CALIFORNIA STATE UNIVERSITY CHANNEL ISLANDS

COURSE MODIFICATION PROPOSAL

DATE: JANUARY 25, 2007
PROGRAM AREA BIOLOGY

1. Catalog Description of the Course. *[Follow accepted catalog format.]*
(If Cross-listed please submit a form for each prefix being modified)

OLD

Prefix BIOL Course# 203 Title Quantitative Methods for Biology Units (3)
3 hours lcture per week
☒ Prerequisites A passing score on the entry level mathematics exam (ELM) or MATH 105 or equivalent.
☐ Corequisites
Description This course introduces students in the biological sciences to the quantitative skills and technological tools necessary to evaluate the literature and carry out original research in the discipline. Topics include the principles of biological sampling design, hypothesis generation for biological experiments, collection of observational and experimental data, statistical analysis and interpretation of biological data, and the presentation of results. Laboratories will emphasize microcomputer technology and software applications likely to be encountered in the biological sciences.

☒ Gen Ed Categories B3
☐ Lab Fee Required
Hegis Code

Graded
☐ CR/NC
☒ A - F
☐ Optional (Student's choice)

☐ Repeatable for up to units
☐ Multiple Enrollment in same semester

NEW

Prefix BIOL Course# 203 Title Quantitative Methods for Biology Units (3)
3 hours lecture per week
☒ Prerequisites A passing score on the entry level mathematics exam (ELM) or MATH 105 or equivalent.
☐ Corequisites
Description This course introduces students in the biological sciences to the quantitative skills and technological tools necessary to evaluate the literature and carry out original research in the discipline. Topics include the principles of biological sampling design, hypothesis generation for biological experiments, collection of observational and experimental data, statistical analysis and interpretation of biological data, and the presentation of results. Laboratories will emphasize microcomputer technology and software applications likely to be encountered in the biological sciences.

☒ Gen Ed Categories B3, B4
☐ Lab Fee Required

Graded
☐ CR/NC
☒ A - F
☐ Optional (Student's choice)

☐ Repeatable for up to units
☐ Multiple Enrollment in same semester

☐ Mission Based Learning Objectives: ☐Interdisciplinary ☐ International ☐Multicultural ☐Service Learning
☐ Title V Section 40404: ☐Government ☐US Constitution ☐US History

2. Mode of instruction

	Existing				**Proposed**				
	Units	**Hour Per Unit**	**Benchmark Enrollment**	**CS# Units (filled out by Dean)**		**Units**	**Hour Per Unit**	**Benchmark Enrollment**	**CS# Units (filled out by Dean)**
Lecture	2	1	24		Lecture	3	1	24	
Seminar					Seminar				
Laboratory	1	1	24		Laboratory				
Activity					Activity				

3. Course Content in Outline Form if Being Changed. *[Be as brief as possible, but use as much space as necessary]*

OLD

NEW
No change

4. Justification and Learning Objectives for the Course. (Indicate whether required or elective, and whether it meets University Writing, and/or Language requirements) *[Use as much space as necessary]*

OLD
This is a required course for biology majors and will introduce students to the quantitative skills and technological tools necessary to evaluate the literature and carry out original research in the life sciences.

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Upon completion of this course, students will be able to:
choose an appropriate sampling scheme and/or experimental design for a given biological question
select and apply the appropriate analytical methods to biological data
demonstrate the necessary computer skills for biological data management, analysis and graphical presentation
evaluate critically the primary literature in observation and experimental biology

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evaluate critically the primary literature in observation and experimental biology

5. References. *[Provide 3-5 references on which this course is based and/or support it.]*

OLD

Quinn, Gerry. P. and Michael. J. Keough. 2002. Experimental Design and Data Analysis for Biologists. Cambridge University Press. ISBN: 0521811287.
Zar, Jerrold H. 1998. Biostatistical Analysis, 4th edition. Prentice Hall. ISBN: 013081542X.
Fowler, Jim. 1998. Practical Statistics for Field Biology, 2nd edition. John Wiley & Sons. ISBN: 0471982962.
Rohlf, F. James and Robert R. Sokal. 1994. Biometry, 3rd edition. W. H. Freeman. ISBN: 0716724111.

