### I. ASCRC General Education Form

<table>
<thead>
<tr>
<th>Group</th>
<th>Group XI Natural Science</th>
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</thead>
<tbody>
<tr>
<td>Dept/Program</td>
<td>Chemistry &amp; Biochemistry</td>
</tr>
<tr>
<td>Course #</td>
<td>CHEM 162</td>
</tr>
<tr>
<td>Course Title</td>
<td>College Chemistry II</td>
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<tr>
<td>Prerequisite</td>
<td>C– or better in CHEM 161</td>
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<tr>
<td>Credits</td>
<td>5</td>
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### II. Endorsement/Approvals

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

<table>
<thead>
<tr>
<th>Please type / print name</th>
<th>Signature</th>
<th>Date</th>
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<tbody>
<tr>
<td>Instructor</td>
<td>Mark Cracolice</td>
<td>9/17/08</td>
</tr>
<tr>
<td>Phone / Email</td>
<td>4475/mark.cracolice@umontana.edu</td>
<td></td>
</tr>
<tr>
<td>Program Chair</td>
<td>Mark Cracolice</td>
<td>9/17/08</td>
</tr>
<tr>
<td>Dean</td>
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### III. Description and purpose of the course:

General Education courses must be introductory and foundational. They must emphasize breadth, context, and connectedness; and relate course content to students’ future lives: See Preamble: [http://www.umt.edu/facultysenate/gened/GEPreamble_final.htm](http://www.umt.edu/facultysenate/gened/GEPreamble_final.htm)

An introductory survey of chemistry. We follow the standard curriculum in the United States, as suggested by the American Chemical Society. This is the second semester of a two-semester sequence. The sequence provides an introduction to the principles of physical and inorganic chemistry appropriate for the level of knowledge necessary for students who plan on majoring in medicine, health, engineering, or the sciences.

### IV. Criteria:

Briefly explain how this course meets the criteria for the group. See: [http://www.umt.edu/facultysenate/ASCRCx/Adocuments/GE_Criteria5-1-08.htm](http://www.umt.edu/facultysenate/ASCRCx/Adocuments/GE_Criteria5-1-08.htm)

1. Courses explore a discipline in the natural sciences and demonstrate how the scientific method is used within the discipline to draw scientific conclusions.

   The course is inquiry based, utilizing the definition of inquiry in the *National Science Education Standards*: “Inquiry is a set of interrelated processes by which scientists and students pose questions about the natural world and investigate phenomena; in doing so, students acquire knowledge and develop a rich understanding of concepts, principles, models, and theories.” (p. 214).

2. Courses address the concept of analytic uncertainty and the rigorous process required to take an idea to a hypothesis and then to a validated scientific theory.

   Uncertainty in measurement is addressed in the fourth course meeting and then emphasized throughout the sequence. The process of formulation and revision of scientific models are emphasized throughout the course.
3. Lab courses engage students in inquiry-based learning activities where they formulate a hypothesis, design an experiment to test the hypothesis, and collect, interpret, and present the data to support their conclusions.

The laboratory portion of the course is also inquiry-based. One form of evidence of this is that the laboratory manual we use is titled *Inquiries Into Chemistry*. Students perform both guided inquiry and open inquiry experiments.

### V. Student Learning Goals:
Briefly explain how this course will meet the applicable learning goals. See: [http://www.umt.edu/facultysenate/ASCRCx/Adocuments/GE_Criteria5-1-08.htm](http://www.umt.edu/facultysenate/ASCRCx/Adocuments/GE_Criteria5-1-08.htm)

1. understand the general principles associated with the discipline(s) studied

The sequence provides an introduction to the principles of physical and inorganic chemistry appropriate for the level of knowledge necessary for students who plan on majoring in medicine, health, engineering, or the sciences.

2. understand the methodology and activities scientists use to gather, validate and interpret data related to natural processes

The laboratory portion of the course is also inquiry-based. One form of evidence of this is that the laboratory manual we use is titled *Inquiries Into Chemistry*. Students perform both guided inquiry and open inquiry experiments.

3. detect patterns, draw conclusions, develop conjectures and hypotheses, and test them by appropriate means and experiments

Chemists often use skills such as mathematical pattern recognition, the development and manipulation of mental models of particulate-level phenomena, and proportional, probabilistic, combinatorial, and correlational thinking. These thinking skills are emphasized throughout the course.

4. understand how scientific laws and theories are verified by quantitative measurement, scientific observation, and logical/critical reasoning

The course is inquiry based, utilizing the definition of inquiry in the *National Science Education Standards*: “Inquiry is a set of interrelated processes by which scientists and students pose questions about the natural world and investigate phenomena; in doing so, students acquire knowledge and develop a rich understanding of concepts, principles, models, and theories.” (p. 214).

5. understand the means by which analytic uncertainty is quantified and expressed in the natural sciences

Uncertainty in measurement is addressed in the fourth course meeting and then emphasized throughout the sequence.

### VII. Syllabus:
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: [http://teaching.berkeley.edu/bgd/syllabus.html](http://teaching.berkeley.edu/bgd/syllabus.html)

Attached.

*Please note: As an instructor of a general education course, you will be expected to provide
sample assessment items and corresponding responses to the Assessment Advisory Committee.