

**ORIGINATOR'S SECTION:**

1. College: Arts and Sciences Desired Term: Spring and Year 2009 of implementation.

2. Course is to be considered for G.E.? (If yes, also fill out appropriate GE form\*) Yes X No \_\_\_\_\_

3. Course will be a variable-topics (generic) course? ("generic" is a placeholder for topics) Yes \_\_\_\_\_ No X

4. Course abbreviation and Number:\* BIOL 326

5. Title: (Titles using jargon, slang, copyrighted names, trade names, or any non-essential punctuation may not be used.)  
Biological Trends in 21<sup>st</sup> Century Medicine

6. Abbreviated Title for Banner:  
(no more than 25 characters, including spaces)  
21<sup>st</sup> Century Medicine

7. Number of Units: 3

8. Catalog Description: (Not to exceed 80 words; language should conform to catalog copy. Please consult the catalog for models of style and format; include all necessary information regarding consent for enrollment, pre- and/or corequisites, repeated enrollment, crosslisting, as detailed below. Such information does not count toward the 80-word limit.)

~~This introductory course~~ E explores the science and controversy surrounding a broad range of cutting edge science topics that will change the way we look at medicine in the 21<sup>st</sup> century. Topics include cloning, GE foods and animals, stem cell research, genetic testing, and the development of personalized gene chips for personalized medical attention.

9. Why is this course being proposed? Science is rapidly advancing and will offer dramatic changes to people in the coming years. The ability to understand these advances and accurately access the implications of these controversial advances while being bombarded with often politicized and misleading misinformation is key to continuing this amazing progress. This course would be appropriate for upper division, non-major seeking "BB" credit.

**10. Mode of Instruction\***

(See pages 17-23 at <http://www.calstate.edu/cim/data-element/APDB-Transaction-DED-SectionV.pdf> for definitions of the Course Classification Numbers)

Type of Instruction	Number of Credit Units	Instructional Mode (Course Classification Number)
Lecture	3	C-2
Activity		
Lab		

**11. Grading Method:\***

N Normal (N) (Allows Letter Grade +/-, and Credit/No Credit)  
 \_\_\_\_\_ Normal Plus Report-in-Progress (NP) (Allows Letter Grade +/-, Credit/No Credit, and Report-in-Progress)  
 \_\_\_\_\_ Credit/No Credit Only (C)  
 \_\_\_\_\_ Credit/No Credit or Report-in-Progress Only (CP)

12. If the (NP) or (CP) grading system was selected, please explain the need for this grade option.

\* If Originator is uncertain of this entry, please consult with Program/Department Director/Chair.

13. Course Requires Consent for Enrollment?  Yes  No  
 Faculty  Credential Analyst  Dean  Program/Department - Director/Chair

14. Course Can be Taken for Credit More than Once?  Yes  No  
 If yes, how many times \_\_\_\_\_ (including first offering)

15. Is Course Crosslisted:  Yes  No  
 If yes, indicate which course \_\_\_\_\_ and check "yes" in item #22 below.

16. Prerequisite(s): NONE

17. Corequisite(s): NONE

18. Documentation attached: \_\_\_\_\_ Syllabus or  Detailed Course Outline

19. If this course has been offered as a topic, please enter topic abbreviation, number, and suffix:\*

20. How often will this course be offered once established?\*every semester

**PROGRAM DIRECTOR/CHAIR - COLLEGE CURRICULUM COMMITTEE SECTION:**  
*(Mandatory information - all items in this section must be completed.)*

21. Does this course fulfill a requirement for any major (i.e., core course or elective for a major, majors in other departments, minors in other departments)? YES \_\_\_\_\_ NO   
 If yes, please specify:  
 Offered to fulfill area BB.

22. Does this course impact other discipline(s)? *(If there is any uncertainty as to whether a particular discipline is affected, check "yes" and obtain signature.)* \_\_\_\_\_ Yes  No  
 If yes, obtain signature(s). Any objections should be stated in writing and attached to this form.

_____	_____	_____	Support	_____	Oppose
Discipline	Signature	Date			
_____	_____	_____	Support	_____	Oppose
Discipline	Signature	Date			

**SIGNATURES : (COLLEGE LEVEL) :**

*Attached*

1. Originator (please print or type name) \_\_\_\_\_ Date \_\_\_\_\_  
 2. Program Director/Chair \_\_\_\_\_ Date \_\_\_\_\_  
 3. College Curriculum Committee \_\_\_\_\_ Date \_\_\_\_\_  
 4. College Dean (or Designee) \_\_\_\_\_ Date \_\_\_\_\_

**(UNIVERSITY LEVEL)**

5. UCC Committee Chair \_\_\_\_\_ Date \_\_\_\_\_  
 6. Vice President for Academic Affairs (or Designee) \_\_\_\_\_ Date \_\_\_\_\_  
 7. President (or Designee) \_\_\_\_\_ Date \_\_\_\_\_

\* If Originator is uncertain of this entry, please consult with Program/Department Director/Chair.

