APPLICANT: Brent Rubio

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COURSE ALPHA and NUMBER: CHEM 161

COURSE TITLE: General Chemistry I

ESTIMATED NUMBER OF SECTIONS:
  Fall: 1
  Spring: 0

APPLICATION IS FOR:
  □ New Course  □ Modified Course  ☒ Existing Course  □ Re-designation

  □ Certification  ☒ Re-Certification. Date of last certification:

DIVERSIFICATION AREA DESIGNATION SOUGHT:

  □ DA (Arts)  ☒ DP (Physical Sciences)
  □ DB (Biological Sciences)  □ DS (Social Sciences)
  □ DH (Humanities)  □ DY (Laboratory)
  □ DL (Literature and Language)

What percentage of the CONTENT of this course focuses on this diversification area? 90

What percentage of CLASS MEETINGS focuses on this diversification area? 90
1. **Hallmarks and SLOs.** Please explain how course-specific SLOs align with the diversification area’s hallmarks.

**DP.1: uses the terminology of the physical sciences**

SLO 1. To develop skills in employing the scientific method.
SLO 2. To provide a suitable background in chemical concepts and skills for students planning careers in physical and life sciences.
SLO 3. To learn how to extract practical information from theoretical information, with emphasis on computational skill.

The scientific method uses specific physical science terminology like hypothesis, theory, experimentation and law (SLO 1). This course demonstrates that chemistry is the study of matter and its changes, interactions and energy. To do so, physical science terminology must be defined and used (SLO 2). There are many theoretical terms throughout this course that require terminology use as students learn about topics like atomic theory, the quantum mechanical model of the atom, wave functions, and periodic law (SLO 3).

**DP.2: involves knowledge and theories relating to processes in the physical sciences**

SLO 1. To develop skills in employing the scientific method.
SLO 2. To provide a suitable background in chemical concepts and skills for students planning careers in physical and life sciences.
SLO 3. To learn how to extract practical information from theoretical information, with emphasis on computational skill.
SLO 4. To learn to appreciate the impact and influence of chemistry on our lives and to learn how we can cope with our environment using our knowledge of chemistry.

The scientific method is the process behind all physical sciences and is included in all aspects of this course (SLO 1). A discussion of chemistry topics include basic constructs and atomic theory (SLO 2). The knowledge of atomic theory and how it was derived shows the process of physical sciences Extracting that information requires an understanding of the theoretical information (SLO 3). Concepts like atomic theory allow for applications such as mercury pollution and how we and the environment can respond to it (SLO 4).

**DP.3: demonstrates inquiry that involves observation/experiment and reasoning and mathematics**

SLO 1. To develop skills in employing the scientific method.
SLO 3. To learn how to extract practical information from theoretical information, with emphasis on computational skill.
SLO 4. To learn to appreciate the impact and influence of chemistry on our lives and to learn how we can cope with our environment using our knowledge of chemistry.
Scientific method consists of observation, hypothesis, experimentation and theory, requiring the involvement of observation and experimentation. Data is analyzed and conclusions are drawn from this method, thus utilizing scientific reasoning to form the theories and/or scientific laws (SLO 1). Several of the scientific laws covered in this course require scientific reasoning and mathematics, like Boyle’s Law and the Ideal Gas Law (SLO 3). Applying chemistry to contemporary environmental issues often shows how data is analyzed using scientific mathematics to determine environmental impacts (SLO 4)

2. Assessment strategies. Explain assessment strategies you have used (or plan to use) to measure the degree to which students exit the course with the course-specific SLOs. If there are multiple sections of the course taught by different instructors, please discuss how assessment is (or will be) carried out across instructors.

Formative and Summative assessments are used throughout this course as an assessment on the pace of the course and student comprehension of basic fundamentals and terminologies of chemistry. At the end of the course, students have the opportunity to assess the course and instructor in the form of student evaluations. There is only one instructor for this course per term.

Informal formative assessments come in terms of spot checks and simple questions posed to the entire class during lecture. Either verbal feedback or visual cues allow the instructor to do an on the spot check of the students’ current comprehension of material presentation (SLO 1, 2). These are not graded, but are essential tools to assess student understanding.

