Academic Policies and Procedures Committee  
PROPOSAL FORM -- Part A

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Proposal # **CHE 2008-10**

Effective Date (semester/year) **Fall, 2009**

<table>
<thead>
<tr>
<th>College/School</th>
<th>Arts &amp; Sciences</th>
<th>Dean</th>
<th>Dr. Tony Calamai</th>
</tr>
</thead>
<tbody>
<tr>
<td>Department</td>
<td>Chemistry</td>
<td>Chair</td>
<td>Dr. Claudia Cartaya-Marin</td>
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1. Briefly describe the action(s) requested:

   Change the course description for CHE 4000 and designate it as a senior capstone course for chemistry majors.

2. Rationale for this request:

   CHE 4000 is a seminar course in chemistry and will help students to integrate their chemical knowledge into a final capstone experience. Students will write research proposals under the close supervision of faculty mentors.

3. Required attachments:
   a. CURRENT and PROPOSED undergraduate or graduate catalog copy

   **CURRENT:**
   CHE 4000. Chemistry Seminar (1).F:S.
   The presentation and discussion of current chemical topics. Oral and written reports are required. Prerequisite: CHE 3000. (SPÆKING)

   **PROPOSED:**
   CHE 4000. Chemistry Seminar (1).F:S.
   A senior capstone experience on the presentation and discussion of current chemical topics. Oral and written reports are required. Prerequisite: CHE 3000 and CHE 3303.

   b. SYLLABI are required when adding or making significant changes to courses.

   c. CHECKSHEETS are required when adding or revising degree programs or concentrations. N.A.

4. List the committees, councils, and other groups that have considered this proposal; the action taken; and the dates that action was taken.

<table>
<thead>
<tr>
<th>Area</th>
<th>Action</th>
<th>Date of Action</th>
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<tbody>
<tr>
<td>Departmental Curriculum Committee</td>
<td>Approve</td>
<td>12-16-08</td>
</tr>
<tr>
<td>Departmental Faculty</td>
<td>Approve</td>
<td>1-15-09</td>
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<tr>
<td>College Council(s)</td>
<td></td>
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<tr>
<td>Core Curriculum Committee</td>
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<tr>
<td>Teacher Education Council</td>
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<td>Graduate Council</td>
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<td>Other Committees/Councils:</td>
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<tr>
<td>Academic Policies &amp; Procedures Committee</td>
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5. Have all appropriate departmental chairs and the Registrar’s Office been consulted in the development of this proposal?

   yes ___ no ___ n/a **X**
   If yes, list the date(s) and person(s) contacted and response:

6. a. Are there any existing programs or courses that will be curtailed or discontinued as a result of the proposed new program or course? yes ___ no **X**

   b. Is this course cross-listed in another (other) department(s)? yes ___ no **X**

   c. List courses in other departments that may cover or partially cover the subject matter of the proposed course.
   This course is unique to the Department of Chemistry.

   d. Is this course dual-listed? yes ___ no **X** (If yes, attach undergraduate and graduate syllabi)

7. Core Curriculum or Special Designator Course proposal must include a syllabus *(more than one if multiple instructors).*
a. Is this a Core Curriculum course? yes ___ no ___ X

b. Is this a Special Designator Course? yes ___ no ___ X
   W____ S____ MC____ ND____ C____ CD____
Complete the following for the proposed new degree or certificate program, concentration, minor or course:

1. Projected enrollment: 1st year __ 2nd year ____

2. Projected student clientele:
   Chemistry majors with various concentration areas.

3. Faculty:
   a. Additional faculty needed: ____________________________________________
   b. Names of current faculty: ____________________________________________
   c. Other and continuing responsibilities of current faculty involved in new degree or course:

4. For a new degree or certificate program, give the career and/or graduate education opportunities available to students in this program:

5. List estimated costs of new program or course that cannot be covered by present budget:

6. Has the Library Collection Development Office been consulted? yes ___ no ___
   List the date(s) and person(s) contacted and response:

(Revised April 25, 2007)
# Academic Policies and Procedures Committee

**PROPOSAL FORM—Part C (for General Education Courses ONLY)**

NOTE: For courses that will be new to the catalog or those that require changes to the catalog copy, Academic Policies and Procedures Proposal Form, Parts A and B, should accompany this form.

