APPLICANT: Michael Ferguson  E-MAIL: mferguso@hawaii.edu

COURSE ALPHA and NUMBER:  Chem 272

COURSE TITLE:  Organic Chemistry I

ESTIMATED NUMBER OF SECTIONS:  Fall 1  Spring 1

Is this request for a:  ☒ New Course  □ Modified Course  ☐ Existing Course

☐ Re-designation

Is this request for a:  ☒ 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?  75%

What percentage of CLASS MEETINGS focuses on this diversification area?  90%

1. Please explain how the course SLOs align with the diversification area’s hallmarks.

Explanatory notes. The hallmarks (three for each designation) are posted on the HCC Intranet. In the text-box below, state the hallmarks for the diversification designation you are seeking and explain how the course SLOs meet each hallmark. For example, an SLO for Hallmark #3 for a DS designation would be to understand how descriptive and inferential statistics are used to summarize and evaluate results from psychological studies.

SLOs:
Upon successful completion of this course, a student will be able to:
1. Categorize types of reactions based on fundamentals of carbon chemistry,
2. Enumerate the consequences arising from the physical and/or chemical properties of the
three-dimensionality of molecules,
3. Recognize patterns of reactivity on the basis of mechanistic reasoning,
4. Design syntheses of organic molecules of moderate complexity,
5. Identify molecular structures from spectroscopic data.

DP.1
DP.2
DP.3
To satisfy the Physical Science requirement, at least
two-thirds of a course
uses the terminology of the physical sciences;
involves knowledge and theories relating to processes in the
physical sciences;
demonstrates inquiry that involves observation/experiment
and reasoning and mathematics.

DP1. Proper terminology must be used in all methods of instruction for this highly specialized
course. The students will be assessed and expected to use this proper terminology. All of the SLOs
require this. For instance with SLO 1, carbon chemistry has its own set of jargon. Uses of words
such as "carbocation" will be commonplace. For SLO 2, enantioomers or molecules that have a
specific type of stereochemistry requires the use of proper terminology. For SLO 3, terminology
integral to chemistry must be understood. For instance, the uses of catalysts. They have their own
jargon as well as the definition of the word, catalyst. For SLO 4, the introductory course on carbon
chemistry requires a basic understanding on how to design synthesis. Similar to SLO 3, proper
terminology is needed to accomplish this. For SLO 5, particular attention will be paid to Nuclear
Magnetic Resonance Spectroscopy (NMR) and Fourier Transform Infrared Spectroscopy (FTIR).
The students will be expected to note which functional groups (the manner in which organic
molecules are classified) correspond to which spectral features in NMR and FTIR. Also, for mass
spectroscopy, the students will be trained to see particular things like if there is a 3:1 ratio at the
mass per charge ratio of 35 and 37, then the molecule would mostly likely contain chlorine. The
students will be expected to have these skills upon completion of the course.

DP2. Again, all the SLOs correspond to this hallmark. For instance, SLO 1, To make the students
knowledgeable about the fundamentals of carbon chemistry, the knowledge and theories relating to
carbon chemistry are necessary to complete this SLO. For instance, the use of the term,"carbocation," in discussions. Since we cannot see atoms directly with optical microscopes, the
idea of a carbocation is compiled by the use of several different types of spectroscopy like NMR,
FTIR etc. and theoretical models such as quantum mechanics and molecular orbital theory.

DP3. All of the SLOs require logic and scientific reasoning in some way. For instance, SLO 5
requires that the student be able to assign spectral features to build a molecule from the
spectroscopic data.

2. Explain assessment strategies you plan to use (or have used, in the case of recertification) to
measure the degree to which students exit the course with the expected SLOs. If there are multiple
sections of the course, please discuss how assessment will be carried through all sections.

See attachment

Explanatory notes. The applicant should clearly connect assessment strategies to the course SLOs stated
in Question #1. For example, an assessment strategy for an SLO would be to have a set of questions on
an exam, which requires students to evaluate a hypothetical study in terms of research methodology, and descriptive statistics (calculate the mean, median, mode of a data set).

