled, and self-explanatory. Any table presented should be referred to in the "Results" section.

**Figures:** Plots and/or spectra. These need not be publication quality; handwritten captions, band assignments, etc., are acceptable and may be written (neatly) directly on the figure. Axes should be clearly labeled. All figures should be referred to in the "Results" section.

**Plagiarism:** Plagiarism in any form, from literature references or from your colleagues, will not be tolerated. Brief passages from the literature may be quoted, but only when clearly attributed to the original authors.

### **Student Learning Outcomes:**

Students in CHE 412 will become familiar with experimental methods in inorganic chemistry, including:

- a. laboratory skills
- b. synthesis of inorganic materials
- c. characterization of inorganic materials
- d. critical thinking
- e. conscientious maintenance of a laboratory notebook
- f. professional communication of results in written lab reports and oral discussions.