Formal formative assessment in the form of Mastering in Chemistry (by Pearson Publishing) is also available to students. This software package is online and provides instant feedback to students as they are performing the calculations (SLO 2, 3). It employs different types of learning. For examples, tactile learners find some of the reasoning easier in this format because some of the tasks include dragging items across the webpage.

Summative assessments come as multiple-choice tests. There are various types of questions that deal with calculations and combine several different concepts (SLO 2). For instance, solving a gas law problem uses algebra, dimensional analysis, and unit conversions. Common mistakes, like not using absolute temperature, are answer choices as well. There are also questions based off of evaluations and comparisons, like in rating certain properties (SLO 3, 4)

Instructor assessments come in forms of student evaluations given at the end of the semester, where students have the opportunity to voice their opinions on the course, material, pace and instructor. This gives direct feedback on the course.

There is only one instructor for this course per term. If there is more than one in a term, then the instructors will all meet once a week to ensure courses are congruent and that assessment items are equivalent to ensure consistency across the board.
3. **Assessment of assessment.** How have you used (or plan to use) the assessment findings to modify or improve this course? If there are multiple sections of the course taught by different instructors, please discuss how review of assessment results is (or will be) carried out across instructors.

Formative and summative assessments help to modify the course as it proceeds. As in class formative assessments occur, the pace of the lecture becomes slower or faster depending on the response (speed and accuracy) of the students. The summative assessments (quizzes and exams) help to modify the course itself to improve the experience for the students. If quizzes and exams show low curve averages, then the pace of the course slows down. If the curve average is good or high, the course pace maintains. This assessment of the assessments allows for a quick modification of the course, improving the course for the current students.

If the in course assessment reveal that some students require extra help, then the HCC system offers free tutorial services (math, comprehension, etc) to address these issues beyond the normal office hours and help from the instructor. This assessment of assessments improves the students' performance in the course, and the course itself. If students continue to perform poorly in the course, they have the option in the first block of the course to drop down to Chem 151 (Elementary Survey of Chemistry). This lets students learn the skills they may be lacking and are keeping them from performing towards their potential.

Assessment of student evaluations allow for a more long-term improvement and modification of the course. Every semester, the instructor reviews the previous semester’s assessments to assess how to improve and modify the course from semester to semester.
DIVERSIFICATION BOARD DECISION:

☑ Approved
Re-Certification Due: Fall 2017

☐ Not approved
If not approved, reasons for disapproval:

Diversification Board Chair Signature: [Signature]
Date: 9/14/12
Chem 161: General Chemistry I
Course Outline

Textbook: Chemistry a molecular approach, Tro 2nd ed. Pearson

General Description of Course:

This is a first semester course of an integrated one year sequence. It is intended for students whose fields of study require a comprehensive general chemistry background. Fluency in algebra is required, as logic and calculations are important aspect of this course. Topics covered include: the basic principles of chemistry, electronic structure, chemical bonding, and solutions.

Student Learning Outcomes:

1. To develop skills in employing the scientific method.
2. To provide a suitable background in chemical concepts and skills for students planning careers in physical and life sciences.
3. To learn how to extract practical information from theoretical information, with emphasis on computational skill.
4. To learn to appreciate the impact and influence of chemistry on our lives and to learn how we can cope with our environment using our knowledge of chemistry.

Articulation: This course fulfills a physical science requirement for Honolulu Community College for the AA degree and a DP requirement for the University of Hawaii – Manoa.

Grading:

The student’s grade in the course will be decided by 3 exams (20 Multiple Choice each) and online homework. The name of the course online is Chem161F11HCC at http://www.masteringchemistry.com/

Students are responsible to properly mark scantron sheets properly. Any fault in improper marking of the scantrons or failure in forgetting to put names on the assessment is owned by the student.

Any types of academic dishonesty including cheating or plagiarism will result in the failure of the course.

