

Course Proposals for Chemistry Program Revisions

LSC Use Only No:	LSC Action-Date:	UWUCC USE Only No.	UWUCC Action-Date:
		Senate Action Date:	App 4/29/03
		02-60h	

App 3/25/03

Curriculum Proposal Cover Sheet - University-Wide Undergraduate Curriculum Committee

Contact Person: Anne Kondo	Email Address: akondo@iup.edu
Proposing Department/Unit: Chemistry	Phone: 7-4595

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

<b>1. Course Proposals (check all that apply)</b> <input type="checkbox"/> New Course <input type="checkbox"/> Course Prefix Change <input type="checkbox"/> Course Deletion <input checked="" type="checkbox"/> Course Revision <input checked="" type="checkbox"/> Course Number and/or Title Change <input checked="" type="checkbox"/> Catalog Description Change	
CHEM 301 – Chemistry Seminar	CHEM 301 – Introduction to Chemical Research
<u>Current</u> Course prefix, number and full title	<u>Proposed</u> course prefix, number and full title, if changing
<b>2. Additional Course Designations: check if appropriate</b> <input type="checkbox"/> This course is also proposed as a Liberal Studies Course. <input type="checkbox"/> Other: (e.g., Women's Studies, Pan-African) <input type="checkbox"/> This course is also proposed as an Honors College Course.	
<b>3. Program Proposals</b> <input type="checkbox"/> New Degree Program <input type="checkbox"/> Program Title Change <input type="checkbox"/> Other <input type="checkbox"/> New Minor Program <input type="checkbox"/> New Track <input type="checkbox"/> Catalog Description Change <input type="checkbox"/> Program Revision	
<u>Current</u> program name	<u>Proposed</u> program name, if changing
<b>4. Approvals</b>	
Dept Curriculum Committee Chair	Ruhl F. See      2/3/03
Department Chair	Bruce Chapman Ramsey      2/5/03
Coll. Curriculum Committee Chair	[Signature]      2/10/03
College Dean	John D. Zed      2/11/03
Director of Liberal Studies *	
Director of Honors College *	
Provost *	
Additional signatures as appropriate: (include title)	
UWUCC Co-Chairs	Gail S. Sedquist      3/25/03

\* where applicable

FEB 11 2003

## Course Proposals for Chemistry Program Revisions

### Part II. 1. New Syllabus of Record

#### I. Catalog Description

Course Title: Introduction to Chemical Research

Prefix: CHEM

Number: 301

Hours: 1c-0l-1sh

Prerequisites: Open to junior or senior chemistry majors and to others by permission of the chairperson.

Description: A discussion of current technical literature and current research interests of faculty. Lectures by outside chemists and student presentations will also be included.

#### II. Course Objectives: Upon the successful completion of this course, the student will be able to:

- 1) understand and interpret formal scientific papers and scientific presentations
- 2) use common chemical databases to find chemical information based on subject and compound searches
- 3) develop a research proposal on an appropriate topic
- 4) present a formal research proposal, in three traditional formats: orally; as a written report; and as a scientific poster
- 5) understand and discuss the American Chemical Society (ACS) Chemist's Code of Conduct and the ACS Ethical Guidelines to Publication of Chemical Research

#### III. Course Outline (each item is one hour)

- 1) Introduction to Chemical Literature (Chemical Abstract Services and other sources of chemical information; peer-reviewed articles vs. news articles; systematic analysis of technical articles)
- 2) Searching Chemical Databases by Subject or Author; Class Discussion of Journal Reading # 1
- 3) Searching Chemical Databases by Molecular Name or Formula; Searching for Polymers
- 4) Discussion of Journal Reading # 2
- 5) Refining Database Search Techniques to Minimize Time/Cost.
- 6) Writing Research Proposals; Discussion of Journal Reading # 3
- 7) Discussion of the American Chemical Society (ACS) Chemist's Code of Conduct and the ACS Ethical Guideline to Publication of Chemical Research
- 8) Discussion of Journal Reading # 4
- 9) Discussion of Case Studies from The Ethical Chemist: Case Studies in Scientific Ethics.
- 10) Discussion of Journal Reading # 5
- 11) Effective Oral and Poster Scientific Presentations
- 12) Discussion of Journal Reading # 6
- 13) Searching Chemical Databases by Molecular Structure
- 14) Student Oral Presentations of Research Proposals (also in finals week)

#### IV. Evaluation Methods

- 1) The final grade will be determined as follows:
- 2) 20 %: Assignments. Over the course of the semester, there will be four assignments involving information retrieval and analysis from chemical databases, and two

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assignments on ethics in chemical research. Assignments on searching the chemical literature will help students develop their research proposal.