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<tr>
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<th>Proposal #</th>
<th>Effective Date(semester/ year)</th>
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<td></td>
<td>X</td>
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<td>CHE 2008-10</td>
<td>Fall 2009</td>
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</tbody>
</table>

College  **Arts & Sciences**

Dean  **Dr. Tony Calamai**

Department/Program  **Chemistry**

My signature below indicates that this course will be offered at least one time, either fall and/or spring, for the next three years.

Department Chair/Program Director __________________________________________ Date __________

Course prefix, number, and title: **CHE 4000 Chemistry Seminar**

1. General Education component for which the course is proposed:

   - Aesthetic Perspective
   - Historical and Social Perspective
   - Local to Global Perspective
   - Science Inquiry Perspective
   - Course Designation within a Perspective
   - Fine Arts
   - Literary Studies
   - Historical Studies
   - Quantitative Literacy
   - Wellness Literacy
   - First Year Writing
   - Second Year Writing
   - Writing in the Discipline
   - Capstone Experience

2. Describe how this course will meet the criteria for the General Education component identified in item 1. (See the website [www.generaleducation.appstate.edu](http://www.generaleducation.appstate.edu) for specific criteria for each component.)
CHE 4000 Chemistry Seminar is an existing course which is traditionally taken by chemistry majors with the certified concentration, and is part of a three semester sequence in research:

- CHE 3000 Introduction to Chemical Research – students learn how to search and read the chemical literature.
- CHE 4000 Chemistry Seminar – students write original research proposals under the close supervision of faculty mentors.
- CHE 4400 Senior Research – students conduct the research which they proposed in CHE 4000 and present their results in oral presentations and written reports.

CHE 4000 is an appropriate capstone experience for our majors in any concentration because:

- It is a senior-level one-credit course;
- The junior writing in the discipline course (CHE 3303 Physical Chemistry I Lab) is a prerequisite;
- It addresses three of the four general education learning goals and outcomes;
- Students are required to attend the weekly chemistry seminar series in which guest speakers present their own original research;
- Students use higher-level thinking and writing skills and integrate a variety of chemical concepts as they develop their research proposals.

In the past, only those students who intended to enroll in CHE 4400 Senior Research actually took CHE 4000. Because CHE 4000 is an appropriate capstone experience, we intend to offer the course to any of our seniors, including those who do not intend to enroll in CHE 4400. Therefore, some small changes are necessary to CHE 4000:

- The class will be divided into two populations: students who will take CHE 4400 and those who will not.
- Students who plan to take CHE 4400 will choose a faculty mentor and work closely (one-on-one) with their mentors to develop original research proposals.
- The rest of the students will meet as a group for one hour per week and learn about proposal writing in the chemical sciences. Each semester, the course will have a theme, for example environmental endocrine disruption, microwave assisted biodiesel synthesis, or cell-free ethanol production. Students will read the relevant chemical literature and will participate in discussions on the literature; the weekly seminar series will be integrated into these discussions. The course will culminate for these students with an original, written research proposal on some aspect of the course theme. The proposals will be evaluated using standards similar to external funding agencies such as the National Science Foundation, EPA, etc.

3. Required attachments: Include representative syllabi and a biographical statement for 2-5 faculty members who will teach the course.
- Syllabi (Cartaya, Babyak)
- Biographical Sketches (Babyak, Schwab, Taubman, Williams)

4. Which goals and learning outcomes will be addressed in the course?

**Goal 1: Thinking critically and creatively.**

- A. Recognize, differentiate, and effectively employ appropriate and increasingly sophisticated strategies to collect and interpret information.
- B. Successfully integrate disparate concepts and information when interpreting, solving problems, evaluating, creating, and making decisions.
- E. Apply theories from a variety of disciplines and advance convincing reasons to connect as well as differentiate theories from different domains of knowledge.

