### 1. Course Information.

*Follow accepted catalog format.* *(Add additional prefixes if cross-listed)*

<table>
<thead>
<tr>
<th>OLD</th>
<th>NEW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prefix BIOL/PHYS</td>
<td>Prefix BIOL/PHYS</td>
</tr>
<tr>
<td>Course# 416</td>
<td>Course# 416</td>
</tr>
<tr>
<td>Title Radiobiology and Radionuclides</td>
<td>Title Radiobiology and Radionuclides</td>
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<tr>
<td>3 hours lecture per week</td>
<td>3 hours lecture per week</td>
</tr>
<tr>
<td>x Prerequisites: BIOL 300, PHYS 201</td>
<td>x Prerequisites: BIOL 300, PHYS 201, BIOL/PHYS/HLTH 434</td>
</tr>
<tr>
<td>Consent of Instructor Required for Enrollment</td>
<td>Consent of Instructor Required for Enrollment</td>
</tr>
</tbody>
</table>

**Catalog Description** *(Do not use any symbols):* Topics include: nature and effects of ionizing radiation on biomolecular structures and living cells; applied radiobiology and radionuclides; genetic effects of ionizing radiation and methods of protection and dosimetry.

### 2. Mode of Instruction (Hours per Unit are defaulted)

#### Existing

<table>
<thead>
<tr>
<th>Mode</th>
<th>Units</th>
<th>Hours Per Unit</th>
<th>Benchmark Enrollment</th>
<th>Graded</th>
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</thead>
<tbody>
<tr>
<td>Lecture</td>
<td>3</td>
<td>1</td>
<td>24</td>
<td>x</td>
</tr>
<tr>
<td>Seminar</td>
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<tr>
<td>Activity</td>
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<tr>
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<tr>
<td>Indep Study</td>
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#### Proposed

<table>
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<th>Hours Per Unit</th>
<th>Benchmark Enrollment</th>
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</thead>
<tbody>
<tr>
<td>Lecture</td>
<td>3</td>
<td>1</td>
<td>24</td>
<td>x</td>
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<tr>
<td>Seminar</td>
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<tr>
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<td>Indep Study</td>
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<tr>
<td>Other blank</td>
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## Hegis Code(s) *(Provided by the Dean)*

9.15.08 km2
3. Course Attributes:

- **General Education Categories:** All courses with GE category notations (including deletions) must be submitted to the GE website: http://summit.csuci.edu/geapproval. Upon completion, the GE Committee will forward your documents to the Curriculum Committee for further processing.

  **A (English Language, Communication, Critical Thinking)**
  - A-1 Oral Communication
  - A-2 English Writing
  - A-3 Critical Thinking

  **B (Mathematics, Sciences & Technology)**
  - B-1 Physical Sciences
  - B-2 Life Sciences – Biology
  - B-3 Mathematics – Mathematics and Applications
  - B-4 Computers and Information Technology

  **C (Fine Arts, Literature, Languages & Cultures)**
  - C-1 Art
  - C-2 Literature Courses
  - C-3a Language
  - C-3b Multicultural

  **D (Social Perspectives)**

  **E (Human Psychological and Physiological Perspectives)**

  **UDIGE/INTD Interdisciplinary**

  Meets University Writing Requirement
  Meets University Language Requirement

- **American Institutions, Title V Section 40404:** Government US Constitution US History

Refer to website, Exec Order 405, for more information: http://senate.csuci.edu/comm/curriculum/resources.htm

- **Service Learning Course** (Approval from the Center for Community Engagement must be received before you can request this course attribute).

4. Justification and Requirements for the Course. **[Make a brief statement to justify the need for the course]**

**OLD**
The course would be part of a proposed Medical Imaging emphasis within the Biology major, preparing students for graduate or professional studies in the medical sciences.

**NEW**
The course is part of the Medical Imaging emphasis within the Biology major, preparing students for graduate or professional studies in the medical sciences.

- Requirement for the Major/Minor
- Elective for the Major/Minor
- Free Elective

**Submit Program Modification if this course changes your program.**

5. Learning Objectives. (List in numerical order)

**OLD**
Upon completion of the course, the student will be able to:

- explain the basic concepts and principles of radiation physics
- explain the genetic effects of ionizing radiation
- calculate radiation doses and estimate risk
- use a variety of simulation programs, featuring data analysis and display, to derive conclusions about radiation exposure and dose
- explain the principles of radiation protection
- explain the principles of operation of various radiation detectors
- critically evaluate scientific and medical literature
- organize and express ideas clearly and convincingly in oral and written forms.

