I. ASCRC General Education Form (revised 2/8/13)

Use to propose new general education courses (except writing courses), to change or renew existing gen ed courses and to remove designations for existing gen ed courses.

Note: One-time-only general education designation may be requested for experimental courses (X91-formerly X95), granted only for the semester taught. A NEW request must be submitted for the course to receive subsequent general education status.

Group (submit separate forms if requesting more than one general education group designation)

<table>
<thead>
<tr>
<th>Group</th>
<th>II. Mathematics</th>
<th>VII: Social Sciences</th>
</tr>
</thead>
<tbody>
<tr>
<td>III. Language</td>
<td>VIII: Ethics &amp; Human Values</td>
<td>X</td>
</tr>
<tr>
<td>III Exception: Symbolic Systems</td>
<td>IX: American &amp; European</td>
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<tr>
<td>IV: Expressive Arts</td>
<td>X: Indigenous &amp; Global</td>
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<tr>
<td>V: Literary &amp; Artistic Studies</td>
<td>XI: Natural Sciences</td>
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<tr>
<td>VI: Historical &amp; Cultural Studies</td>
<td>w/ lab ☐ w/out lab ☐</td>
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</table>

*Courses proposed for this designation must be standing requirements of majors that qualify for exceptions to the modern and classical language requirement

Dept/Program: Chemistry and Biochemistry

Course # CHMY302E

Course Title: Chemistry Literature & Scientific Writing

Prerequisite: CHMY 223 and chemistry or biochemistry majors

Credits: 3

II. Endorsement/Approvals

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

Please type / print name

Signature

Date

Instructor: Dr. William R. Laws

Phone / Email: 243-4107 bill.laws@umontana.edu

Program Chair: Dr. Chris Palmer

Dean: Dr. Chris Comer/Dr. Jenny McNulty

III. Type of request

New X One-time Only Renew Change Remove

Reason for Gen Ed inclusion, change or deletion: Periodic review.

Description of change: Ethics content has been enhanced and updated.

IV. Description and purpose of the general education course: General Education courses must be introductory and foundational within the offering department or within the General Education Group. They must emphasize breadth, context, and connectedness; and relate course content to students’ future lives: See Preamble:

http://umont.edu/facultysenate/archives/minutes/gened/GE_preamble.aspx
**Purpose**

CHMY302E has many learning goals. These include learning how to:

- read and assess different types of chemistry articles
- obtain scientific data using library and on-line resources
- develop skills in writing scientific information in different formats to different audiences
- evaluate three standard western traditions in ethics and their applications in science

**Description**

**Course Content**

- The students learn how to evaluate the organization and mechanics of scientific writing.
- The students work together to develop skills of organization, language use, and style required for high-quality scientific writing.
- The students learn to use library and Internet resources and then assemble the information in a variety of professional formats.
- The students learn about the main ethics theories from guest lectures, internet resources, and textbook reading assignments.
- Guest lecturers discuss how the ethics traditions relate to science and scientific writing. The students will also examine several specific case studies involving ethics in science.
- Guest lecturers cover aspects in science that require different writing skills.

**Writing assignments**

Students submit six major writing assignments:

1. Edit a text; justify the editing.
2. Read a chemistry research paper, and then write a summary and a new abstract.
3. Read several types of technical descriptions of laboratory procedures, and then write a how-to manual for a laboratory procedure.
4. Research a well-known example of ethics in science, and then write an evaluation.
5. Use library and Internet resources to research a current issue in chemistry, first write a scientific persuasion article for their peers and then write one for the general public.
6. Write a resume and cover letter for an academic and an industrial job description.

Each assignment undergoes peer review, instructor review, and additional drafts. Students use a meta-linguistic rubric to evaluate each others’ and their own work.

**Reading assignments**

Students read assigned portions of textbooks, peer-reviewed scientific papers, how-to-manuals, and material on the Internet. These readings complement the lecture topics, discussions, and writing assignments.