These outcomes will be achieved as students work on their research proposals. Students will consult a variety of sources in the literature and will use information from a variety of disciplines as they formulate sound research questions and develop plans to address them.

**Goal 2: Communicating Effectively.**

- A. Articulate and comprehend effectively, using verbal or non-verbal communication suitable to topic, purpose, and
audience.

E. Read actively and analytically at the college level and synthesize and apply information and ideas from their reading across disciplines.

F. Know, apply, and communicate college-level quantitative concepts and methods. A well-written research proposal is evidence of this learning outcome. The proposal must include a review of the relevant literature.

**Goal 4: Understanding Responsibilities of Community Membership**

C. Collaborate effectively with others in shared processes of inquiry and problem solving. Students will participate in discussions with either their faculty mentors or other students.

5. How will the course be assessed for achievement of the general education goals and learning outcomes?

The primary product of this course is the final proposal. A scoring rubric will be developed and used to grade the proposals to determine if the above outcomes were met. In addition, students will be asked to complete a survey in which they discuss how the course addressed the general education learning goals and outcomes and how effectively the course incorporated other general education experiences.

6. Is this course being proposed as part of a theme?  __X__ No  ____ Yes (if yes, please respond to items a, b, and c)

a. List the perspective and approved theme for which this course is being proposed.

   N.A.

b. What forms of integration will be employed for this course?

   N.A.

c. Provide estimated costs for achieving integration (such as lecture series, field trips, writing consultants, etc.).

   N.A.
The faculty advisor chosen by the student will become the instructor of record for that student, and class rolls at the end of the semester will reflect that relationship (see the section below titled Evaluation and Grading Policies).

4000. Chemistry Seminar/(1).F;S.
A senior capstone experience on the presentation and discussion of current chemical topics. Oral and written reports are required. Prerequisite: CHE 3000 and CHE 3303.

Course Goals and Objectives. CHE 4000 is the second course in a three-part chemistry research course sequence. In the first course in the sequence, CHE 3000, the student learns how to search the chemical literature and how to develop a seminar presentation based on the current chemical literature. The seminar developed by the student is presented to the faculty and students of the Department of Chemistry at the weekly seminar discussion period which all junior and senior chemistry majors are expected to attend.

In this course the student will learn about the specific research interests of the faculty of the Department of Chemistry and then interview 3 or 4 potential faculty mentors in order to select the Senior Research topic and the faculty mentor who will direct the Senior Research project. After the student and the faculty mentor have agreed on the topic for the research, the faculty mentor will provide a bibliography and/or copies of leading papers, and the student will then conduct a review of the background literature on the chosen topic. Working closely with the faculty mentor, the student will develop a research proposal that will be presented to the faculty of the Department of Chemistry in written form and as a poster presentation following guidelines published by the American Chemical Society.

In the third course in the sequence, CHE 4400, the student then carries out the proposed research under the direction of the faculty mentor. When the student has completed a satisfactory amount of research on the chosen topic, he/she will write a formal research report following guidelines established by the American Chemical Society and then present the results of these efforts to the faculty of the department during the Department of Chemistry seminar program.

Topical Course Content. In this course the student learns about the specific research interests of the faculty of the Department of Chemistry and interviews potential faculty mentors in order to select the Senior Research topic and the faculty mentor who will direct the Senior Research project. Because of the subjective nature of the activities required of each student, course content will vary but the specific skills of preparing and defending a research proposal will be common to all students who complete the course.

Methods of Teaching. Direct one-on-one contact with faculty members who have experience and who have research interests in common with those of the student. This student-mentor relationship is developed during the preparation of the research proposal.

Course Requirements. Working closely with the faculty mentor, the student will develop a research proposal that is presented to the faculty of the Department of Chemistry in written form and as a poster presentation, following the style and guidelines published by the American Chemical Society. The student defends this proposal during a scheduled time period in which the poster presentation is on public display in the department.

