

1. General Information

1a. Submitted by the College of: ARTS & SCIENCES

Date Submitted: 10/2/2015

1b. Department/Division: Chemistry

1c. Contact Person

Name: Arthur Cammers

Email: a.cammers@uky.edu

Phone: (859) 323-8977

Responsible Faculty ID (if different from Contact)

Name: Beth Guiton

Email: beth.guiton@uky.edu

Phone: (859) 257-4215

1d. Requested Effective Date: Specific Term/Year¹ Spring 2016

1e. Should this course be a UK Core Course? No

2. Designation and Description of Proposed Course

2a. Will this course also be offered through Distance Learning?: No

2b. Prefix and Number: CHE 516

2c. Full Title: Inorganic Materials Chemistry

2d. Transcript Title:

2e. Cross-listing:

2f. Meeting Patterns

LECTURE: 3

2g. Grading System: Letter (A, B, C, etc.)

2h. Number of credit hours: 3

2i. Is this course repeatable for additional credit? No

If Yes: Maximum number of credit hours:

If Yes: Will this course allow multiple registrations during the same semester?

2j. Course Description for Bulletin: Introduction to solid state inorganic materials chemistry, including atomic structure; optical, electronic, and magnetic properties; and characterization methods such as x-ray diffraction and electron microscopy.

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SENATE COUNCIL

2k. Prerequisites, if any: CHE 440G or CHE 547 or equivalent; and CHE 410G or 510 or equivalent; or permission from the instructor

2l. Supplementary Teaching Component:

3. Will this course taught off campus? No

If YES, enter the off campus address:

4. Frequency of Course Offering: Spring,

Will the course be offered every year?: Yes

If No, explain:

5. Are facilities and personnel necessary for the proposed new course available?: Yes

If No, explain:

6. What enrollment (per section per semester) may reasonably be expected?: 35

7. Anticipated Student Demand

Will this course serve students primarily within the degree program?: Yes

Will it be of interest to a significant number of students outside the degree pgm?: Yes

If Yes, explain: Primarily aimed to serve doctoral students in the Chemistry department. Also useful for (and frequently taken by): BA/BS Chemistry, MS Chemistry, BS Chemical and Materials Engineering, BS Materials Science and Engineering

8. Check the category most applicable to this course: Traditional – Offered in Corresponding Departments at Universities Elsewhere,

If No, explain:

9. Course Relationship to Program(s).

a. Is this course part of a proposed new program?: No

If YES, name the proposed new program:

b. Will this course be a new requirement for ANY program?: No

If YES, list affected programs:

10. Information to be Placed on Syllabus.

a. Is the course 400G or 500?: Yes

b. The syllabus, including course description, student learning outcomes, and grading policies (and 400G-/500-level grading differentiation if applicable, from 10.a above) are attached: Yes

Distance Learning Form

Instructor Name:

Instructor Email:

Internet/Web-based: No

Interactive Video: No

Hybrid: No

1. How does this course provide for timely and appropriate interaction between students and faculty and among students? Does the course syllabus conform to University Senate Syllabus Guidelines, specifically the Distance Learning Considerations?

2. How do you ensure that the experience for a DL student is comparable to that of a classroom-based student's experience? Aspects to explore: textbooks, course goals, assessment of student learning outcomes, etc.

3. How is the integrity of student work ensured? Please speak to aspects such as password-protected course portals, proctors for exams at interactive video sites; academic offense policy; etc.

4. Will offering this course via DL result in at least 25% or at least 50% (based on total credit hours required for completion) of a degree program being offered via any form of DL, as defined above?

If yes, which percentage, and which program(s)?

5. How are students taking the course via DL assured of equivalent access to student services, similar to that of a student taking the class in a traditional classroom setting?

6. How do course requirements ensure that students make appropriate use of learning resources?

7. Please explain specifically how access is provided to laboratories, facilities, and equipment appropriate to the course or program.

8. How are students informed of procedures for resolving technical complaints? Does the syllabus list the entities available to offer technical help with the delivery and/or receipt of the course, such as the Information Technology Customer Service Center (<http://www.uky.edu/UKIT/>)?