**In-class work**

To help students work on the various aspects of scientific writing, class time is spent on performing different tasks. These include:

- peer reviews of the six writing assignments
- composition and word-use exercises
- discussions on 1) writing scientific information, 2) the main ethics traditions, 3) how to evaluate ethics with respect to science, and 4) case studies of science ethics
- library orientation and research
- two “time restricted” writing assignments

**Final**

The final is a technical portfolio that gives students the opportunity to evaluate the improvements in their writing skills and allows them to demonstrate scientific writing abilities to prospective employers.
<table>
<thead>
<tr>
<th>V. Criteria: Briefly explain how this course meets the criteria for the group. See: <a href="http://umt.edu/facultysenate/documents/forms/GE_Criteria5-1-08.aspx">http://umt.edu/facultysenate/documents/forms/GE_Criteria5-1-08.aspx</a></th>
</tr>
</thead>
<tbody>
<tr>
<td>Courses focus on one or more of the specific traditions of ethical thought (either Western or non-Western), on basic ethical topics such as justice or the good life as seen through the lens of one or more traditions of ethical thought, or on a professional practice within a particular tradition of ethical thought.</td>
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<tr>
<td>The three standard traditions of ethical thought - utilitarianism, deontology and virtue ethics - are presented using the on-line lectures of Michael Sandel (Harvard University) and in selected readings from textbooks and the internet. Four of the Sandel lectures are viewed (55 min) and discussed (25 min) in detail during class time; other Sandel lectures are assigned for viewing at home to enhance the discussions. The students complete reading assignments, attend lectures, participate in discussions and complete writing assignments concerning the influence and application of these traditions of ethical thought in the professional practice of science. Students learn about the application of ethics in publishing and peer review, grant writing and review, and in communication of scientific ideas and results to the general public and public policy makers.</td>
</tr>
<tr>
<td>Courses provide a rigorous analysis of the basic concepts and forms of reasoning which define the traditions, the ethical topics, or the professional practices that are being studied.</td>
</tr>
<tr>
<td>A rigorous analysis of the basic concepts and forms of reasoning that define the traditions of ethics is accomplished through 1) the four lectures and discussions mentioned above, 2) two subsequent lectures and discussions by experts to show the application of ethics to science, 3) in-class discussions of well-studied cases dealing with ethics in science, and 4) two writing assignments. As a result, the basic concepts and traditions of ethics are covered in the context of professional practices in science.</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>VI. Student Learning Goals: Briefly explain how this course will meet the applicable learning goals. See: <a href="http://umt.edu/facultysenate/documents/forms/GE_Criteria5-1-08.aspx">http://umt.edu/facultysenate/documents/forms/GE_Criteria5-1-08.aspx</a></th>
</tr>
</thead>
<tbody>
<tr>
<td>Correctly apply the basic concepts and forms of reasoning from the tradition or professional practice they studied to ethical issues that arise within those traditions or practices;</td>
</tr>
<tr>
<td>Students learn to correctly apply the basic ethics concepts and forms of reasoning in the context of professional practices in science throughout the course via topical lectures, analysis of case studies discussed in class, and selected reading. Achievement of this learning goal is evaluated by their participation in the in-class discussions and application of ethics concepts in two writing assignments (assignment details attached).</td>
</tr>
<tr>
<td>Analyze and critically evaluate the basic concepts and forms of reasoning from the tradition or professional practice they studied.</td>
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<tr>
<td><strong>VII. Justification:</strong> Normally, general education courses will not carry pre-requisites, will carry at least 3 credits, and will be numbered at the 100-200 level. If the course has more than one pre-requisite, carries fewer than three credits, or is upper division (numbered above the 200 level), provide rationale for exception(s).</td>
</tr>
<tr>
<td><strong>VIII. Syllabus:</strong> Paste syllabus below or attach and send digital copy with form. The syllabus should clearly describe how the above criteria are satisfied. For assistance on syllabus preparation see: <a href="http://teaching.berkeley.edu/bgd/syllabus.html">http://teaching.berkeley.edu/bgd/syllabus.html</a></td>
</tr>
</tbody>
</table>
CHMY302E: Chemistry Literature & Scientific Writing  Autumn, 2013

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

Office hours
Mornings TR, or schedule a specific time

Student Conference
Each student will meet with Dr. Laws to discuss the fourth writing assignment as well as their progress in the course. The meeting will be during office hours or by appointment during the week of Nov. 5.

Textbooks

The textbooks will be referenced as ACS, DS, and J.

Video Lectures
Online video lectures by Michael J. Sandel, Dept. of Government, Harvard University, on the main ethics theories will be used. We will refer to these lectures, denoted as episodes on the web site, as E1, E2, etc. Some episodes will be viewed and discussed in class. Other episodes will be recommended to be viewed out of class to help you evaluate the main ethics theories and participate in the discussions. The web site for these videos is www.justiceharvard.org.