3. How have you **used the assessment findings** to modify or improve this course?

   N/A

   *Explanatory notes. If this is a new course, enter “N/A” as an answer. Courses being re-certified should include a summary of how assessment strategies and measures (Question #2) were used to modify or improve the course.*

   **Reminder:** Please attach a copy of your course syllabus that includes information described in the instruction part of this form.

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**DIVERSIFICATION BOARD DECISION:**

☑ Approved
   Re-Certification Due: **Fall 2015**

☐ Not approved
   If not approved, reasons for disapproval:

   

Diversification Chair Signature: [Signature] Date: **11/19/10**
Assessment strategies will be completed by formative and summative methods. These will specifically cover the SLOs. The formative methods will provide feedback to the instructor and the summative methods will be the primary form of grade assignment. The summative methods will be based in the SLOs. For instance, the chemistry of each functional group will be tested specifically. For instance, the student will know that alcohols can be oxidized to form aldehydes and carboxyllic acids. This maps with SLO 1. For SLO 2, the students will be able to characterize certain types of sterospecific reactions such as substitution reactions which require an knowledge of stereochemistry. The student will be assessed on the ability to see when a substitution reaction will take place instead of another type of reaction like an elimination reaction (an elimination reaction is one where a carbon to carbon double or triple bond is formed). For SLO 3, the student will be given summative assessments on mechanistic reasoning. For instance, the student could be asked to identify the mechanistic change of ethanol to acetaldehyde by the liver. In continuing SLO 4 with the ethanol example, the student could further indentify how acetaldehyde could be turned into acetic acid. For SLO 5, the student will either be given a molecule and asked to generate a spectrum (or spectra) or the student will be given a spectrum (or spectra) and be asked to identify the molecule. These are example of summative methods used in exams to assess the students' understanding of the SLOs. The formative assessments are more informal in this class and will be generally be used as feedback to the instructor to see if the students are understanding the course content at that exact moment in lecture.
Chem 272
Fall 2011
Course Outline

Instructor: Michael J. Ferguson, Ph.D.
Office: 5-208A
e-mail: mferguso@hawaii.edu
AIM: HIChemistry
Office hours: immediately following class


General Description of Course:

CHEM 272 is the first semester of a comprehensive introduction to organic chemistry including molecular structure, nomenclature, stereochemistry, spectroscopy, reactions and reaction mechanisms, synthesis, and applications to biology.

Student Learning Outcomes:

1. To make the students knowledgeable about the fundamentals of carbon chemistry,
2. To understand the consequences (reactivity, properties) of the three-dimensionality of molecules,
3. To be able to interpret patterns of reactivity on the basis of mechanistic reasoning,
4. To be able to design syntheses of organic molecules of moderate complexity
5. To be able to deduce molecular structures from spectroscopic data.

Grading:

The student’s grade in the course will be decided by 3 midterms and the final. No make-ups for missed tests will be given. The final exam is comprehensive.

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

Relative weights:

<table>
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<tr>
<th>Evaluation</th>
<th>Relative weight</th>
<th>Total</th>
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<tr>
<td>Midterm exam (3)</td>
<td>20%</td>
<td>60%</td>
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<tr>
<td>Final</td>
<td>40%</td>
<td>40%</td>
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Final exam schedule:

8:30-11:20 AM, Monday, Dec. 12th, 2011

Course Grades:
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<th>Grade</th>
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<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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<tr>
<td>F</td>
<td>Below 60</td>
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Curving may be employed if necessary.

Student ACCESS:

Web Site: [http://honolulu.hawaii.edu/disability](http://honolulu.hawaii.edu/disability)

Student ACCESS provides coordinated services to help students with documented disabilities achieve their educational goals. Students requiring disability accommodations should submit requests in advance to HCC's Student ACCESS Office with appropriate disability documentation. For more information visit the Student ACCESS web site or call 844-2392 (voice/text).

