

LSC Use Only Proposal No:

LSC Action-Date: AP-9/27/12

UWUCC Use Only Proposal No: 12-24

UWUCC Action-Date: AP-10/16/12 Senate Action Date: App-11/6/12

Curriculum Proposal Cover Sheet - University-Wide Undergraduate Curriculum Committee

Contact Person(s) Sharon Sowa	Email Address ssowa@iup.edu
Proposing Department/Unit Chemistry	Phone 74481

Check all appropriate lines and complete all information. Use a separate cover sheet for each course proposal and/or program proposal.

1. Course Proposals (check all that apply)

- New Course Course Prefix Change Course Deletion
 Course Revision Course Number and/or Title Change Catalog Description Change

Current course prefix, number and full title: CHEM 490 W Chemistry Seminar III
 Proposed course prefix, number and full title, if changing: _____

2. Liberal Studies Course Designations, as appropriate

- This course is also proposed as a Liberal Studies Course (please mark the appropriate categories below)
 Learning Skills Knowledge Area Global and Multicultural Awareness Writing Intensive (include W cover sheet)
 Liberal Studies Elective (please mark the designation(s) that applies – must meet at least one)
 Global Citizenship Information Literacy Oral Communication
 Quantitative Reasoning Scientific Literacy Technological Literacy

3. Other Designations, as appropriate

- Honors College Course Other: (e.g. Women's Studies, Pan African)

4. Program Proposals

- Catalog Description Change Program Revision Program Title Change New Track
 New Degree Program New Minor Program Liberal Studies Requirement Changes Other

Current program name: _____
 Proposed program name, if changing: _____

5. Approvals	Signature	Date
Department Curriculum Committee Chair(s)		4/11/12
Department Chairperson(s)		9/11/12
College Curriculum Committee Chair		4/20/12
College Dean		4/20/12
Director of Liberal Studies (as needed)		10/4/12
Director of Honors College (as needed)		
Provost (as needed)		
Additional signature (with title) as appropriate		
UWUCC Co-Chairs		10/22/12

Received
OCT 22 2012
Liberal Studies

Received
APR 20 2012
Liberal Studies

REQUEST FOR APPROVAL TO USE W-DESIGNATION

LSC # _____
Action _____

TYPE I. PROFESSOR COMMITMENT

- () Professor _____ Phone _____
- () Writing Workshop? (If not at IUP, where? when?) _____
- () Proposal for one W-course (see instructions below)
- () Agree to forward syllabi for subsequently offered W-courses?

TYPE II. DEPARTMENT COURSE

- (x) Department Contact Person S. Sowa Phone 74481
- (x) Course Number/Title CHEM 490 Chemistry Seminar III
- (x) Statement concerning departmental responsibility
- (x) Proposal for this W-course (see instructions below)

-----TYPE

III. TYPE III. SPECIFIC COURSE AND SPECIFIC PROFESSOR(S)

- () Professor _____ Phone _____
- () Course Number/Title _____
- () Proposal for this W-course (see instructions below)

SIGNATURES:

Professor(s)

Department _____
 Chairperson *Dean R Long*
 College Dean *D. H. Proctor*
 Director of Liberal Studies _____

COMPONENTS OF A PROPOSAL FOR A WRITING-INTENSIVE COURSE:

- I. "Writing Summary"--one or two pages explaining how writing is used in the course. First, explain any distinctive characteristics of the content or students which would help the Liberal Studies Committee understand your summary. Second, list and explain the types of writing activities; be especially careful to explain (1) what each writing activity is intended to accomplish as well as the (2) amount of writing, (3) frequency and number of assignments, and (4) whether there are opportunities for revision. If the activity is to be graded, indicate (5) evaluation standards and (6) percentage contribution to the student's final grade.
- II. Copy of the course syllabus.
- III. Two or three samples of assignment sheets, instructions, or criteria concerning writing that are given to students. Limit: 4 pages. (Single copies of longer items, if essential to the proposal, may be submitted to be passed among LSC members and returned to you.)

Please number all pages. Provide one copy to Liberal Studies Committee.

