### I. General Education Review – Upper-division Writing Requirement

<table>
<thead>
<tr>
<th>Dept/Program Subject</th>
<th>Chemistry and Biochemistry</th>
<th>Course # (i.e. ANTY 455) or sequence</th>
<th>CHMY 302E</th>
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<tbody>
<tr>
<td>Course(s) Title</td>
<td>Chemical Literature and Scientific Writing</td>
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<td>Description of the requirement if it is not a single course.</td>
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### II. Endorsement/Approvals

Complete the form and obtain signatures before submitting to Faculty Senate Office.

<table>
<thead>
<tr>
<th>Instructor</th>
<th>Signature</th>
<th>Date</th>
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<tbody>
<tr>
<td>Bill Laws</td>
<td>[Signature]</td>
<td>9/26/14</td>
</tr>
<tr>
<td>Phone / Email</td>
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<tr>
<td>243-4107</td>
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<tr>
<td><a href="mailto:bill.laws@umontana.edu">bill.laws@umontana.edu</a></td>
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<tr>
<td>Program Chair</td>
<td>Chris Palmer</td>
<td>9/26/14</td>
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<tr>
<td>Dean</td>
<td>Jenny McNulty</td>
<td>9/30/14</td>
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### III. Type of request

<table>
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<tr>
<th>New</th>
<th>Renew</th>
<th>One-time Only</th>
<th>Change</th>
<th>Remove</th>
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Reason for new course, change or deletion

### IV Overview of the Course Purpose/ Description

CHMY 302E is a writing and ethics course taught by faculty in the Department of Chemistry and Biochemistry. Students in the course learn to evaluate standard western traditions in ethics and their applications in science, read and assess different types of chemistry articles, obtain scientific data using library and on-line resources, and develop skills in writing scientific information in different formats for different audiences. The course includes five major writing assignments and two in-class writing assignments. Each major assignment undergoes peer review, instructor review, and additional drafts. Class time is spent on performing tasks including: (1) composition and word-use exercises; (2) lectures and discussions on writing scientific information; (3) ethics traditions, how to evaluate ethics with respect to science, and case studies of science ethics; (4) peer reviews of the five major writing assignments; and (5) library orientation and research. The course satisfies the Ethics and Human Values (Group VIII) General Education Requirement as well as the Upper Division Writing Requirement for Chemistry majors.

### V Learning Outcomes: Provide examples of how the course will support students in achieving each learning outcome.

| Identify and pursue sophisticated questions for | Yes |
| If yes, how will student learning be supported? | |
Two of the assignments (A4 and A5) have students using library and internet resources. For A4, they research a well-known case of ethics in science, and then write a paper for a general science audience consisting of (a) an impartial summary of the incident and the issues raised and (b) a personal evaluation of the ethics. For A5, they research a current public issue involving chemistry. Two articles are required. First, applying ethics to their arguments, they write a detailed persuasion article for their peers. Second, they rewrite this for the general public.

<table>
<thead>
<tr>
<th>Find, evaluate, analyze, and synthesize information effectively and ethically from diverse sources (see: <a href="http://www.lib.umont.edu/library-information-literacy-tables#Table2">http://www.lib.umont.edu/library-information-literacy-tables#Table2</a>) Subject liaison librarians are available to assist you embed information literacy into your course: <a href="http://www.lib.umont.edu/node/115#instructors">http://www.lib.umont.edu/node/115#instructors</a></th>
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<tr>
<td>Yes</td>
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<td>If yes, how will student learning be supported? Students learn how to use library and internet resources and then assemble the information in a variety of professional formats, while giving appropriate credit to original sources. The course includes visiting lectures by Dr. Barry N. Brown of the Mansfield Library regarding the use of chemistry-specific information databases, reference management, citation indexes, and comprehensive science literature searches and by Dr. Nadia White, School of Journalism, concerning presentation of scientific ideas, accomplishments, and goals to the public reader, and ethical practice in scientific journalism. Students are expected to apply this knowledge in two major research writing assignments (A4 and A5).</td>
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<th>Manage multiple perspectives as appropriate</th>
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<td>Yes</td>
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<td>If yes, how will student learning be supported? The fourth writing assignment has the students research a well-known case of ethics in science. They are to research this case and obtain multiple perspectives on the issues. The students write an 8-10 page article that contains an impartial summary followed by their views based on at least one of the three standard western ethics traditions that have been studied. The fifth writing assignment requires two persuasion articles. Each student finds and researches a current public issue involving chemistry. For their chemistry peers, they write a 10-15 page article that details the issue, gives existing ethics perspectives, and emphasizes their views, which must either extend a current viewpoint or introduce a new perspective on how to address the situation. Second, the students rewrite the first article, generating a 4-5 page article for the general public.</td>
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<tr>
<td>Requirement</td>
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<td>Recognize the purposes and needs of discipline-specific audiences and adopt the academic voice necessary for the chosen discipline</td>
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<td>Use multiple drafts, revision, and editing in conducting inquiry and preparing written work</td>
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<tr>
<td>Follow the conventions of citation, documentation, and formal presentation appropriate to that discipline</td>
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VI. Writing Course Requirements