**NEW**
Upon completion of the course, the student will be able to:

- (i) explain the basic concepts and principles of radiation physics
- (ii) explain the genetic effects of ionizing radiation
- (iii) calculate radiation doses and estimate risk
- (iv) use a variety of simulation programs, featuring data analysis and display, to derive conclusions about radiation exposure and dose
- (v) explain the principles of radiation protection
- (vi) explain the principles of operation of various radiation detectors
- (vii) critically evaluate scientific and medical literature
- (viii) organize and express ideas clearly and convincingly in
6. Course Content in Outline Form. (Be as brief as possible, but use as much space as necessary)

OLD

NEW

Does this course content overlap with a course offered in your academic program? Yes [ ] No [x]
If YES, what course(s) and provide a justification of the overlap.

Does this course content overlap a course offered in another academic area? Yes [ ] No [x]
If YES, what course(s) and provide a justification of the overlap.

Overlapping courses require Chairs’ signatures.

7. Cross-listed Courses (Please note each prefix in item No. 1)
   A. List cross-listed courses (Signature of Academic Chair(s) of the other academic area(s) is required).
   B. List each cross-listed prefix for the course: BIOL, PHYS
   C. Program responsible for staffing: Math and Applied Physics

8. References. [Provide 3-5 references]


9. Tenure Track Faculty qualified to teach this course.
Geoff Dougherty

10. Requested Effective Date or First Semester offered: Spring 2010

11. New Resource Requested: Yes [ ] No [x]
If YES, list the resources needed.
A. Computer Needs (data processing, audio visual, broadcasting, other equipment, etc.)

B. Library Needs (streaming media, video hosting, databases, exhibit space, etc.)

C. Facility/Space/Transportation Needs:

D. Lab Fee Requested: Yes ☐ No ☒ (Refer to the Dean’s Office for additional processing)

E. Other: ☐

12. Indicate Changes and Justification for Each. [Check all that apply and follow with justification. Be as brief as possible but, use as much space as necessary.]

<table>
<thead>
<tr>
<th>Course title</th>
<th>Course Content</th>
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</thead>
<tbody>
<tr>
<td>Prefix/suffix</td>
<td>Course Learning Objectives</td>
</tr>
<tr>
<td>Course number</td>
<td>References</td>
</tr>
<tr>
<td>Units</td>
<td>GE</td>
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<td>Staffing formula and enrollment limits</td>
<td>Other</td>
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<tr>
<td>x Prerequisites/Corequisites</td>
<td>Reactivate Course</td>
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<tr>
<td>Catalog description</td>
<td></td>
</tr>
<tr>
<td>Mode of Instruction</td>
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</table>

Justification: The course covers material for nuclear medicine imaging. It is more useful for students to do it after completing Biol/Phys 434 Introduction to Biomedical Imaging, and we have always counselled them to do the courses in this order. We wish to include 434 as a prerequisite for 416 to ensure that students take the courses in this (logical) order. We have also reduced the number of references to the mandated 3-5, and updated the justification (para. 4) to the present.

13. Will this course modification alter any degree, credential, certificate, or minor in your program? Yes ☐ No ☒

If YES attach a program update or program modification form for all programs affected.

Priority deadline for New Minors and Programs: October 6, 2008 of preceding year.

Priority deadline for Course Proposals and Modifications: November 3, 2008.

Last day to submit forms to be considered during the current academic year: April 15th.

Dr. Geoff Dougherty, Dr. Ching-Hua Wang 10/13/2008

Proposer(s) of Course Modification Date

Type in name. Signatures will be collected after Curriculum approval.
Course: [ ]

If your course has a General Education Component or involves Center affiliation, the Center will also sign off during the approval process.

Multiple Chair fields are available for cross-listed courses.

<table>
<thead>
<tr>
<th>Chair Name</th>
<th>Signature</th>
<th>Date</th>
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<tbody>
<tr>
<td>Program Chair</td>
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<td>Center for Multicultural Engagement Director</td>
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<tr>
<td>Center for Civic Engagement and Service Learning Director</td>
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<tr>
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