Before you submit: Have you double-checked your proposal against "The Liberal Studies Committee's Most Frequently Asked Questions"?

I. Writing Summary

The CHEM 390/490 sequence is proposed (together) as a writing-intensive course. The sequence is taught every year and is required for three tracks of the CHEM degree. It is taken by junior and senior CHEM majors. This writing intensive sequence is seen as an opportunity for students to practice professional levels of scientific communication - reading scientific papers, writing up procedures, communicating and interpreting/critiquing the results of other scientists, producing scientific publications, including a research proposal, and effectively presenting a research poster and a seminar.

The students practice the following kinds of writing:

1. Writing to demonstrate reading skills [experimental laboratory procedures]:
Students are given a published reference to a standard assay (which is usually obtained as a "kit") and are required to translate the "Methods" section of the paper into a step-by-step procedure that they would follow if they were doing the experiment in lab. As working chemists/researchers, proper maintenance of a notebook that includes reproducible procedures is a daily requirement. The students are evaluated on detail and clarity of writing, as well as scientific feasibility.
2. Writing to demonstrate knowledge transfer from oral presentations.
Students write content and critical reports based on their attendance at five seminars given by guest scientists. This exercise emphasizes to students the importance of clear communication, helps them distinguish between important vs. trivial details in scientific procedures, allows them to experience a variety of oral presentation styles, and provides them with an opportunity to give constructive written criticism to fellow scientists, a component of peer review.
3. Writing for clarity and for critiquing.
Students read and critique papers from the scientific literature. They present the results in 'journal club' format. Students also prepare a formal research proposal. The proposals are also peer-reviewed by the students, and are evaluated for thoroughness (background information) and clarity (interpretation of the results in context with the subject).
4. Writing to practice clear communication of scientific principles.
Students are given scientific writing that describes basic concepts in chemistry. They are then asked to 'translate' the concepts into a form that resembles a 'textbook' rendition of the concepts, a formal research paper. Students must also transform their formal research proposals into poster presentations that are reviewed by chemistry faculty. These components of writing allow students to practice developing the tools of scientific literacy as they improve their writing skills.

I. Catalog Description

CHEM 490W Chemistry Seminar III

1 class hour, 1 credit

(1c-0l-1cr)

Prerequisites: CHEM 390

Description: A discussion of recent trends in chemical thought. Oral and written reports on assigned readings, library, or laboratory research. Guest lecturers. Seminar course intended to provide knowledge to students regarding effective oral and written scientific communication. Students will refine their skills in reading and evaluating research papers from the literature, they will write a formal research paper, and present a research seminar. The combination of CHEM 390-490 counts as one writing-intensive course.

II. Course Outcomes

CHEM 390/490 serve together as one writing-intensive course. In the second semester, students choose a topic of interest within chemistry (broadly defined) and develop written and oral reports on the topic. These reports include:

- 1) A detailed evaluation of at least one primary research article (published within the last 5 years) as performed in the journal club format in CHEM 390.
- 2) Significant background information, allowing the reader/audience to understand the research in the context of what is already known or not known and to assess the significance of the research.
- 3) A full explanation and analysis of a specific experimental technique used in the research.

Successful students will build on the skills developed last semester, gaining additional experience in assessing and understanding scientific literature and enhancing and improving their skills in written and oral scientific communication.

Students will be able to:

1. understand and interpret formal scientific papers and scientific presentations
2. critically evaluate the results of a recent research article by
 - a. providing sufficient background information
 - b. describing a key experimental technique
 - c. placing the results in context of current knowledge on this topic
3. present the critical evaluation of the research article as a formal oral seminar
4. summarize the critical evaluation of the research article in a written paper that resembles a scientific review of the current topic of interest

Students will also be able to assess ethical behavior in science/scientific research through reading and discussing case studies.

Through these exercises, students will gain an appreciation for the process of scientific discovery, and, most importantly, the methods to present, evaluate, and disseminate knowledge.

III. Detailed Course Outline: note 1 hour = 1 academic hour or 50 minutes

The course will consist of **5 writing assignments, structured class discussions,** and a final oral report in the form of a **seminar**. One writing assignment is a **written report on five separate seminars** attended by students during the course of the semester.