Internet Readings
Two sites of the “Mansfield Ethics and Public Affairs Program” (University of Montana) will be assigned for reading. The first will be used as an introduction to the ethics theories. The second will be used as an introduction to extending ethics theories to science.

Course Materials
Details for the assignments and other materials will be handed out in class and will also be available on ERes (password: CHMY302).

Course Goals
You will gain the ability to write various types of scientific ideas and concepts for different audiences. This will involve learning how to edit, use the library effectively, and assemble information into a concise report. In addition, you will learn the three main ethics theories along with their application to science. Writing assignments will require the use of ethics on topics in science and chemistry.

Course Content
You will read scientific writing and learn how to evaluate the organization and mechanics of scientific writing.

We will work together to practice the skills of organization, development, language use, and style required for high-quality scientific writing.

You will learn to edit, use library and internet resources with emphasis on those important to chemists and biochemists, and assemble information in a variety of professional formats.

Michael J. Sandel will present the main ethics theories.

Guest lecturers will then show how these ethics theories relate to science and scientific writing. We will also examine several specific cases involving ethics in science.

Other guest lecturers will cover aspects in science and chemistry that require different writing skills.

For your final, you will assemble a portfolio that: 1) shows the improvement in your scientific writing abilities; and 2) demonstrates these skills to prospective academic and commercial employers.

**Guest Lecturers**

- **Dr. Orion Berryman**, Dept. of Chemistry and Biochemistry, Univ. of Montana: introduction to the ACS database SciFinder
- **Dr. Albert Borgmann**, Dept. of Philosophy, Univ. of Montana: To live the good life, we need to follow ethical rules of conduct. It's just as important, however, to recognize and to take responsibility for the material context of life because it has powerful ethical inducements built into it.
- **Dr. Bruce E. Bowler**, Dept. of Chemistry and Biochemistry, Univ. of Montana: Grant writing: stylistic, substantive, and ethical issues in the preparation and evaluation of grant proposals.
- **Dr. Barry N. Brown**, Mansfield Library, Univ. of Montana: reference management, citation indexes, and comprehensive science literature searches
- **Dr. Joseph C. Fanguy**, Director of Technology Transfer, Univ. of Montana: topics relevant to the University’s role in commercializing technology, and stimulating economic development will be covered, including patents, licensing, and business incubation
- **Laurie L. Fisher**, Interim Director, Career Services, Univ. of Montana: workshop on resumes and cover letters
- **Jean Kyle**, Esq., School of Law, Univ. of Montana: review the rights conveyed by a patent, what can be patented, the criteria of patentability, and the process of obtaining a patent
- **Dr. Henriette B. Lowisch**, School of Journalism, Univ. of Montana: writing scientific ideas, accomplishments, and goals for the public reader
- **Dr. Christopher J. Preston**, Dept. of Philosophy, Univ. of Montana: how the three main theories of ethics can help in public policy issues related to science and emerging technology
- **Dr. J.B. Alexander (Sandy) Ross**, Dept. of Chemistry and Biochemistry, Univ. of Montana: scientific publishing: authors, journals, readership, submission, reviewers, editors, future of scientific journals, and ethics in publishing

**Course Assignments**
Reading: Reading good scientific writing is helpful in developing your professional writing skills. You will be expected to read assigned portions of the textbooks and other material before the class covering that material. These assigned readings will complement the lecture topics, discussions, and writing assignments.

In-class work: To help you work on the various aspects of scientific writing, some class time will be spent on you performing different tasks. These include:

- peer reviews of the six writing assignments
- composition and word-use exercises
- discussions on various topics
- library orientation and research
- two writing tasks (T1 and T2)

Writing: You will submit six writing assignments (A1, A2, etc). Good scientific writing requires editing a progressive series of drafts. Consequently, there are two parts to all six assignments. First, you are required to submit a peer review draft (A1.prd, etc.) and be a peer reviewer. Second, you are required to submit a revised draft for instructor review (A1.id, etc.); this draft will be returned to you (A1.idr, etc.). For A4 and A5, you are also required to write final drafts (A4.fd and A5.fd) using A4.idr and A5.idr. The course schedule gives the due dates for the different drafts. All drafts of all writing assignments will be part of your final portfolio.

