CALIFORNIA STATE UNIVERSITY CHANNEL ISLANDS

NEW COURSE PROPOSAL

PROGRAM AREA _____

1. **Catalog Description of the Course.** *[Include the course prefix, number, full title, and units. Provide a course narrative including prerequisites and corequisites. If any of the following apply, include in the description: Repeatability (May be repeated to a maximum of ___ units); time distribution (Lecture ___ hours, laboratory ___ hours); non-traditional grading system (Graded CR/NC, ABC/NC). Follow accepted catalog format.]*

Biol 202. BIOSTATISTICS (3)
Three hours of lecture/laboratory per week.
Prerequisite: A passing score on the Entry Level Mathematics Exam (ELM) or credit for Math 105 (or equivalent).
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 to analyze real world and simulated data.
GenEd: B3
Same as MATH 202, PSY 202

MATH 202. Biostatistics (3)
Three hours of lecture/laboratory per week.
Prerequisite: A passing score on the Entry Level Mathematics Exam (ELM) or credit for Math 105 (or equivalent).
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 to analyze real world and simulated data.
GenEd: B3
Same as BIOL 202, PSY 202

PSY 202. Biostatistics (3)
Three hours of lecture/laboratory per week.
Prerequisite: A passing score on the Entry Level Mathematics Exam (ELM) or credit for Math 105 (or equivalent).
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 to analyze real world and simulated data.
GenEd: B3
Same as BIOL 202, MATH 202

2. **Mode of Instruction.**

	Units	**Hours per Unit**	**Benchmark Enrollment**
Lecture	3	1	48
Seminar			
Laboratory			
Activity			

3. **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]*

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 critical thinking skills obtained from this course to critique and interpret scientific data, results and conclusions in scientific literatures and mass media;
2. reach factual and independent conclusions based on sound inferences drawn from properly/improperly analyzed information;
3. distinguish matters of fact from issues of judgment or opinion presented by individuals, organizations, or scientific/ popular media;
4. apply quantitative problem-solving skills to biological problems and issues;
5. select, apply and interpret descriptive statistics in an appropriate fashion;
6. select, apply and interpret hypothesis testing methods in an appropriate fashion;
7. reason both inductively and deductively with quantitative information and data;
8. use statistical software to conduct complex statistical analysis of real-world and simulated data; and,
9. write the results of a statistical study in a lab report.

4. Is this a General Education Course **YES** **NO**

If Yes, indicate GE category:

A (English Language, Communication, Critical Thinking)	**A3**
B (Mathematics & Sciences)	**B3**
C (Fine Arts, Literature, Languages & Cultures)	
D (Social Perspectives)	
E (Human Psychological and Physiological Perspectives)	

5. Course Content in Outline Form. *[Be as brief as possible, but use as much space as necessary]*

Need and reasons for quantitative methods in science in general and biology in specific
Distinguish facts from fallacies using examples and matierals from scientific literature and mass media
Statically methods as ways to reason inductively and deductively in a quantitative framework
Methods of graphical and numerical description
Basic probability theory
Normal curve methods in statistics
Logic of sampling and sampling methods
Logic of hypothesis testing and experimental design
Logic of estimation
Basic hypothesis testing of differences: *t*- and *z*- tests
Advanced hypothesis testing: ANOVA models
Basic hypothesis testing of similarities: correlation and association
Advanced hypothesis testing of similarities: linear regression models
Reasoning about proportions: Chi-squared and other nonparametric methods and models
Simple spreadsheet methods for data description and analysis
Computer analysis of complex biological data using SPSS

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

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.

7. List Faculty Qualified to Teach This Course.

Dr. Harley Baker
Dr. Kevin Volkan
Biology and math faculty with the expertise in statistical applications in biology

8. Frequency.

a. Projected semesters to be offered: Fall __**X**__ Spring __**X**__ Summer _____

9. New Resources Required.

a. Computer (data processing), audio visual, broadcasting needs, other equipment
b. Library needs
c. Facility/space needs

10. Consultation.

Attach consultation sheet from all program areas, Library, and others (if necessary)
Consultation has been carried out with Drs. Harley Baker, Kevin Volkan and Ivona Grzegorczyk.

11. If this new course will alter any degree, credential, certificate, or minor in your program, attach a program modification.

____Harley Baker_____1/8/03_____
Proposer of Course Date