

**GENERAL EDUCATION COURSE PROPOSAL
WRITING INTENSIVE FORM**

Department or program _____ Chemistry _____

Semester Course Number ___5861___

Course Title ___Polymer Science 1: Polymer Chemistry and Plastics___

Faculty teaching course _____Allen Hunter_____

Estimated number of sections to be offered in Fall 2002 __1__, Spring 2003 __0__

Please note that general education course proposals (send 14 copies) must include this page, the responses to the questions, and a syllabus.

Submitted by (Daryl Mincey', Chemistry Department Chair) (date)

Reviewed by (Ikram Khawaja's, Acting Dean Arts & Sciences) (date)

Certified by (Bill Jenkins, GEC Coordinator) (date)

(Chair, Academic Senate, signature) (date)

GEC Proposal Number (GEC Use Only) _____

QUESTIONS

- 1) Is the course designed for majors or for the general student population?

This course is taken primarily by Chemistry Majors and also by a few Engineering Students and will be one of the senior level Chemistry courses designed to help our majors complete the Oral Communication Intensive requirements. This course typically enrolls 4-8 students and has never enrolled more than 10 in the last 9 years (including its Quarter analogues, Chemistry 824/825).

More details about the Fall 2001 session of this class which was carried out in the proposed format for both writing and oral communication intensive activities, including the specific projects, can be found at <http://www.as.yosu.edu/~adhunter/Teaching/Chem5861/index.html>.

- 2) What percentage of the course grade will be based on writing assignments (minimum of 30%)?

Writing assignments (One page "essay" answers, 3-5 page reports, and 25-40 page papers) comprise 275/500 (55%) points for the course.

- 3) Approximately how many words will students write (minimum of 2500 words)?

A total of at least 6,000 to 7,500 words are required.

- 4) Approximately how many words will be devoted to each writing activity (i.e., reports, journals, drafts, finished essays)?

3/4 of these words will be in the form of formal written reports on library or lab research projects. The rest will be for the take home "essay type" final exam. The individual literature reports are typically 3-6 pages in length (a minimum of 3 single spaced pages), the final lab report is around 40 pages in length, and each essay type exam question is around 3 pages in length.

- 5) What will be the balance between "writing to learn" and "learning to write" activities?

In the early part of the course, learning to write will be emphasized but the two are not entirely separate. About 1/3 of the grade for written assignments will be for effectively organizing, writing, and presenting their ideas, the rest for the facts/conclusions themselves. There is both formal instruction on how to do writing in Chemistry and well as feedback from the instructor to individuals and the group.

- 6) How will the course integrate writing as a vital component?

Over half of all assessment for grades will be via formal writing assignments (9 separate reports from 3 to 40 pages (the later a group report) in length). The written and oral reports will force the students to integrate the new information they find into a larger coherent whole.

- 7) How will the writing process (i.e., planning, drafting, revising, editing) be taught?

In the initial weeks, there will be formal instruction in this area (following the American Chemical Society Instructions for Authors Guidelines). As the six sequential reports are turned in, the formal and informal feedback will be used to emphasize and improve writing skills in an iterative process. The major formal report/paper on the laboratory work is handed in with 3-4 drafts to allow for

corrections and revisions as the lab progresses.

8) How will the course integrate General Education Goal #1 (speaking in particular)?

The central feature of this course involves having the students learn content knowledge about polymer chemistry with written and spoken assignments being primary tools to both help them do so and to assess their progress.

9) How will the course integrate General Education Goal #2 (research)?

For each project, the students will carry out extensive research on some project in the area of Polymer Chemistry. These will involve reading the current professional literature, review articles and books. They will also carry out lab research.

10) How will the course integrate General Education Goal #3 (critical thinking)?

The students will have to evaluate each piece of new information they get from the literature and/or their lab work to see how it integrates with what they already know and to synthesize a cohesive picture. This is critical thinking in science!

11) How will students' progress in achieving goals #1, #2, and #3 be assessed?

Oral and written feedback from classmates and the instructor will be compiled and the students progress at making professional presentations and written reports will be evaluated with respect to the standards defined by the department for the final presentations on their Capstone chemistry research experiences via oral and written presentations (Chemistry 4850 and 4850L) and with respect to professional presentations at American Chemical Society meetings and in American Chemical Society journals.

12) How will the course prepare students to pursue critical inquiry within a field, do research within a field, and address an audience within a field?

This is the central theme of this course, each assignment involving either literature research and/or lab research on a topic in his/her discipline and then critically analyzing it for its significance and its relationship to the other materials.

13) How will students' progress in learning to write within a field be assessed?

Self feedback reports, oral feedback from his/her classmates, oral and written feedback from the instructor.

14) Have faculty teaching the course some experience in teaching writing or in taking a Writing Across the Curriculum workshop?