Relative weights:

<table>
<thead>
<tr>
<th>Evaluation</th>
<th>Date Due</th>
<th>Chapters covered</th>
<th>Relative weight</th>
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</thead>
<tbody>
<tr>
<td>Midterm exam 1</td>
<td>Oct. 5th</td>
<td>1-4</td>
<td>25%</td>
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<td>Midterm exam 2</td>
<td>Nov. 16th</td>
<td>5-7</td>
<td>30%</td>
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<td>Midterm exam 3</td>
<td>Dec. 12th</td>
<td>8-10</td>
<td>30%</td>
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<td>Online Homework</td>
<td>Dec. 12th</td>
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Course Grades:

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<th>Grade</th>
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<tbody>
<tr>
<td>A</td>
<td>100-90%</td>
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<tr>
<td>B</td>
<td>89-80%</td>
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<tr>
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<tr>
<td>D</td>
<td>69-60%</td>
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<td>F</td>
<td>Below 60</td>
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Curving may be employed if necessary.

Students with disabilities:

Web Site: http://www.hawaii.edu/kokua/

KOKUA provides disability access services to individuals on a case by case basis, and students are not charged for these services. A student's disability status is considered confidential information and is only disclosed to faculty with the student's permission. We have served thousands of students with disabilities since our inception in 1966 and will continue to be here to serve the needs of students with disabilities on our campus in the years to come!

Academic Dishonesty:

Academic Dishonesty: Academic dishonesty cannot be condoned by the University. Such dishonesty includes cheating and plagiarism (examples of which are given below), which violate the Student Conduct Code and may result in expulsion from the University.

Cheating includes, but is not limited to:

- giving or receiving unauthorized assistance during an examination;
- obtaining unauthorized information about an examination before it is given;
- using inappropriate or unallowable sources of information during an examination;
- falsifying data in experiments and other research;
- altering the record of any grade;
- altering answers after an examination has been submitted;
- falsifying any official University record; or,
- misrepresenting the facts in order to obtain exemptions from course requirements.

Plagiarism includes, but is not limited to:

- submitting, in fulfillment of an academic requirement, any document that has been copied in whole or in part from another individual's work without attributing that borrowed portion to the individual;
- neglecting to identify as a quotation another's idea and particular phrasing that was not assimilated into the student's language and style or paraphrasing a passage so that the reader is misled as to the source;
- submitting the same written or oral material in more than one course without obtaining
authorization from the instructors involved; or,

• drylabbing, which includes obtaining and using experimental data and laboratory write-ups from other sections of the course or from previous terms, or fabricating data to fit the desired or expected results.

Copies of the Student Conduct Code are available from the Dean of Student Services.

Native Hawaiian Values

An understanding within the course is that the instructor and students will form a community where the following values will be upheld:

Aloha – Love, compassion, charity etc.

Laulima – To work together, Cooperation. "Many hands make light work"

Lokahi – Unity, Harmony, Agreement etc.

Malama – To take care of, care for, Preserve, Protect etc.

Kuleana – Responsibility, Rights, Privilege etc.

'Ike – Knowledge, Awareness and/or Understanding

Course Content

<table>
<thead>
<tr>
<th>Week</th>
<th>Chapter</th>
<th>Topics</th>
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<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>Matter and Measurement</td>
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<tr>
<td>2-3</td>
<td>2</td>
<td>Atoms and Elements</td>
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<td>4-5</td>
<td>3</td>
<td>Molecules, Compounds and Chemical Equations</td>
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<td>6</td>
<td>4</td>
<td>Chemical quantities and Aqueous Reactions</td>
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<td>7-8</td>
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<td>Gases</td>
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<td>9</td>
<td>6</td>
<td>Thermochemistry</td>
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<tr>
<td>10</td>
<td>7</td>
<td>The Quantum-Mechanical Model of the Atom</td>
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<tr>
<td>11</td>
<td>8</td>
<td>Periodic Properties of Elements</td>
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<td>9</td>
<td>Chemical Bonding</td>
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<tr>
<td>13</td>
<td>10</td>
<td>Liquids, Solids and Intermolecular Forces</td>
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