CALIFORNIA STATE UNIVERSITY CHANNEL ISLANDS COURSE MODIFICATION PROPOSAL Courses must be submitted by November 3, 2008, to make the next catalog (2009-2010) production DATE (CHANGE DATE EACH TIME REVISED): 10/13/2008 REV 11.3.08

PROGRAM AREA(S): BIOLOGY/PHYSICS

Directions: All of sections of this form must be completed for course modifications. All documents are stand alone sources of course information.

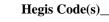
1. Course Information.

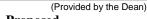
[Follow accepted catalog format.] (Add additional prefixes i f cross-listed)

NEW OLD Prefix **BIOL/PHYS** Course# 416 Title Radiobiology and Radionuclides Prefix **BIOL/PHYS** Course# 416 Title Radiobiology and Radionuclides 3 hours lecture per week 3 hours lecture per week hours blank per week hours blank per week x Prerequisites: BIOL 300, PHYS 201, BIOL/PHYS/HLTH x Prerequisites: BIOL 300, PHYS 201 434 Consent of Instructor Required for Enrollment Consent of Instructor Required for Enrollment Corequisites: Corequisites: Catalog Description (Do not use any symbols): Topics Catalog Description (Do not use any symbols): Topics include: nature and effects of ionizing radiation on include: nature and effects of ionizing radiation on biomolecular structures and living cells; applied biomolecular structures and living cells; applied radiobiology and radionuclides; genetic effects of radiobiology and radionuclides; genetic effects of ionizing radiation and methods of protection and ionizing radiation and methods of protection and dosimetry. dosimetry. Graded Graded **General Education** Repeatable General Education Repeatable for CR/NC Categories for up to units Categories CR/NC up to units Lab Fee Requested x A - F Total Lab Fee Requested x A - F Total Completions Completions Multiple Multiple Course Level: Course Level: Optional Enrollment in Optional Enrollment in same X Undergraduate x Undergraduate (Student's same semester (Student's semester Post-bac/Credential Post-bac/Credential choice) choice) Graduate Graduate

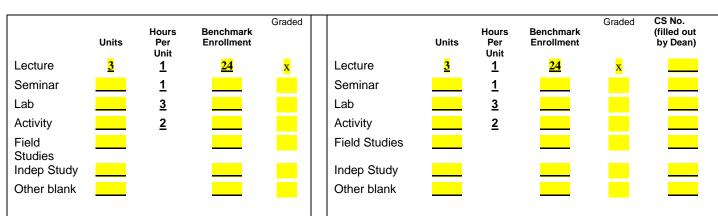
2. Mode of Instruction (Hours per Unit are defaulted)

Existing





Proposed



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.

x 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)

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

Through this course, students 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

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

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

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

Through this course, students 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

oral and written forms.

6. Course Content in Outline Form. (Be as brief as possible, but use as much space as necessary)

OLD	NEW
Properties of matter and energy. Properties of radiation,	Properties of matter and energy. Properties of radiation,
measurement units. Sources of ionizing radiation. Interaction of	measurement units. Sources of ionizing radiation. Interaction of
radiation with matter.energy transfer processes.	radiation with matter.energy transfer processes.
Biological effects of ionizing radiation. Dose-response	Biological effects of ionizing radiation. Dose-response
characteristics, theories of cell survival, direct and indirect	characteristics, theories of cell survival, direct and indirect
effects, acute and delayed effects.	effects, acute and delayed effects.
Radiation dosimetry: exposure-dose relationship, kerma, half-	Radiation dosimetry: exposure-dose relationship, kerma, half-
life, Medical Internal Radiation Dose (MIRD) method.	life, Medical Internal Radiation Dose (MIRD) method.
Relative Biological Effectiveness (RBE) and Quality Factor	Relative Biological Effectiveness (RBE) and Quality Factor
(QF). Dose equivalent. Risk estimates.	(QF). Dose equivalent. Risk estimates.
Radiation protection guides, ALARA principle, exposure	Radiation protection guides, ALARA principle, exposure
limits.	limits.
Radiation detectors.	Radiation detectors.

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]

OLD E.L.Alpen. Radiation Biophysics. Academic Press, 1998, 2nd ed. (ISBN 0120530856).

S.C. Bushong. Radiation Protection. McGraw-Hill, 1999. (ISBN 0-07-012013-7).

- J.J. Bevelacqua. Basic Health Physics: Problems and Solutions. Wiley-Interscience, 1995. (ISBN 0471297119).
- J.J. Bevelacqua. Contemporary Health Physics: Problems and Solutions. Wiley-Interscience, 1995. (ISBN 0471018015).
- S.B.Dowd. Practical Radiation Protection and Applied Radiobiology. WB Saunders, 1994.

H.Cember. Introduction to Health Physics. McGraw-Hill, 1996. (ISBN 0071054618).

W.R.Hendee & E.R.Ritenour. Medical Imaging Physics. John Wiley, 4th edition, 2002. (ISBN 0-471-38226-4).

R.R.Carlton & A.M.Adler. Principles of Radiographic Imaging; an Art and a Science. Delmar, 2001. (ISBN 0-7668-1300-2)

NEW E.L.Alpen. Radiation Biophysics. Academic Press, 1998, 2nd ed. (ISBN 0120530856).

S.C. Bushong. Radiation Protection. McGraw-Hill, 1999. (ISBN 0-07-012013-7).

J.J. Bevelacqua. Basic Health Physics: Problems and Solutions. Wiley-Interscience, 1995. (ISBN 0471297119).

J.J. Bevelacqua. Contemporary Health Physics: Problems and Solutions. Wiley-Interscience, 1995. (ISBN 0471018015).

S.B.Dowd. Practical Radiation Protection and Applied Radiobiology. WB Saunders, 1994.

- 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.]

	Course title		Course Content
	Prefix/suffix		Course Learning Objectives
	Course number	X	References
	Units		GE
	Staffing formula and enrollment limits		Other
Prerequisites/Corequisites			Reactivate Course
	Catalog description		
	Mode of Instruction		

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 x 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

Proposer(s) of Course Modification Type in name. Signatures will be collected after Curriculum approval.

10/13/2008

Date

Approval Sheet

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.

Program Chair		
	Signature	Date
Program Chair		
	Signature	Date
Program Chair		
	Signature	Date
General Education Chair		
	Signature	Date
Center for Intl Affairs Director		
	Signature	Date
Center for Integrative Studies Director		
	Signature	Date
Center for Multicultural Engagement Director		
	Signature	Date
Center for Civic Engagement		
and Service Learning Director		
	Signature	Date
Curriculum Chair		
	Signature	Date
Dean of Faculty		
	Signature	Date