The writing assignments are:

A1 Edit a text, justifying your editing.
A2 Read a scientific article, and write a summary and a new abstract.
A3 Read several technical descriptions of laboratory procedures, and write a “how-to” manual for a laboratory procedure of your choice.
A4 Read a well-studied case of an ethics violation in science, and write a summary that includes your thoughts with respect to ethics theories.
A5 This assignment has two parts. First, write a scientific persuasion article about a current issue in chemistry that a) uses library and internet resources to detail the chemistry, and b) applies ethical considerations of scientific practice to your arguments. Second, write this article for the general public.
A6 Write a resume and cover letter for two different job descriptions.

Final portfolio
You will assemble a technical portfolio consisting of your written work for the semester: initial, intermediate, and finals drafts, and peer and instructor feedback. A complete description of the portfolio specifications will be ready early in the semester.

Evaluation
Your grade will be based on your in-class work (40%) and final portfolio (60%).
in-class evaluation will be assessed by 1) your effort and ability as a peer reviewer, 2) your participation in workshops and discussions, and 3) your two in-class writing tasks. The final portfolio will be judged by 1) your ability to improve each draft of each assignment, 2) your improvement in all scientific writing skills over the entire semester, and 3) on the quality of the A4 and A5 final drafts.

Writing Requirements
Unless stated otherwise, submit all assignments printed double-spaced, one-sided with one inch margins in Times New Roman 12-point font or Arial 11-point font. Do not staple, punch binder holes, etc., the drafts for all assignments. Collation of the drafts into the final folder will be done in a folder provided by Dr. Laws. Other details such as the type of audience and minimum required length will be specified for each assignment.

Remember to keep the original, peer-reviewed draft, and instructor-reviewed draft for each assignment, and final draft for assignments 4 and 5. All drafts for all assignments will be required for your final portfolio. It is also advised to keep a complete electronic record of all drafts of each assignment.

Attendance
It is strongly urged that you make every effort to attend all classes. Most classes directly relate to the writing assignments. Loss of points towards your final grade will occur for failure to attend classes involving discussions, workshops, in-class writing assignments, and peer reviews. Points will also be lost for handing in assignments late. You should contact Prof. Laws in advance about the possibility of missing a class, or as soon as possible following an illness.

Disability
Any student with a disability that may hinder a full demonstration of their abilities in this course should contact Prof. Laws within the first week of classes to discuss accommodations necessary to ensure full participation and facilitate your educational opportunities. For more information, go to Disability Services for Students at http://www.umt.edu/disability.

Legal Notice
This syllabus is not a contract; it is a tentative outline of course policies, requirements, and schedules. Changes may be made during the semester at the discretion of Prof. Laws.

Academic Misconduct
All students must practice academic honesty. Academic misconduct is subject to an academic penalty by the course instructor and a disciplinary sanction by the University. All students must be familiar with the Student Conduct Code at http://life.umt.edu/vpsa/studentconduct.php.

