CALIFORNIA STATE UNIVERSITY CHANNEL ISLANDS

NEW COURSE PROPOSAL

PROGRAM AREAS _____BIOLOGICAL AND PHYSICAL SCIENCES, MATH AND COMPUTER SCIENCE

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 431. BIOINFORMATICS (4)

   Four hour lecture in the lab per week.
   Prerequisites: CHEM 318 or 400; BIOL 400 with a grade of C or better.
   The rapid expansion of data acquisition for the human genome and proteome has huge implications for our understanding of the most fundamental processes that direct human life. An understanding of the methodoligies used to acquire, store and analyse these data bases is of great value for students choosing to pursue careers in molecular biology, genetics and biotechnology. Topics include: reglating the genome, including epigenetic mechanisms, the human genome project, including the clinical genetics databases, bioinformatics tools and databases, identifying functional and structural sequence elements, analysis of gene expression: microarrays and other tools. A lab fee is required.
   GenEd ID: B2, B4, and Interdisciplinary

2. **Mode of Instruction.**

	Units	Hours per Unit	Benchmark Enrollment
Lecture	___4_____	___1_____	__24_____
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 an elective course for Biology majors.. An understanding of the methodoligies used to acquire, store and analyse these data bases is of great value for students choosing to pursue careers in molecular biology, genetics and biotechnology.

   Students completing this class should be equipped with the knowledge and skills to:
   - Describe the flow and regulation of biological information
   - Describe the techniques used to collect sequence and expression data
   - Identify appropriate biological data bases for specific analyses
   - Manipulate on-line resources appropriately
   - Analyse gene expression and interpret its significance
   - Manage bioinformatics tools
   - Apply appropriate statistical methods to determine sequence similarities

4. **Is this a General Education Course**   **YES**
   If Yes, indicate GE category:

A (English Language, Communication, Critical Thinking)	
B (Mathematics & Sciences)	B2, B4
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]*

1. Introduction
2. Cell and molecular biology
3. Reglating the genome, including epigenetic mechanisms
4. Human genome project, including the clinical genetics databases
5. Bioinformatics tools and databases
6. The genome database: analysis and similarity searching
7. Identifying functional and structural sequence elements
8. Analysis of gene expression: microarrays and other tools

6. **References.** *[Provide 3 - 5 references on which this course is based and/or support it.]*
   1. **Bioinformatics: Sequence and Genome Analysis**, D.W. Mount, Cambridge Univ Press,1999.
   2. **Introduction to Bioinformatics: A Practical and Theoretical Approach**, by D. Womble, Blackwell, 2002.
   3. **Fundamental Concepts of Bioinformatics**, by DE Krane and ML Raymer, Addison Wesley, 2003.
   4. **Introduction to Bioinformatics**, by AM Lesk, Oxford Univ. Press, 2002.
   5. **DNA Microarrays and Gene Expression: From Experiments to Data Analysis and Modeling**, by P. Baldi, W.G. Hatfield, Cambridge Univ. Press, 2002.

7. **List Faculty Qualified to Teach This Course.**

   Biology faculty with expertise in Bioinformatics.

8. **Frequency.**
   a. Projected semesters to be offered: Fall ___X__   Spring _X____   Summer _____

9. **New Resources Required.**

   None

10. **Consultation.**
    Attach consultation sheet from all program areas, Library, and others (if necessary)

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

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Proposer of Course   Date