9. Will the course be delivered via services available through the Distance Learning Program (DLP) and the Academic Technology Group (ATL)? NO

If no, explain how student enrolled in DL courses are able to use the technology employed, as well as how students will be provided with assistance in using said technology.

10. Does the syllabus contain all the required components? NO

11. I, the instructor of record, have read and understood all of the university-level statements regarding DL.

Instructor Name:

SIGNATURE|YATES|S W Yates|CHE 516 NEW Dept Review|20150203

SIGNATURE|YATES|S W Yates|CHE 516 NEW Dept Review|20150207

SIGNATURE|YATES|S W Yates|CHE 516 NEW Dept Review|20150210

SIGNATURE|ACSI222|Anna C Harmon|CHE 516 NEW College Review|20150511

SIGNATURE|JMETT2|Joanie Ett-Mims|CHE 516 NEW Undergrad Council Review|20150930

SIGNATURE|JMETT2|Joanie Eit-Mims|CHE 516 NEW Undergrad Council Review|20151005

SIGNATURE|YATES|S W Yates|CHE 516 ZCOURSE_NEW Approval Returned to Dept|20151005

SIGNATURE|ZNNIKO0|Roshan Nikou|CHE 516 NEW Graduate Council Review|20151210

New Course Form

<https://myuk.uky.edu/sap/bc/soap/rfc?services=>

[Open in full window to print or save](#)

Generate R

Attachments:

[Browse...](#)

Upload File

	ID	Attachment
Delete	5486	CHE 516 S16 Syllabus Guiton (revised 10-15).doc

First 1 Last

(*denotes required fields)

1. General Information

- a. * Submitted by the College of: Submission Date: 10/2/2015
- b. * Department/Division:
- c.
- * Contact Person Name: Arthur Cammers Email: a.cammers@uky.edu Phone: (859) 323-8977
- * Responsible Faculty ID (if different from Contact) Beth Guiton Email: beth.guiton@uky.edu Phone: (859) 257-4215
- d. * Requested Effective Date: Semester following approval OR Specific Term/Year ¹ Spring 2016
- e. Should this course be a UK Core Course? Yes No
- If YES, check the areas that apply:
- Inquiry - Arts & Creativity Composition & Communications - II
- Inquiry - Humanities Quantitative Foundations
- Inquiry - Nat/Math/Phys Sci Statistical Inferential Reasoning
- Inquiry - Social Sciences U.S. Citizenship, Community, Diversity
- Composition & Communications - I Global Dynamics

2. Designation and Description of Proposed Course.

- a. * Will this course also be offered through Distance Learning? Yes ⁴ No
- b. * Prefix and Number: CHE 516
- c. * Full Title: Inorganic Materials Chemistry
- d. Transcript Title (if full title is more than 40 characters):
- e. To be Cross-Listed ² with (Prefix and Number):
- f. * Courses must be described by at least one of the meeting patterns below. Include number of actual contact hours³ for each meeting pattern type.
- | | | | |
|--|--|---------------------------------|---------------------------------|
| <input type="text" value="3"/> Lecture | <input type="text"/> Laboratory ¹ | <input type="text"/> Recitation | <input type="text"/> Discussion |
| <input type="text"/> Indep. Study | <input type="text"/> Clinical | <input type="text"/> Colloquium | <input type="text"/> Practicum |
| <input type="text"/> Research | <input type="text"/> Residency | <input type="text"/> Seminar | <input type="text"/> Studio |
| <input type="text"/> Other | If Other, Please explain: | | |
- g. * Identify a grading system:
- Letter (A, B, C, etc.)
- Pass/Fail
- Medicine Numeric Grade (Non-medical students will receive a letter grade)
- Graduate School Grade Scale
- h. * Number of credits: 3
- i. * Is this course repeatable for additional credit? Yes No
- If YES: Maximum number of credit hours:
- If YES: Will this course allow multiple registrations during the same semester? Yes No

j. * Course Description for Bulletin:

