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.

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

OLD

Prefix BIOL/PHYS Course# 416 Title Radiobiology and Radionuclides
3 hours lecture per week
hours blank per week

x Prerequisites: BIOL 300, PHYS 201

Consent of Instructor Required for Enrollment
Corequisites:

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.

General Education Categories
Lab Fee Requested

Graded
CR/NC
x A - F

Repeatable for up to units
Total Completions

Course Level:
x Undergraduate
Post-bac/Credential
Graduate

Optional (Student's choice)

Multiple Enrollment in same semester

NEW

Prefix BIOL/PHYS Course# 416 Title Radiobiology and Radionuclides
3 hours lecture per week
hours blank per week

x Prerequisites: BIOL 300, PHYS 201, BIOL/PHYS/HLTH 434

Consent of Instructor Required for Enrollment
Corequisites:

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.

General Education Categories
Lab Fee Requested

Graded
CR/NC
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Repeatable for up to units
Total Completions

Course Level:
x Undergraduate
Post-bac/Credential
Graduate

Optional (Student's choice)

Multiple Enrollment in same semester

2. Mode of Instruction (Hours per Unit are defaulted) **Hegis Code(s)**_____
(Provided by the Dean)

Existing

	Units	Hours Per Unit	Benchmark Enrollment	Graded
Lecture	3	1	24	x
Seminar		1		
Lab		3		
Activity		2		
Field Studies				
Indep Study				
Other blank				

Proposed

	Units	Hours Per Unit	Benchmark Enrollment	Graded	CS No. (filled out by Dean)
Lecture	3	1	24	x	
Seminar		1			
Lab		3			
Activity		2			
Field Studies					
Indep Study					
Other blank					

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

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

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.

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

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

NEW

Properties of matter and energy. Properties of radiation, measurement units. Sources of ionizing radiation. Interaction of radiation with matter.energy transfer processes.
Biological effects of ionizing radiation. Dose-response characteristics, theories of cell survival, direct and indirect effects, acute and delayed effects.
Radiation dosimetry: exposure-dose relationship, kerma, half-life, Medical Internal Radiation Dose (MIRD) method.
Relative Biological Effectiveness (RBE) and Quality Factor (QF). Dose equivalent. Risk estimates.
Radiation protection guides, ALARA principle, exposure limits.
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
- Prefix/suffix
- Course number
- Units
- Staffing formula and enrollment limits
- x Prerequisites/Corequisites
- Catalog description
- Mode of Instruction
- Course Content
- Course Learning Objectives
- x References
- GE
- Other
- Reactivate Course

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 — 10/13/2008

Proposer(s) of Course Modification — Date

Type in name. Signatures will be collected after Curriculum approval.

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