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

List of Lessons and Sections

Structure & Bonding 1.1-1.12
Acids and bases 2.1-2.6, 2.8
Molecules & Functional groups 3.1-3.4, 3.8
Alkanes 4.1-4.6, 4.9-4.13,
Exam 1 (Chapters 1-4)
Stereochemistry 5.1-5.13
Understanding Reactions 6.1-6.10
Alkyl halides and Nucleophilic
Substitution 7.1-7.19
Exam 2 (Chapters 5-7)
Alkyl halides and Elimination 8.1-8.11
Alcohols, ethers & epoxides 9.1-9.15
Alkenes 10.1-10.17
Alkynes 11.1-11.12
Exam 3 (Chapters 8-11)
Oxidation and reduction 12.1-12.12
Radical reactions 15.1-15.13
Final (Chapters 1-12, 15)
University of Hawai'i Honolulu Community College
CURRICULUM ACTION PROPOSAL
ADD a New Course

Course Alpha & No.: Chem 272  
Proposer: Michael Ferguson  
Effective Term: Fall 2011

PROPOSAL SUMMARY (Include reasons for adding course, and similar courses offered elsewhere, i.e. college, alpha, number, title):
This is the next course is the next level of chemistry courses. Similar courses are offered at Manoa, Leeward and Kapiolani. All courses have the same course number, Chem 272 and lab. The name of the course is Organic Chemistry I.
### UNIVERSITY OF HAWAII HONOLULU COMMUNITY COLLEGE

**CURRICULUM ACTION PROPOSAL**  
**ADD a New Course**

**INSTRUCTIONS:** Complete all applicable fields. Continue overflow text on p. 3 under “Additional Information”.

<table>
<thead>
<tr>
<th>Course Alpha &amp; No.:</th>
<th>Chem 272</th>
<th>Effective Term:</th>
<th>Fall 2011</th>
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<tbody>
<tr>
<td>Course Type:</td>
<td>Regular</td>
<td>Experimental Course Expiration Date:</td>
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**Title:** Organic Chemistry I  
**Banner Title (30 characters):** Organic Chemistry I

**Does this course satisfy Career & Technical Education GEN ED Requirements (A.S. / A.A.S.)?**  
If “YES”, select GEN ED requirement:  
2a. Understanding the Natural Environment (ASGA)

**Does this course satisfy Liberal Arts A.A. GEN ED Requirements &/or UHM GEN ED Core Articulation?**  
If “YES”, select GEN ED requirement below.

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<td>LBART</td>
<td>A.A. UHM</td>
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<td>Arts (DA)</td>
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<td>☐</td>
<td>Humanities (DH)</td>
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<td>Global/Multicultural Perspectives (FG)</td>
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<td>Literature (DL)</td>
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<td>Social Sciences (DS)</td>
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<td>Physical Sciences (DP)</td>
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<td>Biological Sciences Lab (DY)</td>
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</table>

| Class Length (weeks): | 17 |
| Credits: (For Variable Credits give range) | 3 |

**Repeat & Credit Limit:**  
May be repeated ___ time(s) for a maximum of ___ credits

**Schedule Type:** LEC (Lecture)

**Weekly Student Contact Hrs:**  
3 Hours Lecture per Week  
0 Hours Lab per Week  
3 Total Contact hrs per Week  

**Grading Option:** Letter Grade Only

**Enrollment Maximum:** 32

**Special Approval:** Click To Select

**Major Restriction:**

**Prerequisite:** Chem 162

**Prerequisite or Corequisite:**

**Corequisite:** Chem 272L

**Bracket Course with:**

**Recommended Prep:**

**Cross-Listed Courses:**

**Comment for online SOC:**
## Catalog Course Description:

CHEM 272 is the first semester of a comprehensive introduction to organic chemistry including molecular structure, nomenclature, stereochemistry, spectroscopy, reactions and reaction mechanisms, synthesis, and applications to biology.

