

CALIFORNIA STATE UNIVERSITY CHANNEL ISLANDS

COURSE MODIFICATION PROPOSAL

Courses must be submitted by October 15, 2010, and finalized by the end of the fall semester to make the next catalog (2011-12) production

DATE (CHANGE DATE EACH TIME REVISED): 10/10/10; REV 3.16.11; REV 4.11.11

PROGRAM AREA(S): MATHEMATICS

Directions: All of sections of this form must be completed for course modifications. Use **YELLOWED** areas to enter data. All documents are stand alone sources of course information.

1. Indicate Changes and Justification for Each. [Mark all change areas 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 Outcomes |
| ☐ Course number | ☐ References |
| ☐ Units | ☐ GE |
| ☐ Staffing formula and enrollment limits | ☐ Other |
| ☒ Prerequisites/Corequisites | ☐ Reactivate Course |
| ☐ Catalog description | |
| ☒ Mode of Instruction | |

Justification. Since we added new programs (like nursing) application fields were broaden in the Learning Outcomes.

2. Course Information.

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

OLD

Prefix MATH/PSY Course# 202
Title Biostatistics Units (3)
3 hours lecture per week
Lab experience in class hours blank per week

☐ Prerequisites: A passing score on the Entry Level Mathematics Exam (ELM) or credit for Math 105 (or equivalent).

☐ Consent of Instructor Required for Enrollment
Corequisites: ☐

Catalog Description (Do not use any symbols):

Critical reasoning using a quantitative and statistical problem-solving approach to solve real-world problems. Uses probability and statistics to describe and analyze biological data collected from laboratory or field experiments. Course will cover descriptions of sample data, probability and empirical data distributions, sampling techniques, estimation and hypothesis testing, ANOVA, and correlation and regression analysis. Students will use standard statistical software (SPSS) to analyze real world and simulated data.

General Education Categories: A3, B3.

Grading Scheme (Select one below):

- ☒ A – F
☐ Credit/No Credit
☐ Optional (Student's Choice)

Repeatable for up to 9 units

Total Completions 3

Multiple Enrollment in Same Semester Y/N n

NEW

Pref Prefix MATH/PSY Course# 202
Title Title Biostatistics Units (3) Units (☐)
3 hours lecture per week
Lab experience in class hours blank per week

☐ Prerequisites: A passing score on the Entry Level Mathematics Exam (ELM) or credit for Math 105 (or equivalent).

☐ Consent of Instructor Required for Enrollment
Corequisites: ☐

Catalog Description (Do not use any symbols):

Critical reasoning using a quantitative and statistical problem-solving approach to solve real-world problems. Uses probability and statistics to describe and analyze biological data collected from laboratory or field experiments. Course will cover descriptions of sample data, probability and empirical data distributions, sampling techniques, estimation and hypothesis testing, ANOVA, and correlation and regression analysis. Students will use standard statistical software (SPSS) to analyze real world and simulated data.

General Education Categories: B3.

Grading Scheme (Select one below):

- ☒ A – F
☐ Credit/No Credit
☐ Optional (Student's Choice)

Repeatable for up to 9 units

Total Completions 3

Multiple Enrollment in Same Semester Y/N n

Course Level:
☒ Undergraduate
☐ Post-Baccalaureate
☐ Graduate

Course Level:
☒ Undergraduate
☐ Post-Baccalaureate
☐ Graduate

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

Hegis Code(s) _____
 (Provided by the Dean)

Existing

Proposed

	Units	Hours Per Unit	Benchmark Enrollment	Graded		Units	Hours Per Unit	Benchmark Enrollment	Graded	CS No. (filled out by Dean)
Lecture	<u>3</u>	<u>1</u>	<u>30</u>	X	Lecture	<u>3</u>	<u>1</u>	<u>20</u>	X	
Seminar		<u>1</u>			Seminar		<u>1</u>			
Lab		<u>3</u>			Lab		<u>3</u>			
Activity		<u>2</u>			Activity		<u>2</u>			
Field Studies					Field Studies					
Indep Study					Indep Study					
Other blank					Other blank					

4. Course Attributes:

X **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).

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

OLD

This is a required course for Biology majors because it introduces students to the type of critical reasoning used by biologists working with empirical data. Utilizing the standard quantitative and statistical problem solving approach required of biologists, students will gain experience with quantitative tools to test and advance biological theories based on empirical data. Through this course, students will be able to:

1. apply quantitative problem-solving skills to biological problems and issues;
2. select, apply and interpret descriptive statistics in an appropriate fashion;
3. select, apply and interpret hypothesis testing methods in an appropriate fashion;
4. reason both inductively and deductively with quantitative information and data;
5. use statistical software to conduct complex statistical analysis of real-world and simulated data; and,
6. write the results of a statistical study in a lab report.

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

NEW

This is a required course for social sciences and health related majors because it introduces students to the type of critical reasoning used in social sciences, medicine and biological sciences working with empirical data. Utilizing the standard quantitative and statistical problem solving approach required of biologists, students will gain experience with quantitative tools to test and advance biological theories based on empirical data.

 **X** Requirement for the Major/Minor
Elective for the Major/Minor
Free Elective

Submit Program Modification if this course changes your program.