Enrollment is capped at 25 students. If not, list maximum course enrollment. Explain how outcomes will be adequately met for this number of students. Justify the request for variance.

| CHMY 302E enrollment is capped at 20. It is taught both fall and spring semesters. |

Briefly explain how students are provided with tools and strategies for effective writing and editing in the major.

Students read and study the ACS Guide (see above), which describes the commonly accepted writing and citation styles and formats in the field of chemistry. Lectures, some given by visiting experts, provide content and discussion on appropriate styles for published manuscripts, research papers, research grants, patents, and resumes and cover letters. Students gain practice in writing and editing through in-class and out-of-class assignments.

Which written assignment(s) includes revision in response to instructor’s feedback?

All five of the out-of-class assignments and both in-class assignments are reviewed by the instructor. The students are expected to show improvements in their writing skills in the subsequent assignments. For the two major assignments (A4 and A5), the students are required to write a third draft based on instructor feedback.

VII. Writing Assignments: Please describe course assignments. Students should be required to individually compose at least 20 pages of writing for assessment. At least 50% of the course grade should be based on students’ performance on writing assignments. Quality of content and writing are integral parts of the grade on any writing assignment.

| Formal Graded Assignments | Five formal out-of-class writing assignments totaling >20 pages of writing. Each is edited, revised, graded and included in the portfolio. The writing portfolio represents 50% of the grade in the course. |
| Informal Ungraded Assignments | Two in-class writing assignments. These assignments are less formal, but are graded. |

Paste or attach a sample writing assignment, including instructions for students.

Two assignments, A4 and A5, which are emphasized in the text above, are included here.

A4 instructions

Proper ethical conduct in science is essential. Unfortunately, a few people in science do perform unethical acts; the rest of the scientific world must accept the negative consequences. This assignment introduces you to ethical issues that have occurred in the scientific community.
An article for each of three well-documented cases in science ethics is provided. Read these articles and select one case to work on.

There are three important goals with A4.

1. Learn how to research for more information.
2. Learn how to write an impartial summary.
3. Learn how to evaluate and comment on ethics principles.

With respect to the three goals:

1. Research the case you chose in more detail; that is, find numerous articles where authors discuss ethics about the incident. Realize that one author may not include all facts concerning the case when expressing their opinions. Examination of the information obtained from all your references could still leave some points unclear. Consequently, you may want to find additional information about the incident, the people involved, similar ethics cases, and other issues that could be pertinent to the case from sources that do not discuss the ethics issues.

2. Provide the reader with an overview of the case in regards to both the actual events and the concerns raised by others about the ethics of the people and institutions involved. Being impartial means your efforts to help the reader understand all aspects of the case cannot express your personal views. Accomplishing this goal requires an objective selection and presentation of the necessary details. Realize that impartial does not mean you cannot use a few negative or positive words and phrases, or perhaps even questions, to spur the reader to think about an issue. You can also present the material in a particular sequence to guide the reader through all the details. However, any emphasis given to one side of an issue must be properly countered.

3. Finish the article with your evaluation of the ethics in the case based on at least one of the three standard western ethics traditions that we have studied. Commenting on points raised or omitted in the cited sources about the actions taken by people and institutions is reasonable. You might even see a new way to consider ethics in regards to the case. Importantly, remember to use at least one of the three standard western traditions in ethics in your discussion.

Write an 8-10 page article for third-year undergraduate science majors; your evaluation of the ethics must be at least two pages. With this multi-disciplined audience, present essential scientific details at a level for all to understand. Be sure to appropriately cite information obtained from different sources and correctly give those references using ACS guidelines.