Introduction to solid state inorganic materials chemistry, including atomic structure; optical, electronic, and magnetic properties; and characterization methods such as x-ray diffraction and electron microscopy.

k. Prerequisites, if any:

CHE 440G or CHE 547 or equivalent; and CHE 410G or 510 or equivalent; or permission from the instructor

l. Supplementary teaching component, if any: Community-Based Experience Service Learning Both3. * Will this course be taught off campus? Yes No

If YES, enter the off campus address:

4. Frequency of Course Offering.

a. * Course will be offered (check all that apply): Fall Spring Summer Winter

b. * Will the course be offered every year? Yes No

If No, explain:

5. * Are facilities and personnel necessary for the proposed new course available? Yes No

If No, explain:

6. * What enrollment (per section per semester) may reasonably be expected? 35

7. Anticipated Student Demand.

a. * Will this course serve students primarily within the degree program? Yes No

b. * Will it be of interest to a significant number of students outside the degree pgm? Yes No

If YES, explain:

Primarily aimed to serve doctoral students in the Chemistry department. Also useful for (and frequently taken by): BA/BS Chemistry, MS Chemistry, BS Chemical and Materials Engineering, BS Materials Science and Engineering

8. * Check the category most applicable to this course:

Traditional – Offered in Corresponding Departments at Universities Elsewhere

Relatively New – Now Being Widely Established

Not Yet Found in Many (or Any) Other Universities

9. Course Relationship to Program(s).

a. * Is this course part of a proposed new program? Yes No

If YES, name the proposed new program:

b. * Will this course be a new requirement ⁵for ANY program? Yes No

If YES ⁵, list affected programs:

10. Information to be Placed on Syllabus.

a. * Is the course 400G or 500? Yes No

If YES, the *differentiation for undergraduate and graduate students must be included* in the information required in 10.b. You must include: (i) identify additional assignments by the graduate students; and/or (ii) establishment of different grading criteria in the course for graduate students. (See SR

b. * The syllabus, including course description, student learning outcomes, and grading policies (and 400G-/500-level grading differentiation if applicable 10.a above) are attached.

¹¹ Courses are typically made effective for the semester following approval. No course will be made effective until all approvals are received.

¹² The chair of the cross-listing department must sign off on the Signature Routing Log

In general, undergraduate courses are developed on the principle that one semester hour of credit represents one hour of classroom meeting per week for a semester, exclusive of any laboratory meeting. Laboratory meeting, generally, require two hours per week for a semester for one credit hour. (from SR 5.2.1)

You must also submit the Distance Learning Form in order for the proposed course to be considered for DL delivery.

In order to change a program, a program change form must also be submitted.

Rev 8/09

CHE 516: Inorganic Materials Chemistry (3 credit hours)

Class Times: TBA
Instructor: Dr. Beth S. Guiton
Office Address: 148C Chemistry-Physics Building
Email: beth.guiton@uky.edu
Office Phone: 257-4215
Office Hours: Monday, 1:15 to 2:45 PM
Tuesday and Thursday, 10:45 to 11:30 AM

Course Description:

Introduction to solid state inorganic materials chemistry, including atomic structure; optical, electronic, and magnetic properties; and characterization methods such as x-ray diffraction and electron microscopy.

Prerequisites:

CHE 440G or CHE 547 or equivalent; and CHE 410G or 510 or equivalent; or permission from the instructor.

Student Learning Outcomes:

After completing this course, the student will be able to:

1. Describe and identify basic crystal structures
2. Demonstrate comprehension of bonding in solids
3. Analyze experimental data to identify structural characteristics of solids
4. Describe and identify crystal defects, non-stoichiometry, and solid solutions, and predict the effects of these features on material properties
5. Interpret common phase diagrams to predict phase stability and phase transformations under different external conditions
6. Demonstrate comprehension of common electrical, magnetic, and optical characteristics of solids, and how these characteristics relate to structure and bonding
7. Critically evaluate published literature in the field of inorganic materials, interpret experimental data, and explain the pertinent details (graduate students)

Required Materials:

One of the two textbooks listed below:

1. *Solid State Chemistry and its Applications (Student Edition)*, Anthony R. West; 2nd Ed, Wiley (2014)
2. *Basic Solid State Chemistry*, Anthony R. West; 2nd Ed, Wiley (1999).