1.	<u>Introduction: Choosing a Topic</u>	1 hour
2.	<u>Writing Assignment 1: Statement of Topic</u>	1 hour
3.	<u>Writing Assignment 2: Professional Ethics</u>	1 hour
4.	<u>Writing Assignment 3: Rough Draft of Written Report</u>	1 hour
5.	<u>Seminar Assignment 1: Preliminary Oral Report</u>	1 hour
6.	<u>Seminar Presentations</u>	6-7 hours
7.	<u>Class Discussion: Review of Effective Scientific Communication</u>	1-2 hours
8.	<u>Writing Assignment 4: Final Written Report</u>	1 hour
9.	<u>Terminating Activity</u> Scheduled during final exam period	2 hours

IV. Evaluation Methods

The final grade will be determined as follows:

Preliminary Topic Statement	10%
Writing Assignment: Professional Ethics	10%
First Draft of Written Report	15%
Preliminary Oral Report	10%
Seminar Presentation	20%
Final Written Report	25%
Seminar Reports	10%
Total	100%

V. Example Grading Scale

Grading Scale: A: $\geq 90\%$ B: 80-89% C: 70-79% D: 60-69% F: $< 60\%$

VI. Undergraduate Course Attendance Policy

The attendance policy for this course will be consistent with the attendance policy in the current IUP undergraduate catalogue.

VII. Required Textbook(s), Supplemental Books and Readings

Students will receive some handouts, but will be required to use library and electronic means to retrieve information. There is no textbook for the course.

VIII. Special Resource Requirements

Students are expected to be proficient in retrieving scientific information from the literature should have access to a computer to use web sites that provide supplementary information. Students should also be familiar with PowerPoint for their seminar presentations.

IX. Bibliography

1. American Chemical Society, *The Chemist's Code of Conduct*, Washington, DC (1994).

2. American Chemical Society *Undergraduate Professional Education in Chemistry: ACS Guidelines and Evaluation Procedures for Bachelor's Degree Programs*, Washington, DC (2008).
3. Dodd, J.S. (editor) *The ACS Style Guide: A Manual for Authors and Editors, Third Edition*, American Chemical Society: Washington, DC, (2006)
4. Doyle, Michael P. editor, *Academic Excellence*, Research Corporation, Tuscon, AZ (2000).
5. Gornick, Vivian, *Women in Science: Then and Now*, The Feminist Press at CUNY, New York (2009).
6. <http://agricola.nal.usda.gov/> (an agricultural literature online database)
7. Laursen, Sandra, Barrie-Hunter, Anne, Seymour, Elaine, Thiry, Heather, and Melton, Ginger, *Undergraduate Research in the Sciences: Engaging Students in Real Science*, Wiley, San Francisco (2010).
8. McCray, Richard A., DeHaan, Robert L., Schuck, Julie, (Editors), *Improving Undergraduate Instruction in Science, Technology, Engineering, and Mathematics: Report of a Workshop*, National Academies Press, Washington, DC (2003).
9. Sigma Xi, The Scientific Research Society, *The Responsible Researcher: Paths and Pitfalls*, Research Triangle Park, NC (1999).
10. www.cas.org (online chemical abstracts service)
11. www.ncbi.nlm.nih.gov/pubmed/ (an online medical literature database)

Course Analysis Questionnaire

Section A: Details of the Course

A1 How does this course fit into the programs of the department? For what students is the course designed? (majors, students in other majors, liberal studies). Explain why this content cannot be incorporated into an existing course.

CHEM 490 is designed to teach chemistry majors to develop methods to obtain current scientific information, to evaluate it, and to develop an idea into a formal research paper that is presented in both written and oral format (seminar).

A2 Does this course require changes in the content of existing courses or requirements for a program? If catalog descriptions of other courses or department programs must be changed as a result of the adoption of this course, please submit as separate proposals all other changes in courses and/or program requirements.