NEW

Quinn, Gerry. P. and Michael. J. Keough. 2002. Experimental Design and Data Analysis for Biologists. Cambridge University Press. ISBN: 0521811287.
Zar, Jerrold H. 1998. Biostatistical Analysis, 4th edition. Prentice Hall. ISBN: 013081542X.
Fowler, Jim. 1998. Practical Statistics for Field Biology, 2nd edition. John Wiley & Sons. ISBN: 0471982962.
Rohlf, F. James and Robert R. Sokal. 1994. Biometry, 3rd edition. W. H. Freeman. ISBN: 0716724111.

6. 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
☐ Prerequisites/corequisites
☐ Catalog description
☐ Course content
☐ References
☒ GE
☐ Other

Justification This course meets GE criterion B4: "Category B4 Computers and Information Technology courses shall include use of computers or information technology to solve problems as appropriate". The one-hour weekly laboratory period and problem sets assigned during the lecture and lab will introduce statistical software applications likely to be encountered in the biological sciences (SPSS, Excel, SAS, for example). The goal is to provide students the opportunity to practice selecting and applying the appropriate statistical tool for a given research problem, and interpreting results obtained using these methods..

7. If this modification results in a GE-related change indicate GE category affected and Attach a GE Criteria Form:

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)	☐
UD Interdisciplinary	☐

8. New Resources Required. YES ☐ NO ☒

If YES, list the resources needed and obtain signatures from the appropriate programs/units on the consultation sheet below.

a. Computer (data processing), audio visual, broadcasting needs, other equipment)

b. Library needs

c. Facility/space needs

9. Will this course modification alter any degree, credential, certificate, or minor in your program? YES ☐ NO ☒

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

10. Effective Date (Semester and Year): Fall 2007

Amy Denton	6 November 2006
Proposer of Course Modification	Date

Request for GE Approval

Course Title	BIOL 203 Quantitative Methods for Biology
Units	3
Lab	Yes
New	No

GE Category	B4 Computers and Information Technology
Submitter	Denton, Amy
Submission Date	11-06-2006
Status	Approved

Criteria Justifications

- Promote the understanding and appreciation of the methodologies of math or science as investigative tools and the limitations of mathematical or scientific endeavors

  This course will introduce students to the quantitative skills and technological tools necessary to evaluate the literature and carry out original research in the life sciences.

- Present mathematical or scientific knowledge in a historical prespective and the influences of math and science on the development of world civilizations, both past and present

  Students will discover the various approaches biologists take to understand the natural world, and recognize that some of the natural sciences rely heavily on detailed observation and analysis of existing evidence, while others are primarily experimental in their approach. With either approach, conclusions are often more robust with the application of statistics and appropriate experimental design. This course will promote an understanding of the impact quantitative tools have had in the historical development of scientific knowledge and technology through the discussion of seminal research papers that trace the application of statistics and improved experimental design/sampling schemes to biological questions.

- Apply inductive and deductive reasoning processes and explore fallacies and misconceptions in the mathematical or scientific areas

  This course will teach students to apply statistical and quantitative problem-solving skills to biological questions, with special emphasis on descriptive statistics, measures of central tendency,

hypothesis testing, P-values, decision errors, power, and checking assumptions. Through the material presented in BIOL 203, students learn to distinguish fact from matters of judgement, reach independent conclusions based on sound inferences drawn from properly analyzed information, and apply critical thinking skills to interpret and evaluate critically scientific data and the results and conclusions presented in scientific and popular literature.

- Include use of computers or information technology to solve problems as appropriate

  In both lecture and lab, students will use statistical software applications (SPSS, Excel, and others at the discretion of the instructor) likely to be encountered in the biological sciences. Students will also become familiar with data visualization and presentation software. The goal is to provide students the opportunity to practice selecting the appropriate statistical method for a given research problem, applying the computer-based tool necessary, and interpreting and presenting results obtained using these methods.

Approvals
Program/Course: Biol 203

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Program Chair(s) Date

_____

General Education Chair(s) Date

_____

Curriculum Committee Chair(s) Date

_____

Dean of Faculty Date