Hunter has published over four dozen papers in peer reviewed chemistry journals and had almost two dozen external research grants funded in addition to other professional writing. He has also published a paper on Writing in the Chemistry Curriculum. "Hunter, A. D.: "A Capstone Writing Experience in Polymer Chemistry: Writing a Proposal to Management for the Purchase of New Polymer Characterization Instrumentation," *Journal of Chemical Education*, 1998, 75, 1424."

Chemistry 5861 *Polymer Science 1: Polymer Chemistry and Plastics.* ¹

Current Catalogue Description

*5861 *Polymer Science 1: Polymer Chemistry and Plastics.* Preparation, characterization, structure-property relationships, morphology, and uses of the major commercial polymers. Two hours lecture and three hours laboratory. Prereq. or Concurrent: CHEM 3720 and CHEM 3739 or 3737 or consent of the department chair. 3 s.h.

Proposal for Revised Catalogue Description

*5861 *Polymer Science 1: Polymer Chemistry and Plastics.* Theoretical and practical aspects of the preparation, characterization, structure-property relationships, morphology, and uses of both the major commercial and newer polymers. Three hours lecture and three hours laboratory. This course is designated as both oral communication intensive and writing intensive. Prereq. or Concurrent: CHEM 3720 and CHEM 3739 or 3737 or consent of the department chair. 4 s.h.

Note 1: The suggested changes in the first sentence do not change the emphasis of the course or its actual lecture content but do better reflect what is actually taught.

Note 2: I am asking for the increase from 3 SH to 4 SH to allow for the increase from 2 to 3 hours of “lecture” per week.

Note 3: In the paragraph at the start of the Chemistry Department’s listings in the course catalogue are noted which courses carry which general education credit. I would also think that it would be better to list it by each course (it is so listed on the web page at <http://www.cc.yosu.edu/ger/GERlist.html>) but this appears not to be General Education/University policy (presumably to save paper).

¹ This request for changed course description and Credit Hours is Currently Before the Graduate Curriculum Committee (Sept 17th, 2002)

Chemistry 5861: Polymer Science I - Polymer Chemistry Syllabus for Fall 2003

Professor: Dr. Allen D. Hunter (Room 5015, Ward Beecher Hall), 742-7176, adhunter@cc.yzu.edu

Textbook: "Polymer Chemistry" by Malcolm P. Stevens, 3rd Edition (2nd Edition OK).

Lecture: Monday, Wednesday, and Friday: 12:00 to 12:50, WB 2008.

Lab: Tuesday: 8:00 to 10:50, WB 6035.

Office Hours: Monday, Wednesday, and Friday 11:00 to 12:00 and Tuesday & Thursday 17:05 to 17:35 and 18:25 to 18:55, or by appointment (I'll be in my office, WB 501, or the Advanced Synthesis or X-Ray labs). If you find me in a meeting, please interrupt! These Friday lectures are contingent on the Oral Communication and Writing Intensive components being approved.

Intensive Components: This course is designed to help meet your upper level requirements for both an Oral Communication Intensive and a Writing Intensive component of the General Education Model (<http://www.cc.yzu.edu/ger/>). As such, both oral communication and writing assignments are fully integrated into the course to develop your writing and oral communication skill in a fashion appropriate to a professional Chemist (or someone in an allied discipline). As such, you will each carry out 5 projects (some individually and some as teams) that will require you to prepare a written report and give a PowerPoint presentation followed by a question period for the class. The class as a "team of the whole" will also prepare a more extensive report describing the results of their lab work in the format of a full paper in the American Chemical Society Journal "Macromolecules" and do a joint PowerPoint presentation on its results. The final exam will be an open book take home exam in which the student will write short 3 page miniature essays on 3 questions chosen out of 5.

Web Page: <http://www.as.yzu.edu/~adhunter/Teaching/Chem5861/index.html>

Course Description: *5861 *Polymer Science I: Polymer Chemistry and Plastics*. Theoretical and practical aspects of the preparation, characterization, structure-property relationships, morphology, and uses of both the major commercial and newer polymers. Three hours lecture and three hours laboratory. This course is designated as both oral communication intensive and writing intensive. Prereq. or Concurrent: CHEM 3720 and CHEM 3739 or 3737 or consent of the department chair. 4 s.h.

Lecture(s)	Chapter(s)	Title
1 - 5	1	Introduction to Chemistry 5861 and Basic Principles of Polymer Chemistry
6 - 112	2	Molecular Weight and Polymer Solutions
13 - 19	3	Chemical Structures and Polymer Morphology
20 - 25	4	Chemical Structure and Polymer Properties
26 - 35	5	Polymer Characterization
36 - 45	6 - 17	Individual Polymers and Special Topics

* This schedule is tentative and the order and relative weighting of topics may be revised as the class progresses.