The combination of CHEM 390/490 will serve as a writing intensive component in three tracks of the revised Chemistry B.S. degree program. The two courses together will cover all aspects of effective scientific communication: the research proposal, the research poster, a formal paper (on a particular topic of interest that may or may not include the student's research project) and a formal seminar. The three seminar courses CHEM290/390/490, along with their individual independent study (CHEM 498) are designed to thoroughly prepare chemistry students for a successful career path following completion of their degree. The revisions of these programs are included in this package.

A3 Has this course ever been offered at IUP on a trial basis (e.g. as a special topic) If so, explain the details of the offering (semester/year and number of students). No

A4 Is this course to be a dual-level course? If so, please note that the graduate approval occurs after the undergraduate.

No

A5 If this course may be taken for variable credit, what criteria will be used to relate the credits to the learning experience of each student? Who will make this determination and by what procedures?

No variable credit

A6 Do other higher education institutions currently offer this course? If so, please list examples (institution, course title).

West Chester University: CHEM 418 Chemical Info, CHEM 480 Intro to Chemical Research, CHEM 491 Chemistry Seminar, Mansfield University: CHEM 4410 Chemistry Seminar, Bloomsburg University: CHEM 52281 Intro to Scientific Literature, Slippery Rock University: CHEM 491 Chemistry Seminar

A7 Is the content, or are the skills, of the proposed course recommended or required by a professional society, accrediting authority, law or other external agency? If so, please provide documentation. **No**

Section B: Interdisciplinary Implications

B1 Will this course be taught by instructors from more than one department? If so, explain the teaching plan, its rationale, and how the team will adhere to the syllabus of record.

There will be only one instructor for this course, although many faculty members will serve as research advisors and may wish to make voluntary contributions to the student research proposals.

B2 What is the relationship between the content of this course and the content of courses offered by other departments? Summarize your discussions (with other departments) concerning the proposed changes and indicate how any conflicts have been resolved. Please attach relevant memoranda from these departments that clarify their attitudes toward the proposed change(s).

CHEM 490 will have no effect on the curriculum of other departments.

B3 Will this course be cross-listed with other departments? If so, please summarize the department representatives' discussions concerning the course and indicate how consistency will be maintained across departments.

The concept of this course is to facilitate undergraduate research in chemistry, biochemistry and related departments across campus.

Section C: Implementation

C1 Are faculty resources adequate? If you are not requesting or have not been authorized to hire additional faculty, demonstrate how this course will fit into the schedule(s) of current faculty. What will be taught less frequently or in fewer sections to make this possible? Please specify how preparation and equated workload will be assigned for this course.

This course proposal is part of a Chemistry Department program revision. The sum of all the changes included in this revision will be a reduction of 9-10 workload hours, and three preps, for the department's faculty.

C2 What other resources will be needed to teach this course and how adequate are the current resources? If not adequate, what plans exist for achieving adequacy? Reply in terms of the following:

All resources needed to offer this course are already in place.

C3 Are any of the resources for this course funded by a grant? If so, what provisions have been made to continue support for this course once the grant has expired? (Attach letters of support from Dean, Provost, etc.)

No

C4 How frequently do you expect this course to be offered? Is this course particularly designed for or restricted to certain seasonal semesters?

CHEM 490 is envisioned to be offered every spring semester.

C5 How many sections of this course do you anticipate offering in any single semester?

One

C6 How many students do you plan to accommodate in a section of this course? What is the justification for this planned number of students?

Based on enrollment trends, ~30 students are expected in this course.

C7 Does any professional society recommend enrollment limits or parameters for a course of this nature? If they do, please quote from the appropriate documents.

No

C8 If this course is a distance education course, see the Implementation of Distance Education Agreement and the Undergraduate Distance Education Review Form in Appendix D and respond to the questions listed.

Not a distance education course.

Section D: Miscellaneous

Include any additional information valuable to those reviewing this new course proposal.

Sample Assignment 1: Statement of Topic (50 points)

A concise (two page maximum) description of the topic chosen. Attach a paper copy of at least one primary research article to be analyzed in depth. Also state the experimental technique that you will focus on in your written and oral report.

Grading Rubric: Points are awarded for clarity, conciseness and correctness.