Schedule
<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Topic</th>
<th>Preparation</th>
<th>Given</th>
<th>Due</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>T Aug. 27</td>
<td>intro to class, basics of editing</td>
<td>bring ACS</td>
<td></td>
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<tr>
<td></td>
<td>R Aug. 29</td>
<td>editing workshop</td>
<td>bring ACS; read ACS: vii-viii, pp. 27-58, 105-128, 135-162</td>
<td>A1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>T Sept. 3</td>
<td>peer review of A1, grammar and word usage</td>
<td>bring ACS</td>
<td>A1.prd</td>
<td></td>
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<tr>
<td></td>
<td>R Sept. 5</td>
<td>writing chemistry research papers</td>
<td>bring ACS; read ACS: pp. 3-26; 287-327</td>
<td>A2</td>
<td>A1.id</td>
</tr>
<tr>
<td>3</td>
<td>T Sept. 10</td>
<td>discuss a chemistry research paper</td>
<td>read example paper</td>
<td>A1.idr</td>
<td></td>
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<tr>
<td></td>
<td>R Sept. 12</td>
<td>S. Ross: publishing a chemistry research paper</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>R Sept. 19</td>
<td>J. Fanguy: technology transfer</td>
<td>see (1) below</td>
<td>A2.id</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>T Sept. 24</td>
<td>peer review of A3, intro to A4 &amp; A5, intro to ethics</td>
<td>bring ACS; see (II) below</td>
<td>A4, A5</td>
<td>A3.prd</td>
</tr>
<tr>
<td></td>
<td>R Sept. 26</td>
<td>M. Sandel: E2</td>
<td>read J: chaps. 1 and 2</td>
<td>A2.idr</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>T Oct. 1</td>
<td>M. Sandel: E3</td>
<td>read J: chap. 3</td>
<td>A3.id</td>
<td></td>
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<tr>
<td></td>
<td>R Oct. 3</td>
<td>M. Sandel: E6</td>
<td>read J: chap. 5</td>
<td></td>
<td>A3.id</td>
</tr>
<tr>
<td>7</td>
<td>T Oct. 8</td>
<td>M. Sandel: E10</td>
<td>read J: chap. 8</td>
<td>A3.idr</td>
<td></td>
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<tr>
<td></td>
<td>R Oct. 10</td>
<td>C. Preston: ethics in science</td>
<td>read DS: chap. 3</td>
<td></td>
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<tr>
<td>8</td>
<td>T Oct. 15</td>
<td>A. Borgmann: ethics and life</td>
<td>read DS: chap. 11; also, see (III) below</td>
<td>A4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>R Oct. 17</td>
<td>ethics in science</td>
<td>see (IV) below</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>T Oct. 22</td>
<td>peer review of A4, T1</td>
<td>bring: ACS and material for T1 topic</td>
<td>A4.prd</td>
<td></td>
</tr>
<tr>
<td></td>
<td>R Oct. 24</td>
<td>B. Brown: MLSLC</td>
<td></td>
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<tr>
<td>10</td>
<td>T Oct. 29</td>
<td>B. Brown: MLSLC</td>
<td></td>
<td>A4.id</td>
<td></td>
</tr>
<tr>
<td></td>
<td>R Oct. 31</td>
<td>O. Berryman: SciFinder: MLSLC</td>
<td></td>
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<tr>
<td>11</td>
<td>T Nov. 5</td>
<td>H. Lowisch: writing science for the public reader</td>
<td></td>
<td>A4.idr</td>
<td></td>
</tr>
<tr>
<td></td>
<td>R Nov. 7</td>
<td>MLSLC: research for A5</td>
<td></td>
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<tr>
<td>12</td>
<td>T Nov. 12</td>
<td>L. Fisher: resumes, cover letters</td>
<td>12:30 in Lommasson 154</td>
<td>A6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>R Nov. 14</td>
<td>peer review of A5</td>
<td>bring ACS</td>
<td>A5.prd</td>
<td></td>
</tr>
</tbody>
</table>
1) Do a search of google patents on something you are interested in, and then a scan of a patent or two generated by your search. In addition, a little due diligence on Rivertop Renewables through the web would provide context for the Rivertop story.

2) Read “Overcoming Philoso-phobia: A Short Introduction to Ethics for the Science Debates” at:
   

3) Although not required to be read before class, references will be made to the following articles:


4) Read sections 1 and 2, including the case study and questions, from the “Free Research Ethics Online Course” at:

   [http://www.umt.edu/ethics/Research%20Ethics/default.aspx](http://www.umt.edu/ethics/Research%20Ethics/default.aspx)

**Please note:** Approved general education changes will take effect next fall.

General education instructors will be expected to provide sample assessment items and corresponding responses to the Assessment Advisory Committee.
Assignments A4 and A5  CHMY302E  Autumn, 2013

A4  (A4.prd due Oct. 22)

1. Select and read one of the articles provided dealing with a well-studied case in science ethics
2. Research this case in more detail citing references (Internet, books, etc.)
3. Write an 8-10 page article for undergraduate science majors where:
   a. You summarize the case and analyses of others
   b. You critique the case based on at least one of the standard western traditions in ethics that we have studied

A5  (A5.prd due Nov.14)

1. Find a current issue in chemistry or biochemistry (try C&E News or other similar news sources)
2. Research this issue:
   a. in detail with respect to chemistry (synthesis, purification, contamination, safety, environment, etc., pertaining to the issue selected)
   b. with respect to the concerns raised by this issue (as done in A4)
3. Write two persuasion articles on this subject
   a. a 10-15 page article for your chemistry major peers that contains the chemistry of the issue in detail
   b. a 4-5 page article for the general public
4. Your persuasion must:
   a. make use of at least one western ethics tradition
   b. either extend current arguments for a view of the issue or introduce a new concern

Final drafts of each (A4.fd and A5.fd) will be written for instructor evaluation.