Michael Burg 3-9-08  
1. Originator (please print or type name) Date

Dennis Garcia 3-10-08  
2. Program Director/Chair Date

Mark Wallace 05-01-08  
3. College Curriculum Committee Date

[Signature] 5/12/08  
4. College Dean (or Designee) Date

\_\_\_\_\_  
5. UCC Committee Chair Date

\_\_\_\_\_  
6. Vice President for Academic Affairs (or Designee) Date

\_\_\_\_\_  
7. President (or Designee) Date

\* If Originator is uncertain of this entry, please consult with Program/Department Director/Chair.

## Biological Trends in 21<sup>st</sup> Century Medicine

This introductory course explores the science and controversy surrounding a broad range of cutting edge science topics that will affect all of us in the 21st century. Topics include the human genome project, cloning, GM foods and animals, stem cell research, genetic testing, and the development of personalized gene chips.

Course Objectives: Upon successful completion of the course the student will be able to:

1. Describe the accomplishments of the human genome project and how this information is being used to advance science in the 21<sup>st</sup> century.
2. Describe the central dogma of molecular biology.
3. Describe what stem cells are and how they can be used for therapeutic and reproductive cloning.
4. Explain the basic principles of Mendelian genetics and contrast this to complex inheritance patterns of complex human behaviors.
5. Describe the basic techniques used in biotechnology including cloning, PCR, DNA fingerprinting, genomics, and proteomics.
6. Describe and debate on how data from the human genome project is being used for the development of personalized genetic analysis of people.
7. Read, analyze, and debate current literature from scientific periodicals concerning stem cells, genetic testing, and GM foods.
8. Examine the socio-economic impact that personalized genetic testing has on families and society.

### Weeks

- I. Introduction: The Human Genome Project: What the future holds.
  - a. Introduction to scientific frontiers of the 21<sup>st</sup> century
  - b. The Human Genome project:
    - i. What has been accomplished
    - ii. How this information will be used: Promises and dangers
- II. Introduction to DNA and molecular biology
  - a. Structure and replication of DNA
  - b. Mitosis and meiosis: How DNA is allocated to daughter cells.
  - c. The flow of genetic material: Transcription and translation
- III. Introduction to Biotechnology: PCR, cloning, DNA fingerprinting
  - a. Cloning and recombinant DNA
  - b. DNA sequencing, PCR, RFLP analysis
- IV. GM foods, bacteria, and animals: The good, the bad, the ugly.
  - a. Benefits and dangers of GM products
  - b. Current GM products on the marketplace
  - c. GM products in development
- V. Introduction to Mendel and heredity
  - a. Mendelian inheritance patterns
  - b. Exceptions to Mendelian inheritance: Blood groups, codominance and polygenic inheritance

- VI. How genes interact with environment in complex human behaviors
  - a. Genes, environment and behavioral disorders
  - b. Genes, environment and intelligence
  - c. Genes, environment and sexual orientation
- VII. Reproductive Technology, Gene Therapy, and Genetic Counseling
  - a. Assisted reproductive technology (ART)
  - b. Gene therapy
  - c. Genetic counseling
- VIII. Genetic testing: Promises and pitfalls.
  - a. Traditional genetic testing
  - b. The Human genome project and genetic profiling
- IX. Gene chips, diseases, and personalized medicine
  - a. Mail-order genetic tests for disease predisposition
  - b. Mail-order genetic tests for personalized diet plans
  - c. Mail-order genetic tests for ???
- X. Introduction to stem cell biology
  - a. Embryonic vs adult stem cells
  - b. Therapeutic vs reproductive stem cell
  - c. Nuclear transfer
- XI. Stem cell therapeutics
  - a. Stem cell therapies for diabetes
  - b. Stem cell therapies for neurodegenerative disease
- XII. Stem cell alternatives
  - a. Cord blood stem cells
  - b. Placental stem cells
  - c. Induced pluripotent stem cells
- XIII. Review of current literature: Selected current news stories and articles
- XIV. Student group presentations

**Biology of Cancer: What causes cancer?  
(10 pts)**

**Names:**

Observation: Reports that suggest that cell phones might cause brain cancer.