Students are required to attend the Departmental Seminar Series on Friday afternoon from 2 to 3:00PM.

The poster presentation should be placed on display in a public location within the Department of Chemistry on or about November 25, 2008. The proposal will then be defended by the student author in a public location during an announced one-to-two hour time period during the following week. This defense will be scheduled at a convenient time to enable the faculty and students of the department to question the author about the background, methodology, and research objectives of the proposal.

The written proposal, to be submitted as a formal paper following the form specified in The ACS Style Guide, should be presented in final draft form to the advisor no later than November 20, 2008, and the completed written proposal should be presented within a week after the defense of the poster presentation. If substantial changes must be incorporated into the proposal as a result of questions raised during the defense the due date may be extended at the discretion of the faculty advisor, but it is expected that in all cases the final copy of the proposal will be submitted no later than Reading Day. A copy of the final draft of the proposal will be filed in the department office.

Evaluation and Grading Policies. The grade in CHE 4000 will be based on the written research proposal and the poster presentation of that proposal. The audience for the poster presentation evaluates the proposal presentation using an evaluation sheet which has
been developed for this purpose and the faculty advisor summarizes these evaluations as one contribution to the student’s grade. The faculty advisor evaluates the written proposal as another contribution to the grade. At the end of the semester the faculty advisors of students presenting proposals will discuss the evaluations of the poster presentations and written proposals, and the faculty advisor assigns the course grade for her or his advisee following these discussions.

**Attendance/Participation Expectations and Policies.** It is essential that the student follow a timely schedule for preparation of the proposal, so there should be regularly-scheduled meetings with the faculty advisor which lead to preparation of the poster presentation and paper within the time frame established for this course.

**Required Textbooks and Readings.** The pertinent style guide and laboratory notebook guide are provided to the student as textbooks for the course. The mentor will provide leading references and/or a reading list appropriate to the chosen research topic.


**Course Calendar.** The following course calendar is suggested to insure the timely development of proposals and presentations.

<table>
<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>Event Description</th>
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<tbody>
<tr>
<td>September 3</td>
<td>Wednesday</td>
<td>Return Interview Forms to Dr. Cartaya.</td>
</tr>
<tr>
<td>October 3</td>
<td>Friday</td>
<td>First draft of written proposal turned in to faculty advisor.</td>
</tr>
<tr>
<td>November 20</td>
<td>Thursday</td>
<td>Final draft of written proposal turned in to faculty advisor.</td>
</tr>
<tr>
<td>November 25</td>
<td>Tuesday</td>
<td>Poster presentation placed on public display in department. The defense of the proposal will be arranged during the following week in cooperation with the faculty advisor.</td>
</tr>
<tr>
<td>December 10</td>
<td>Reading Day</td>
<td>All course requirements should be completed by this date. Faculty advisors meet to discuss evaluations of poster presentations and written proposals.</td>
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</tbody>
</table>
The course is for students who do not intend to enroll in CHE 4400.

4000. Chemistry Seminar/(1).F;S.
A senior capstone experience on the presentation and discussion of current chemical topics. Oral and written reports are required.
Prerequisite: CHE 3000 and CHE 3303.

Overview: In this course you will learn how to ask a good research question and write an original research proposal. The theme of the course this semester is Environmental Endocrine Disruption, but I will not directly teach you about this topic. You are expected to teach yourself through reading the assigned material and searching the chemical literature. There will be four assigned readings and you will turn in a short paper on each of them. The readings are designed to help you understand environmental endocrine disruption and to help you discover what research still needs to be done in this area.

Required Text: Getting Science Grants, Thomas R. Blackburn. You will probably need to consult analytical, organic, inorganic, biochemistry, and physical chemistry textbooks to help you understand fundamental concepts which you will encounter as you read the chemical literature on environmental endocrine disruption.

Course Goals. The goals of this course are to:
• Ask a good research question and write a research proposal about it.
• Apply all of your chemistry knowledge (and perhaps knowledge from other disciplines) to a focused research question.
• Participate in discussions on current chemical topics.
• Critically assess chemical literature.