Optional Visualization Aids:

1. Advanced Molecular Model Set for General and Organic Chemistry, LLC Mega Molecules (~\$20)
2. Polyhedral Model Kit, Institute for Chemical Education (~\$115)

3. CrystalMaker software suite: available in person in Dr. Parkin's x-ray diffraction facility, or remotely, at <vnc://xray.uky.edu> (user name: che580; password: c_maker). A VNC client may be required when accessing from a linux or windows machine. Note: if someone is already logged on to the computer when you try to access it, open a text box and type "Are you using this machine?" – if no-one responds, log out and back in as che580.

Course Assignments

Distribution of the grade by assignment (graduate students)

- 2 Midterm exams at 25 percentage points each
- 1 Final exam at 30 percentage points each
- 10 graded homework sets at 1.5 percentage points each
- 1 literature presentation at 5 percentage points each

Distribution of the grade by assignment (undergraduate students)

- 2 Midterm exams at 25 percentage points each
- 1 Final exam at 30 percentage points each
- 10 graded homework sets at 2 percentage points each

An additional 5 percentage points in extra credit will be assigned to any student absent from no more than two classes (or with legitimate excused absences – see below).

Summary Description of Course Assignments

Examinations:

Three examinations will be given: two midterms and a Final. Unless announced otherwise Midterm 1 will examine the material covered in Problem Sets 1-4, Midterm 2 will examine the material covered in Problem Sets 5-7, and the Final will be cumulative.

Problem Sets:

Problem sets will be assigned each week and due the following week during class.

Literature Presentations:

Short presentations will be given by each **graduate student** during the week before dead week. Graduate students will be assigned to groups of three to four and will present as a group on a subject determined by the instructor. Papers from the literature chosen to illustrate the chosen subject will be assigned by the instructor approximately one week ahead of time. Further details will be announced in class, based around the following guidelines.

Instructions for Graduate Students

- The presentations should be 25 minutes long *plus* 10 minutes for questions
- The presentations should aim to introduce a general topic with examples provided by the assigned literature, and explained using material learned in CHE 516
- You will receive a score out of 40, with 25 points assigned individually (for Content, Structure, Delivery, and Group Participation), and 15 points assigned to each group member (for Content, Structure, and Group Dynamic) (see attached rubric)

-- Assessments of your group members and the slides from your presentation should be communicated to the instructor *via* email in the week following the presentation. Assign a score from 0 to 5 for each group member, and a brief justification for that score (one sentence is fine), regarding the contribution you felt that your group member gave, in terms of preparing and giving the presentation and contributing to the group dynamic. Additionally, provide a score for yourself, and how your contribution could have enhanced the performance of your other group members.

Instructions for Undergraduates

- To receive the attendance extra credit: you must attend both literature presentations
- To receive an additional extra credit point: you must comment on something you thought was interesting/effective in one of the presentations, or ask a question about something that interested or intrigued you. If you do ask a question/make a comment, please make a note of it on your attendance sheet (with date and presentation #) in order to receive the extra credit
- The first three questions/comments at the end of each talk will be reserved for undergrads who have not yet asked a question/made a comment

Grading scale (Graduate Students):

85 – 100% = A; 75 – 84% = B; 60 – 74% = C; Less than 60% = E
Ranges may be lowered but will not be raised.

Grading scale (Undergraduate Students):

85 – 100% = A; 75 – 84% = B; 60 – 74% = C; 50 – 59% = D; Less than 50% = E
Ranges may be lowered but will not be raised.