- ___ The primary paper was published within the past 5 years (10 points)
- ___ A copy of the primary paper is attached to the Statement of Topic (10 points)
- ___ The topic is broad enough to include the context of the work (5 points)
- ___ The topic is narrow enough to allow for a thorough analysis (5 points)
- ___ One experimental technique is designated as a focus point of the report (5 points)
- ___ The statement of topic is concisely summarized and all writing uses correct grammar, spelling and punctuation (15 points)

Sample Assignment 2: Final Written Report (125 points)

The written report should be an expanded version of the evaluation of a research article(s) as completed in CHEM 390 using the 4-step method. This report should reflect a greater effort on your part to understand the broader content of a primary research article(s). Thus, you need to include background information that places the research in context of other relevant research. You should then address all of the points described in the “reflection and criticism” step of the 4-step method. You will need to include a similar background and analysis for the experimental technique that you choose to focus on. You should explain how the technique is performed, its usefulness and limitations.

The format of this report is flexible, however, it is strongly suggested that informative section headings be used. Two required elements are:

- 1) An abstract summarizing your report (2 page max)
- 2) A reference section giving full citations (authors, publication date, article title, journal name, volume, starting and ending page) for all articles used. Use an appropriate format for books. Citations for internet resources must include the page title, URL, and date accessed.

NOTE: *use the ACS style manual* for instructions on how to *cite* and *list* references.

The final written report should *address the instructor’s comments* on the draft report. The copy of the draft report with the instructor’s comments must be turned in along with the final report.

Grading Rubric: Points are awarded for clarity, conciseness and correctness.

- ___ The abstract is included and clearly serves as a summary (25 points)
- ___ The background information places the topic in context (25 points)
- ___ One experimental technique is defined and the results are critiqued (25 points)
- ___ Literature references are cited in acceptable style format (25 points)
- ___ The paper is well-organized, thorough, and all writing uses correct grammar, spelling and punctuation (25 points)

Chemistry Department Statement of Responsibility for All Writing-Intensive Courses:

The Department Chair shall provide a copy of this agreement to each faculty member assigned to teach a Writing-Intensive course.

Each faculty member assigned to teaching a Program Writing Intensive Course agrees to the following criteria:

- Writing assignments are an integral part of the course, which promise to enhance student learning (not 'exercises in writing for writing's sake').
- Writing assignments will include various forms of writing such as case studies, laboratory reports, journals, letters, memos, formal essays, research articles, project or grant proposals, etc.
- The improvement of student writing is a clear objective of the course.
- Students will be provided with written instructions that cover major criteria for the evaluation of the assignment(s).
- Students will receive guidance in conceiving, organizing, and presenting written material in ways appropriate to the field of Chemistry/Biochemistry.
- Students will produce at least 5000 words (15-20 typed pages) of writing that will be critically evaluated.
- Each writing assignment will have specified length in terms of minimum number of pages required.
- Writing assignments include at least one major assignment and several shorter different assignments.
- Students will be required to submit drafts of at least one major writing assignment that will be returned with instructor comments/suggestions for improvement before the final copy of the assignment is due, so that students have an opportunity to revise their written work.
- Students will submit final copies of writing assignments for critical evaluation.
- Instructor evaluation of written work will comprise at least 50% of the course grade.

Summary Chart for Writing Assignments*

A. Writing Assignments					
Assignment Title	# of Assignments	# of total pages	Graded (Yes/No)	Opportunity for Revision (Yes/No)	Written Assignment represents what % of final course grade
Preliminary Topic	1	2	yes	yes	10%
Scientific Ethics	1	4-5	yes	no	10%
Written Report (Preliminary/Final)	2	10-20	yes	yes	35%
Seminar Attendance Seminar Presentation	7	10-20	yes	yes	30%
Totals	11	26-47	NA	NA	85 %

B. Examinations (Complete only if you intend to use essay exams/short answers as part of the required number of pages of writing.)

Exams	Approx. % of exam that is essay or short answer	Anticipated # of pages for essay or short answer, or approx. word count	Exam constitutes what % of final course grade
1.			
2.			
3.			
Totals			

**Total writing assignments should contain at least 5000 words (approximately 15-20 typed pages) in two or more separate assignments; written assignments should be a major part of the final grade—at least 50% or more.*