This course also fulfills the following General Education Learning Outcomes:

Goal 1: Thinking critically and creatively.
A. Recognize, differentiate, and effectively employ appropriate and increasingly sophisticated strategies to collect and interpret information.
B. Successfully integrate disparate concepts and information when interpreting, solving problems, evaluating, creating, and making decisions.
E. Apply theories from a variety of disciplines and advance convincing reasons to connect as well as differentiate theories from different domains of knowledge.

These outcomes will be achieved as you write your research proposals. You will consult a variety of sources in the literature and will use information from a variety of disciplines as you formulate a sound research question and develop plans to address it.

Goal 2: Communicating Effectively.
A. Articulate and comprehend effectively, using verbal or non-verbal communication suitable to topic, purpose, and audience.
E. Read actively and analytically at the college level and synthesize and apply information and ideas from their reading across disciplines.
F. Know, apply, and communicate college-level quantitative concepts and methods.

Goal 4: Understanding Responsibilities of Community Membership
C. Collaborate effectively with others in shared processes of inquiry and problem solving

Course Outline and Due Dates
Week 1 - Introduction
Week 2 - Components of a research proposal
Week 3 - Class discussion on Reading Assignment 1, Writing assignment due
Week 4 - Class discussion on Reading Assignment 2, Writing assignment due
Week 5 - Technical Writing
Week 6 - Class Discussion on Reading Assignment 3, Writing assignment due
Week 7 - Class Discussion on Reading Assignment 4, Writing assignment due
Week 8 - Funding agencies
Week 9- Background and Purpose sections of proposal due  
Week 10- Reviewing research proposals  
Week 11- Project Plan section of proposal due  
Week 12- Careers in Chemistry  
Week 13- Budget and Budget Justification sections of proposal due  
Week 14- Gen Ed Survey  
Week 15- Final Drafts of proposals due  

**Evaluation and Grading Policies.**  
Class Participation, 10%  
Attendance at Departmental Seminars (Friday, 2-3pm), 10%  
Writing Assignments, 30%  
Final Proposal, 50%
Biographical Sketches

Carol M. Babyak received her Ph.D. in Chemistry from West Virginia University in 2004 and has been at Appalachian since 2004. Her research interests include water quality, metal speciation, and detection of environmental endocrine disruptors. She has been a PI on a CCLI grant from the NSF and a co-PI on grants from NC Biotechnology and Merck-AAAS. Her research students typically present at national and regional meetings of the American Chemical Society.

Alexander D. Schwab is a pre-tenured Assistant Professor in the Department of Chemistry. He joined the departmental faculty in Fall 2005, after receiving a Ph.D. in Polymer Science from the University of Akron (2002). His field of expertise is polymer physical properties. He is the sole or co-author of 12 publications in the peer-reviewed chemistry literature.

Brett Taubman received his Ph.D. in Chemistry from the University of Maryland in 2004 and was a Post-doctoral Research Associate in the Meteorology Department at the Pennsylvania State University before coming to Appalachian in 2007. His research interests include regional air quality and climate issues. Specifically, he is investigating the effects of both anthropogenic (sulfate, nitrate, and soot particles from industrial and combustion processes) and natural (organic particles from biogenic emissions and wildfire) aerosols on the solar radiation budget in the Southern Appalachian region. He is a founding co-director of AppalAIR (Appalachian Atmospheric Interdisciplinary Research), a cross-disciplinary research program focused on understanding the atmospheric properties and processes and their associated impacts on terrestrial ecosystems in the southern Appalachian Mountains.

Steven D. Williams is a tenured Professor in the Department of Chemistry. He joined the departmental faculty in Fall 1983, after receiving a Ph.D. in Chemical Physics from Washington State University (1983). His fields of expertise are computational quantum chemistry and vibrational spectroscopy. He is the sole or co-author of 14 publications in the peer-reviewed chemistry literature.