Final Exam Information

Thursday, May 7, 8:00 to 10:00 AM, Room 103 Chemistry-Physics Building

Mid-term Grade

Mid-term grades will be posted in myUK by the deadline established in the Academic Calendar (<http://www.uky.edu/Registrar/AcademicCalendar.htm>)

Tentative Course Schedule

Assignment due dates, and examination dates:

Homework 1 due:	Tuesday January 27
Homework 2 due:	Tuesday February 3
Homework 3 due:	Tuesday February 10
Homework 4 due:	Tuesday February 17
Homework 5 due:	Tuesday February 24
Midterm examination 1:	Thursday March 5, 9:30 to 10:45 AM
Homework 6 due:	Thursday March 12
Spring break:	March 16-21
Homework 7 due:	Tuesday March 24
Homework 8 due:	Tuesday March 31
Midterm examination 2:	Thursday April 9, 9:30 to 10:45 AM

Homework 9 due:	Thursday April 16
Literature Presentations:	April 21, 23
Homework 10 due:	Thursday April 23
Dead Week:	April 27 – May 1
Final examination:	Thursday, May 7, 8:00 to 10:00 AM

List of topics (tentative class schedule):

1. Crystal Structures (classes 1-4)
2. Bonding in Solids (classes 5-8)
3. Crystallography and Diffraction Techniques (classes 9-10)
4. Other Techniques (class 11)
5. Crystal Defects, Non-Stoichiometry and Solid Solutions (classes 12-15)
6. Phase Diagram Interpretation (classes 16-17)
7. Electrical Properties (classes 18-21)
8. Magnetic and Optical Properties (classes 22-23)

Course Policies:

Submission of Assignments:

Homework assignments should be submitted on paper, before class, on the date posted on the class webpage. Late assignments will be accepted for full credit up to one week after an excused absence. Late assignments will be accepted for half credit up to one week after the due date if the absence is not excused.

Attendance Policy:

Attendance will be taken with a sign-in sheet during class, with extra credit assigned as described above.

Excused Absences:

Students need to notify the professor of absences prior to class when possible. *Senate Rules 5.2.4.2* defines the following as acceptable reasons for excused absences: (a) serious illness, (b) illness or death of family member, (c) University-related trips, (d) major religious holidays, and (e) other circumstances found to fit “reasonable cause for nonattendance” by the professor.

Students anticipating an absence for a major religious holiday are responsible for notifying the instructor in writing of anticipated absences due to their observance of such holidays no later than the last day in the semester to add a class. Two weeks prior to the absence is reasonable, but should not be given any later. Information regarding major religious holidays may be obtained through the Ombud (859-257-3737, http://www.uky.edu/Ombud/ForStudents_ExcusedAbsences.php).

Students are expected to withdraw from the class if more than 20% of the classes scheduled for the semester are missed (excused) per University policy.

Per *Senate Rule 5.2.4.2*, students missing any graded work due to an excused absence are responsible: for informing the Instructor of Record about their excused absence within one

week following the period of the excused absence (except where prior notification is required); and for making up the missed work. The professor must give the student an opportunity to make up the work and/or the exams missed due to an excused absence, and shall do so, if feasible, during the semester in which the absence occurred.

Verification of Absences:

Students may be asked to verify their absences in order for them to be considered excused. *Senate Rule 5.2.4.2* states that faculty have the right to request “appropriate verification” when students claim an excused absence because of illness, or death in the family.

Appropriate notification of absences due to University-related trips is required prior to the absence when feasible and in no case more than one week after the absence.

Academic Integrity:

Per University policy, students shall not plagiarize, cheat, or falsify or misuse academic records. Students are expected to adhere to University policy on cheating and plagiarism in all courses. The minimum penalty for a first offense is a zero on the assignment on which the offense occurred. If the offense is considered severe or the student has other academic offenses on their record, more serious penalties, up to suspension from the University may be imposed.

Plagiarism and cheating are serious breaches of academic conduct. Each student is advised to become familiar with the various forms of academic dishonesty as explained in the Code of Student Rights and Responsibilities. Complete information can be found at the following website: <http://www.uky.edu/Ombud>. A plea of ignorance is not acceptable as a defense against the charge of academic dishonesty. It is important that you review this information as all ideas borrowed from others need to be properly credited.

