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 410. COMPUTER APPLICATIONS IN BIOMEDICAL FIELDS (3)
Three hours of lecture in the lab per week.
Prerequisites: BIOL 201 or consent of the instructor.
Current applications of computers and data processing technology to the understanding and solving of specific problems in biomedical fields.
Same as COMP 410

COMP 410. COMPUTER APPLICATIONS IN BIOMEDICAL FIELDS (3)
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Same as BIOL 410

2. **Mode of Instruction.**

	Units	Hours per Unit	Benchmark Enrollment
Lecture	___3_____	___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]*

The course is an elective course for Computer Science and Biology majors.

Through this course, students will be able to –

- Use internet resources and publicaly available biological data bases
- Apply computanional methods to image analysis in biological systems – from cells to organisms
- Understand the flow of biological information from DNA to protein
- Understand protein classification, structure and function
- Understand the principles of control theory, systems analysis, and model identification used in physiological regulation.
- Present their work in the form of electronic portfolios
- Analyze biological data using various computational software packages
- Apply statistical methods to analyze patterns of similarities in biological sequences
- Use simulation tools to understand central concepts
- Perform independent research and prepare comprehensive projects
- Work in teams

- Solve problems in various contexts.
- Organize and express ideas clearly and convincingly in oral, electronic, visual, and written forms, and as an interactive computer simulation..

This course is not designed to satisfy the University Writing or Language requirements.

4. Is this a General Education Course NO
If Yes, indicate GE category:

A (English Language, Communication, Critical Thinking)	
B (Mathematics & Sciences)	
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 to Biocomputing
2. Data procedssing and image analysis of biological systems from cells (FACS) to whole body (CAT) scans
3. Modeling and analysis of biological control systems
4. Central Dogma
5. Protein structure, function and classification
6. DNA and protein data banks
7. Protein visualization and modeling
8. Biological sequence comparison
9. BLAST theory and practice
10. Patterns and probabilistic models, profiles
11. Computational analysis and statitical methods for analysis of biological data
12. Case studies, final projects

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

1) Biological Sequence Analysis : Probabilistic Models of Proteins and Nucleic Acids by Richard Durbin , Sean R. Eddy , Anders Krogh , Graeme Mitchison , Cambridge University Press, (2000)
2) Bioinformatics: A Practical Guide to the Analysis of Genes and Proteins, Second Edition by Andreas D. Baxevanis, B. F. Francis Ouellette, Wiley-Interscience; ISBN: 0471383910; 2nd edition (2001)
3) Developing Bioinformatics Computer Skills, by Cynthia Gibas, Per Jambeck O'Reilly & Associates; ISBN: 1565926641; 1st edition (2001)
4) Bioinformatics Computing, by Bryan P. Bergeron , Prentice Hall; ISBN: 0131008250; 1st edition (2002)
5) Computing with Cells and Atoms: An Introductin to Quantum, DNA and Membrane Computing, by C.S. Calude and G.Paun. Taylor & Francis; ISBN: 0748408991; (2001)
6) Computing Supplement to Models in Biology, Mathematics, Statistics and Computing (Book With Disc) by D. Brown. John Wiley & Son Ltd; ASIN:0471943266; (1993)
7) Biomedical Signal Analysis: A Case Study Approach, by Rangaraj M. Rangayyan. John Wiley & Sons; ISBN: 0471208116; (2001)
8) Physiological Control Systems : Analysis, Simulation, and Estimation by Michael C. K. Khoo. ISBN: 0780334086; (1999)

7. List Faculty Qualified to Teach This Course.

Computer Science faculty with expertise in Biocomputing.

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

Use of existing computer lab.

b. Library needs

none

c. Facility/space needs

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.

_____Louise Lutze-Mann_____1-7-03_____
Proposer of Course Date