A suggested approach to writing this article, especially the summary, is:

- Research the case.
- Compile all the information that you think is necessary.
- Outline how to present this information in a logical, understandable way.
- Write a preliminary draft.
- Edit this draft; besides punctuation, sentence structure, etc., look for lack of, inconsistencies in, and poor organization of the information.
Remember, you will write a third draft (A4.d3) to be included in the portfolio.

**A5 instructions**

Persuading others to your point of view in any public concern can be important. It can be particularly difficult with respect to a scientific issue because this involves presenting the concerns and the science at the appropriate level for the intended audience.

The purpose of A5 has three parts:
1. Find and research a current public issue involving chemistry
2. Develop a personal view on the issue
3. Write persuasion articles for two different audiences

A persuasion article attempts to influence people's beliefs, attitudes, and intentions toward some event, idea, object, or other person(s). Science uses systematic persuasion through logic and reason.

These details define this assignment.
1. Find a current public concern involving chemistry or biochemistry where different ethical viewpoints have emerged (try C&E News or other similar news sources).
2. Research this issue in detail:
   a. With respect to the chemistry (e.g., reactions, purifications, side reactions, contamination problems, detection instrumentation, safety issues, the environment, etc.).
   b. With respect to the published viewpoints (as done in A4).
3. Write two persuasion articles on this issue.
   a. First, write a 10-15 page article for your chemistry peers that:
      i. Presents the details and existing viewpoints.
      ii. Explains in detail the chemistry involved with the problem - be a teacher.
      iii. States your views that either extend a current viewpoint or introduce a new perspective on how to address the situation. Your arguments must use at least one of the three standard western ethics traditions that we have studied.
   b. Second, rewrite the first article for the general public. This 4-5 page article must be a simpler presentation of the situation, existing viewpoints, and your ideas and emphasis. Unless already common terminology, or easily defined and explained concepts, do not include technical details (wording, theory, etc.) for the chemistry or the ethics.

A third draft (A5.d3) of both articles is to be included in your portfolio.

Here are some thoughts on writing a persuasion article.
To succeed in promoting your ideas, you need to attract readers. First, the title of the article must catch the eye of the reader. A brief, concise introduction is the next challenge; typically, a reader will quickly lose interest looking at a long, elaborate introduction. A short (one paragraph?) introduction consisting of a few precise sentences helps entice the reader to
continue. Important points that could be mentioned include what the problem is, why it is important, and who is involved. Finish the introduction with how you will use this article to address the situation.

You must now keep a reader interested through the rest of the article. Present details, challenge other views, and promote your ideas in a format you judge appropriate. Do you want to present the incident, then the views of others, and finish with your ideas? Or do you want to mix these points in some way? You may disagree with some evaluations of the situation; however, your criticisms should be done in a scholarly manner. Be sure to be persuasive by emphasizing your thoughts.

**VIII. Syllabus:** Paste syllabus below or attach and send digital copy with form. The syllabus **must** include the list of Writing Course learning outcomes above.

Syllabus attached.
CHMY302E: Ethics, Science Writing, and Chemistry Literature

Fall, 2014

Instructor
William R. Laws, Chem304, 243-4107, bill.laws@umontana.edu

Office Hours
Open door MWF or schedule a specific time

Course Goals
This course provides instruction and experience in effective communication and ethical practice in science. Topics to be covered include:
- the three main western ethics theories
- the role of ethics in science
- the presentation of scientific information in different formats to different audiences
- the effective use of library and internet databases

Course Textbooks

Course Materials
1. Assignment details and in-class materials will be handed out in class and posted on Moodle.
2. Online lectures at www.justiceharvard.org by Michael J. Sandel, Dept. of Government, Harvard University, viewed out of class may help you participate in the discussions on ethics.

Course Content
A. Reading: You will be expected to read assigned portions of the two textbooks and other material before the class. This information will complement the lecture topics, discussions, and writing assignments.

B. In class: Class time will be split into three basic categories:
1. The three standard western traditions in ethics will be presented, discussed, and compared. The insights gained will be applied to the role of ethics in science.
2. To help with the out-of-class assignments (see below), time will be spent on:
   a. composition, word use, formatting, etc.
   b. peer reviews of the out-of-class writing assignments
   c. library and database use
   d. two writing assignments: one on ethics and another on chemistry; topics to be announced in class
3. Invited experts will provide:
   a. information, ideas, and guidelines for two writing assignments
   b. overviews of writing research grants and publishing scientific articles