### Additional Information to print with Course Description:

- **YES** ☐ NO  Does this proposal affect Programs and/or Courses? (If “Yes” continue below.)
- **YES** ☐ NO  Were the affected Programs/Departments consulted and notified?

### IMPACT ON COHORTS

- **This Proposal affects Program requirements:**
  - The number of Credits for these Programs: _____ *
  - Prerequisite for these Programs: _____ *
  - Requirement for these Programs: _____ *
  - Elective for these Programs: _____
  - Other

* Attach Program Modification Forms

- **This Proposal affects other Courses:**
  - Prerequisite for these Courses: _____ **
  - Prerequisite or Co-requisite for these Courses: _____ **
  - Co-requisite for these Courses: _____ **
  - Recommended Prep for these Courses: _____ **
  - Cross-list for these Courses: _____ **
  - Other **

** Attach Course Modification Forms

### Describe changes marked above:

- **YES** ☐ NO  Does this proposal require additional resources? (Such as staff, equipment, facilities, etc.)
  - If yes, provide details and indicate whether or not resources are available.

There needs to be the addition of glassware kits, chemicals, engineering controls and instrumentation. These resources are currently unavailable in the Natural Sciences and Mathematics Department.

### Additional Information:
See Instructions for Information on each item.

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<th>Course Alpha &amp; No.:</th>
<th>Chem 272</th>
<th>Semester Credit Hours:</th>
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<th>Effective Term:</th>
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<td>Chem 162</td>
<td>Co-requisites:</td>
<td>Chem 272L</td>
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<td>Instructor Approval or other Approval:</td>
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1. **Catalog Course Description:**
CHM 272 is the first semester of a comprehensive introduction to organic chemistry including molecular structure, nomenclature, stereochemistry, spectroscopy, reactions and reaction mechanisms, synthesis, and applications to biology.

2. **Student Learning Outcomes:**
   
   Upon successful completion of this course, a student will be able to:
   1. To make the students knowledgeable about the fundamentals of carbon chemistry,
   2. To understand the consequences (reactivity, properties) of the three-dimensionality of molecules,
   3. To be able to interpret patterns of reactivity on the basis of mechanistic reasoning,
   4. To be able to design syntheses of organic molecules of moderate complexity
   5. To be able to deduce molecular structures from spectroscopic data.

3. **Means by which the assessment of the SLOs will be accomplished:**
Assessment will be accomplished by evaluating the performance of the students in exam evaluation. Formative and summative assessment techniques will be used.

4. **Program Learning Outcomes addressed by this course:**

5. **Method(s) of Instruction:**
Lecture

6. **Method(s) of Evaluation:**
Quiz, exam.

7. **Course Content:**
   1. Structure and Bonding
   2. Acids and Bases
   3. Introduction to Organic Molecules and Functional Groups
   4. Alkanes
   5. Stereochemistry
   6. Understanding Organic Reactions
   7. Alkyl Halides and Nucleophilic Substitution
   8. Alkyl Halides and Elimination Reactions
   9. Alcohols, Ethers, and Epoxides
   10. Alkenes
   11. Alkynes
   12. Oxidation and Reduction
   13. Mass Spectrometry and Infrared Spectroscopy
   14. Nuclear Magnetic Resonance Spectroscopy
   15. Radical Reactions

8. **Possible Texts:**

9. **Reference and/or Auxiliary Materials (if any):**
Proposed syllabus
10. Resource Requirements (if applicable):

11. Relationship to other courses in the program (if applicable):

12. General Education or other requirement(s) satisfied:

13. Articulation (if applicable):
   Currently offered at Leeward CC, Kapiolani CC, and Manoa

14. Additional information of importance:
   This course will expand the number of chemistry courses available at Honolulu CC. This is the next chemistry course in the series of chemistry courses after Chem 162. The course is a prerequisite for many programs including chemistry and biology degrees and for all premedical programs.