Question: Do cell phones cause cancer?

It is your job to design an epidemiologic study to help answer this question.

1. What is your group's hypothesis?

2. Design an experiment to test your hypothesis. Make sure you define your **experimental group**, **control group**, **experimental variable**, and at least three **controlled variables**

**Describe your experiment:**

**How will you measure your results?**

	Experimental Group	Control Group	
			Experimental variable
			Controlled variable #1
			Controlled variable #2
			Controlled variable #3

Is your study prospective or retrospective? Explain.

**Describe what you have done to limit the problem of bias and confounding variables.**

**Will your results demonstrate cause and effect....that cell phones cause cancer? Explain.**

**Propose an animal model that will help resolve this issue**

Read **Your cells are my cells** and answer the following questions>

1. Define microchimerism. What type/class of transferred cells appear to survive, grow and persist in recipient individuals?

2. Complete the following table:

	<b>Maternal microchimerism</b>	<b>Fetal microchimerism</b>
<b>Source of chimeric cells</b>		
Possible benefits to recipient of cells including future therapeutic applications		
Possible harmful effects to recipient of cells (include at least two diseases)		

Human Heredity Homework #3 supplement Due Thursday Jan. 24

Read: **Disease for Darwinism** and answer the following questions

1. What are the two observations made by the authors that suggest that Huntington's might offer people adaptive advantages?
2. What is p53 and explain how Huntington's might influence this protein and affect cancer incidence.
3. What is **antagonistic pleiotropy** and how is this thought to be involved with members of the population with Huntington's disease? Do you agree? Explain.

**Debbie Schwarz**

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**From:** Staci Beavers  
**Sent:** Monday, March 31, 2008 11:19 AM  
**To:** Denise Garcia  
**Cc:** Debbie Schwarz  
**Subject:** BIOL 326 CAPC Review  
**Attachments:** stemCUPD.doc

Hi Denise,

Thanks for the responses and the updated C form. I'm passing along to Debbie for the next CAPC meeting. Enjoy the rest of the break! Staci

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**From:** Denise Garcia  
**Sent:** Monday, March 31, 2008 10:11 AM  
**To:** Staci Beavers  
**Subject:** RE: CAPC review of BIOL 326

Hi Staci,  
 I have attached the new C form and answered the questions below.

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**From:** Staci Beavers  
**Sent:** Thursday, March 27, 2008 4:16 PM  
**To:** Michael Burg; Denise Garcia  
**Cc:** Debbie Schwarz  
**Subject:** CAPC review of BIOL 326

Hi Michael and Denise,

I am writing on behalf of the College of Arts & Sciences Curriculum Committee (CAPC). We reviewed the proposal to create BIOL 326 (the "C form") at today's meeting, and we have several questions/concerns that need to be addressed before the proposal can move forward. Please consider the items below and resubmit the completed "C" form as soon as possible.

1. We're concerned that the course title and course content (as reflected in the catalog description and the course outline) may not fit very well (i.e., perhaps there's less "medicine" in the course than there is "forensic science?"). So the committee is requesting that a new title be proposed to more accurately reflect the course content.

We are confused about this one. Every example in the course description is the future of medicine not forensic science. The Wikipedia definition of personalized medicine: "is the use of information and data from a patient's genotype, level of gene expression and/or other clinical information to stratify disease, select a medication, provide a therapy, or initiate a preventative measure that is particularly suited to that patient at the time of administration. Personalized medicine makes it possible to give: "the appropriate drug, at the appropriate dose, to the appropriate patient, at the appropriate time". The benefits of this approach are in its accuracy, efficacy, safety and speed. The term emerged in the late 1990s with progress in the Human Genome Project. Research findings over the past decade, or so, in biomedical research have unfolded a series of new, predictive sciences that share the appendage -omics (genomics,

proteomics, lipidomics, metabolomics, cytomics). These are opening the possibility of a new approach to drug development as well as unleashing the potential of significantly more effective diagnosis, therapeutics, and patient care. Laboratories that support personalized molecular medicine develop patient-specific tests that monitor the effectiveness of treatment and can identify the recurrence of disease far earlier than was once possible."

Therefore, we respectfully request to keep the name as it is.

2. Regarding Item #9 of the "C" form: the course is described as being appropriate for students interested in Nursing or BIOL—will the class actually be applicable for credit to these majors, or is the course in fact intended for non-science majors? I have changed this to just include non-majors.
3. The following questions on the "C" form were not answered: #14, #15, #16, #17, #21.

Please contact Debbie Schwarz in the Dean's office or myself if you have questions. Thanks! Staci

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