- 3) 20 %: Journal Readings and Reports. Students will read six assigned journal articles (recent articles from peer-reviewed chemical journals), write reports analyzing the articles, and participate in class discussions about the articles.
- 4) 10 %: Seminar Attendance. Students are expected to attend weekly Chemistry Department seminars, which are given by external or IUP faculty or IUP graduate students. One seminar may be missed without penalty. (If the Chemistry department's regular seminar time is in conflict with another course, please see the instructor for alternative arrangements.)
- 5) 30 %: Written Research proposal. Students will write formal research proposals for original research projects in chemistry or chemical education, subject to instructor's approval of the topic. Students are expected to complete a search of the Chemical Literature to write the background section of the research proposal.
- 6) 20 %: Proposal Presentation. Students will give 10 –15 minute professional quality oral presentations of their research proposals. Presentations will occur during the last class period, and during the time scheduled for the Final Exam.

### V. Grading Scale:

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

### VI. Attendance Policy:

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

### VII. Required textbooks, supplemental books and readings

- 1) *The ACS Style Guide: A Manual for Authors and Editors, Second Edition*, Dodd, J.S., Ed.; American Chemical Society: Washington, DC, 1997
- 2) *The Chemist's Code of Conduct*, American Chemical Society: Washington, DC, 1994.
- 3) Articles selected from the following:
  - a) Kovac, J. *The Ethical Chemist: Case Studies in Scientific Ethics*, University of Tennessee: Knoxville, TN, 1995.
  - b) Bebeau, M.J.; Pimple, K.D. *Moral Reasoning in Scientific Research: Case Studies for Teaching and Assessment*, Poynter Center for the Study of Ethics and American Institutions, Indiana University, Bloomington, 1995.

### VIII. Special resource requirements

None.

### IX. Bibliography

- 1) Bebeau, M.J.; Pimple, K.D. *Moral Reasoning in Scientific Research: Case Studies for Teaching and Assessment*, Poynter Center for the Study of Ethics and American Institutions, Indiana University, Bloomington, 1995.

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- 2) Drake, B. D.; Acosta, G. M.; Smith Jr., R. L. *An Effective Technique for Reading Research Articles - The Japanese KENSHU Method*, J. Chem. Educ. **1997**, *74*, 186.
- 3) Kandel, M. *Presenting Scientific Ethics to Undergraduates*, J. Chem. Educ. **1994**, *71*, 405.
- 4) Kovac, J. *The Ethical Chemist: Case Studies in Scientific Ethics*, University of Tennessee: Knoxville, TN, 1995.
- 5) Mabrouk, P.A. *Research Skills and Ethics – A Graduate Course Empowering Graduate Students for Productive Research Careers in Graduate School and Beyond*, J. Chem. Educ. **2001**, *78*, 1628.,
- 6) Matthews, F. J. *Chemical Literature: A Course Composed of Traditional and Online Searching Techniques*, J. Chem. Educ. **1997**, *74*, 1011.
- 7) Moody, A.E.; Freeman, R.G. *Chemical Safety and Scientific Ethics in a Sophomore Chemistry Seminar*, J. Chem. Educ. **1999**, *76*, 1224.
- 8) Ordman, A. B. *Scientific Literature and Literacy: A Course of Practical Skills for Undergraduate Science Majors*, J. Chem. Educ. **1996**, *73*, 753.
- 9) Sweeting, L.M. *Ethics in Science for Undergraduate Students*, J. Chem. Ed., **1999**, *76*, 369.
- 10) *Introduction to Online Searching for Chemistry*, American Chemical Society: Washington, DC, 1999.
- 11) *Structure Searching with STN Express*, American Chemical Society: Washington, DC, 1997.
- 12) *The ACS Style Guide: A Manual for Authors and Editors, Second Edition*, Dodd, J.S., Ed.; American Chemical Society: Washington, DC, 1997.

## Course Proposals for Chemistry Program Revisions

### **Part II. 2. Summary of the proposed revisions.**

Old Catalog Description: CHEM 301 Chemistry Seminar (1c-0l-1sh)

A discussion of current technical literature and current research problems of staff. Lectures by outside chemists and student presentations. Open to junior or senior chemistry majors and to others by permission of the chairperson.

New Catalog Description: CHEM 301 Introduction to Chemical Research (1c-0l-1sh)

A discussion of current technical literature and current research interests of faculty. Lectures by outside chemists and student presentations will also be included. Open to junior or senior chemistry majors and to others by permission of the chairperson.

As proposed, the topics covered in CHEM 301 have been revised to better reflect current disciplinary trends and requirements for tomorrow's chemists, including a component on the ethics of scientific research.

### **Part II. 3. Justification/rationale for the revision.**

There is currently no syllabus of record for this course. The new title reflects the current emphasis of the course. Undergraduate research will better prepare our students as chemists. The suggested start in the junior year will make them also more competitive for summer research fellowships at national laboratories, research-intensive universities and in industry. It is also appropriate for students to consider ethics as they begin their undergraduate research experience. An ethics component to the certified degree in chemistry is strongly encouraged by the ACS.

### **Part II. 4. Old syllabus of record.**

There is no syllabus of record for CHEM 301 on file in the Chemistry Department. This new syllabus of record was written by the professor (Dr. A. Kondo) who has taught the existing course over the past two years, and reflects the current composition of her course.