GRADING SYSTEM	TOTAL POINTS
Project Report I (25 points for Written and 25 for Oral presentation)	50
Project Report II (25 points for Written and 25 for Oral presentation)	50
Project Report III (25 points for Written and 25 for Oral presentation)	50
Project Report IV (25 points for Written and 25 for Oral presentation)	50
Project Report V (25 points for Written and 25 for Oral presentation)	50
Lab Report (50 for Lab Technique and Effort, 50 for Written, and 50 for Oral presentation)	150
Take Home (Essay Type) Final Exam	100
Total (250 points for Written, 150 points for Oral, 50 Points for Lab Technique & Effort), A 90 - 100%, B 78 - 89%, C 65 - 77%, D 50 - 64%, F Below 50%	500

Reports: To train you to make effective oral and written reports in a style appropriate for a professional chemist, in the first few weeks you will be given training in how to design and execute a professional oral and written report using Microsoft PowerPoint and Word, respectively. The content and topics for these reports will be announced as the class progresses from current topical areas of polymer chemistry and the expected format of the final lab paper can be found at: <http://www.as.ysu.edu/~adhunter/Teaching/Chem5861/Chem5861.MacromoleculesPaperFormat.doc>.

Exam: The final exam is comprehensive and will be open book and take home. You will have to answer 3 out of 5 questions posed on the exam and answer each with a concise essay including diagrams as appropriate.

Lab: The lab is integral to the course and will follow the collaborative discovery research model.

Attendance: Lecture attendance is mandatory and students are responsible for all information, material, and announcements made in class. Typically, the oral reports will be presented on Mondays except for the final oral lab report which will be presented in the final lab class on Tuesday.

Assigned Problems: I will assign problems from the text and on handouts regularly. These will not be graded but are very important since these are the questions on which most of the exams will be based!

Academic Honesty: In accordance with university policy and professional standards, the highest levels of academic integrity are expected in this lecture and lab. The code of student conduct will be strictly enforced. Academic dishonesty will result in reductions in grades and/or expulsion from this class and/or the university.

Chemistry 5861L, Polymer Chemistry I Laboratory, Fall 2002

Laboratory Research Project, Structure Property Relationship Study

Outline of Research Project Concept: This research project is designed as a rigorous polymer research project, but is at a scale appropriate for our course. It will be carried out on a group basis. Thus, the group will decide on the target polymer system, how the research problem will be addressed, and the roles of each of the project participants. Each of you are seniors or graduate students and will in a very short time be working in higher level academic research labs, in industry, or in other professional settings. This project concept was chosen to help you build your individual research skills and rounded expertise in polymer science and to build your team work and project presentation skills while allowing each student to emphasize their own areas of interest.

Project Topic: The overall project must be a structure-property relationship study focusing on one class of structurally related polymer. Various routes to the “parent” polymer of this series should be employed and one of these methods should be used to prepare a series of different derivatives of this parent polymer in which one structural characteristic is systematically varied. The complete range of polymer characterization tools available at YSU (and perhaps at neighboring institutions and at participating/collaborating companies) should be employed.

Project Definition:^{1,2} Using this assignment document as a starting point, the group should meet to design the overall project scope and goals and their individual roles, determine what literature review needs to be done and carry it out, design the specific experimental procedures, determine what materials need to be ordered or obtained within YSU, determine all safety issues in advance and obtain the requisite training, MSDS sheets, etc.,

Project Reporting:³ As with any professional project, each stage along the way as well as the final project materials needs to be fully documented. Keep minutes of each of your team meetings to document all main decisions made and the major points of controversy and the basis on which they were decided. Further, keep detailed records of all materials that had to be ordered or obtained within YSU (for a final project budget and the supplies and materials report), all raw data collected (whether in your lab books or spectra, etc.), all contacts with non-YSU collaborators (if any), copies of all references used, etc. This will not only facilitate your writing of the final project report but is also good professional practice.

The Interim Project Materials: At the end of each week, the team will meet to discuss that week’s progress and define the next weeks goals and activities. On the first day of each week, the project team will meet to present a short progress report to the Chemistry 5861 Polymer Science Director (Hunter) that will include what was accomplished the previous week, the goals and activities planned for the coming week, and to discuss opportunities and challenges. This weekly oral report should include a 5-15 minute “chalk talk” and draft copies of the interim project documents. At least 3 drafts of the final project report should be handed in to the instructor in the 9th, 11th, and 13th weeks and a report outline is required by the 7th week.

The Final Project Materials: The final project materials will have several components. One will be a paper written in the format of *Macromolecules* as described in the separate handout. The group will also present a 45 minute PowerPoint report summarizing their results. Both of these will be emailed to adhunter@cc.ysu.edu. All materials prepared must be handed in well labeled sample vials and all raw characterization data needs to be included in the package that is handed in.

The State of the Laboratory: While this research project is in progress and especially when you are done, ensure the laboratory and instrumentation spaces are in immaculate condition!

¹ With careful project design and careful choice of the literature assignments, there can be a high degree of synergy between the Literature Projects and the Laboratory Project - keep this in mind as you design each of these Chemistry 5861 components.

² If an appropriate research topic is chosen, it might eventually lead to a publication after several classes work and/or a formal student project....

³ As the project progresses, keep a record of specific changes in this project description that you would recommend for future years as an annotated copy of this printed document.