Senate Rules 6.3.1 (see <http://www.uky.edu/Faculty/Senate/> for the current set of *Senate Rules*) states that all academic work, written or otherwise, submitted by students to their instructors or other academic supervisors, is expected to be the result of their own thought, research, or self-expression. In cases where students feel unsure about a question of plagiarism involving their work, they are obliged to consult their instructors on the matter before submission.

When students submit work purporting to be their own, but which in any way borrows ideas, organization, wording, or content from another source without appropriate acknowledgment of the fact, the students are guilty of plagiarism.

Plagiarism includes reproducing someone else's work (including, but not limited to a published article, a book, a website, computer code, or a paper from a friend) without clear attribution. Plagiarism also includes the practice of employing or allowing another person to alter or revise the work, which a student submits as his/her own, whoever that other person may be. Students may discuss assignments among themselves or with an instructor or tutor, but when the actual work is done, it must be done by the student, and the student alone.

When a student's assignment involves research in outside sources or information, the student must carefully acknowledge exactly what, where and how he/she has employed them. If the words of someone else are used, the student must put quotation marks around the passage in question and add an appropriate indication of its origin. Making simple changes while leaving the organization, content, and phraseology intact is plagiaristic. However, nothing in these Rules shall apply to those ideas, which are so generally and freely circulated as to be a part of the public domain.

Please note: Any assignment you turn in may be submitted to an electronic database to check for plagiarism.

Accommodations due to disability:

If you have a documented disability that requires academic accommodations, please see me as soon as possible during scheduled office hours. In order to receive accommodations in this course, you must provide me with a Letter of Accommodation from the Disability Resource Center (DRC). The DRC coordinates campus disability services available to students with disabilities. It is located on the corner of Rose Street and Huguelet Drive in the Multidisciplinary Science Building, Suite 407. You can reach them via phone at (859) 257-2754 and via email at drc@uky.edu. Their web address is <http://www.uky.edu/StudentAffairs/DisabilityResourceCenter/>.

Accommodations for victims of violence:

By federal law, any student who is a victim of dating violence, domestic/intimate partner violence, sexual assault, or stalking (whether on or off campus) is entitled to appropriate accommodations for his or her coursework. To get help getting accommodations and other support, students who are assaulted can do any of the following:

1. Tell your instructor who can assist you in accessing resources appropriate to your situation; ☐
2. Call the UK VIP Center (Violence Intervention and Prevention Center) at 257-3574 or vipcenter@uky.edu or http://www.uky.edu/StudentAffairs/VIPCenter/about_contact.php; or walk in to the Center in Frazee Hall, lower level, between 8:30 and 5:00; ☐
3. Call the University Counseling Center at 257-8701; 2nd floor, Frazee Hall; ☐
4. Call Ms. Patty Bender from the UK Institutional Equity and Equal Opportunity at 257-8927 or ☐patty.bender@uky.edu; or ☐
5. **In the case of an emergency, contact the UK Police Department at 911.** ☐
6. Students may also contact community resources 24-hours a day, including:
 - a. Bluegrass Rape Crisis Center at 800.656.4673 or <http://bluegrassrapecrisis.org/> ☐
 - b. Greenhouse17 (formerly Bluegrass Domestic Violence Program) at 800.544.2022 or ☐<http://greenhouse17.org/> ☐

Grading Rubric for Literature Presentations:

Group: 1 (Topic)		Person A	Person B	Person C	Person D	Group
Content	Analysis (understanding)	/5	/5	/5	/5	
	Reasoning (supporting evidence)	/5	/5	/5	/5	
	Material (comprehensive, pertinent)					/5
Structure	Macro (thesis statement, transitions)	/5	/5	/5	/5	
	Macro (logical flow, transitions)					/5
Delivery	Use of voice, body, presentational aids	/5	/5	/5	/5	
Group	Contribution (score 1)					
	Contribution (score 2)					
	Contribution (score 3)					
	Contribution (score 4)					
	Group dynamic (average)	/5	/5	/5	/5	
	Group dynamic (instructor)					/5
Score	Individual /25					
	Group /15					
	Total /40					