6. Student Learning Outcomes. (List in numerical order. You may wish to visit resource information at the following website: <http://senate.csuci.edu/comm/curriculum/resources.htm>)

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

OLD

1. apply quantitative problem-solving skills to biological problems and issues;
2. select, apply and interpret descriptive statistics in an appropriate fashion;
3. select, apply and interpret hypothesis testing methods in an appropriate fashion;
4. reason both inductively and deductively with quantitative information and data;
5. use statistical software to conduct complex statistical analysis of real-world and simulated data; and,
6. write the results of a statistical study in a lab report.

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

NEW

1. apply quantitative problem-solving skills to **social sciences and health related** problems and issues;
2. select, apply and interpret descriptive statistics in an appropriate fashion;
3. select, apply and interpret hypothesis testing methods in an appropriate fashion;
4. reason both inductively and deductively with quantitative information and data;
5. use statistical software to conduct complex statistical analysis of real-world and simulated data; and,
6. write the results of a statistical study in a lab report.

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

OLD



NEW

1. Need for quantitative methods in the life and social settings
2. Statistical methods as ways to reason inductively and deductively in a quantitative framework
3. Methods of graphical and numerical description

4. Basic probability theory
5. Normal curve methods in statistics
6. Logic of sampling and sampling methods
7. Logic of hypothesis testing and experimental design
8. Logic of estimation
9. Basic hypothesis testing of differences: *t*- and *z*- tests
10. Advanced hypothesis testing: ANOVA models
13. Basic hypothesis testing of similarities: correlation and association
14. Advanced hypothesis testing of similarities: linear regression models
15. Reasoning about proportions: Chi-squared and other nonparametric methods and models
16. Simple spreadsheet methods for data description and analysis
17. Computer analysis of data using computer software including SPSS

Does this course content overlap with a course offered in your academic program? Yes ☒ No ☐

If YES, what course(s) and provide a justification of the overlap. The course has similar content as Math 201, but focuses on applications of statistical methods to data arising from the life and social sciences.

Does this course content overlap a course offered in another academic area? Yes ☐ No ☒

If YES, what course(s) and provide a justification of the overlap. This course has similar content to Biology 203, but teaches students to use specialized statistics software including SPSS.

Overlapping courses require Chairs' signatures.

8. 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:
- C. Program responsible for staffing:

9. References. [Provide 3-5 references]

OLD George, D., & Mallery, P. (2002). *SPSS for Windows step by step: A simple guide and reference* (4th ed.). New York: Allyn & Bacon.

Jackson, S. L. (2003). *Research methods and statistics: A critical thinking approach*. Pacific Grove, CA: Thompson.

Norman, G. R., & Streiner, D. L. (2000). *Biostatistics: The bare essentials* (2nd ed.). London: B. C. Decker.

Rosner, B. (2000). *Fundamentals of biostatistics with data disk* (5th ed.). Pacific Grove, CA: Thompson.

Westin, A. (1993). *A rulebook for arguments* (2nd ed.). Indianapolis: Hackett. [Also available online at: <http://www.hozien.com/mih/arg/rule.pdf>.

NEW

Westin, A. (2008). *A rulebook for arguments* (4th ed.). Indianapolis: Hackett. [Also available online at: <http://www.hozien.com/mih/arg/rule.pdf>.

George, D., & Mallery, P. (2009). *SPSS for Windows step by step: A simple guide and reference* (10th ed.). New York: Allyn & Bacon.

Jackson, S. L. (2008). *Research methods and statistics: A critical thinking approach* (3rd ed.). Wadsworth Publishing

Norman, G. R., & Streiner, D. L. (2008). *Biostatistics: The bare essentials* (3rd ed.). London: B. C. Decker.

Rosner, B. (2010). *Fundamentals of biostatistics* (7th ed.). Duxbury Press

10. Tenure Track Faculty qualified to teach this course.
All math faculty

11. Requested Effective Date or First Semester offered:

12. New Resource Requested: Yes No ☒
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.

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 4, 2010** of preceding year.

Priority deadline for Course Proposals and Modifications: **October 15, 2010.**

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

Ivona Grzegorzczuk

10/10/10

Proposer(s) of Course Modification

Date

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

Request for MATH 202: Biostatistics to be added to GE Category B3: Mathematics -- Mathematics and Applications.

Committee Response:

Approved by committee on 11-17-2010

Criteria and Justifications Submitted:

- *Promote the understanding and appreciation of the methodologies of math or science as investigative tools and the limitations of mathematical or scientific endeavors*
The focus of this course is the development and use of statistical methods and appropriate software for testing scientific hypotheses. Students learn the theoretical background for different types of hypothesis testing, the accuracy of results and learn the uses and limitations of different statistical tests.
- *Present mathematical or scientific knowledge in a historical perspective and the influences of math and science on the development of world civilizations, both past and present*
Students in this course will "apply quantitative problem-solving skills to social science and health related problems and issues." These health and social science issues are chosen to show the impact of statistical tools on the proper analysis, decision making and development of these scientific areas.
- *Apply inductive and deductive reasoning processes and explore fallacies and misconceptions in the mathematical or scientific areas*
Two learning objectives speak directly to this. "Through this course, students will be able to: ... select, apply and interpret hypothesis testing methods in an appropriate fashion; reason both inductively and deductively with quantitative information and data;"
- *Promote an understanding of mathematical ideas and problem solving skills*
Students will learn the technology and theory behind application of statistics as well as hypothesis testing and error evaluation methods in various scientific contexts.

Approval Sheet

Course: Math 202

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