# RECEIVED OCT 1 5 2007

ATTACHMENT A

### PROPOSAL FOR COURSE CHANGE

To: Curriculum Committee

From: Department of Biological Sciences

Date submitted: October 11, 2007

Request for: Course addition

Submitted by: Dr. Ivan H. Still, Assistant Professor of Biology Immu M

Approved by: Department Head: March Agen

Dean of School

Reviewed by: Registrar:

Vice President:

I. Catalog description: (AS IT WILL APPEAR IN THE CATALOG).

Number: BIOL 4083

Title for Catalog: Cancer Biology

\*Title for Course Inventory: Cancer Biology

Description: An in-depth study of major areas and topics in cancer biology, including etiology and epidemiology of cancer, impact of the human genome mapping project, molecular genetics and cell biology of cancer, cancer modeling and clinical aspects of human cancer.

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Prerequisites: BIOL 3034

Effective date or term: As soon as possible.

II. Justification and feasibility of course:

A. What is the need for this course? Who will take it?

This course was taught successfully once as Advanced Topics (BIOL 4883) during the spring semester 2007. We suggest that this course become a permanent 3-credit offering (**BIOL 4083**) within our program. The course will be suitable for students with a general interest in the topic. However, of particular importance, this course will provide significant background for students wishing to pursue medical or research careers in the cancer field.

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B. How does it relate to other work being offered by your department? Is there an overlap with other courses in the department?

The department currently offers courses in Molecular Genetics (BIOL4074), Cell Biology (BIOL4033), Human Physiology (BIOL3074) and Histology (BIOL4054). These courses cover normal and to a certain extent human disease processes. The addition of a Cancer Biology course will enhance the representation of medically oriented biology electives. In particular, this course will provide a new avenue in human disease study for Biology Majors and PreMed students.

C. Is this course part of any general plan of development within your department? Explain.

During **assessment** committee meetings, BIOL faculty have expressed a desire to see additional specialized offerings that can meet a growing need for training/preparation of students in the medical and biopharmaceutical fields. Cancer Biology would provide students with the opportunity to explore a medical/research option previously unavailable at TECH.

D. How often will the course be offered?

This course will be taught each spring semester.

E. How will the course be staffed?

A faculty member (Dr. Still) from the Biology program will teach this course.

F. How will this course change affect other departments' students and offerings? With what other departments have you specifically consulted?

It is not thought that this new course offering will affect other department's students or offerings.

III. Integration with assessment plan:

Faculty in the BIOL Program annually assess student learning by administering an exit exam (Major Field Tests, Educational Testing Service). Additionally, these faculty discuss student classroom performance in cell/molecular biology as well as other areas. It was concluded that at least some of the students could benefit from additional cell/molecular offerings, particularly in relation to a medical/research related cell/molecular option. After piloting the course, the faculty have decided that Cancer Biology should be offered regularly as an upper level elective. We hope to see many students take advantage of this opportunity and we hope to see improvement in classroom performance in related areas, and in the assessment outcomes.

# **BIOL 4083 Cancer Biology**

## Dr. Ivan H. Still - Instructor

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Office Hours:	M3-5 TW2-5, R10-12, or by ap	opointment

Required Text: The Biology of Cancer Weinberg (2007) Garland Science. ISBN 08153-4076-1

Suggested Text: *Molecular Biology of the Cell* Alberts et al. (2002). Garland Science ISBN 08153-4072-9

#### **Course Description:**

This advanced course covers modern aspects of cancer biology. Prerequisites: BIOL 3034. Topics included are: etiology and epidemiology of cancer, impact of the human genome mapping project, molecular genetics and cell biology of cancer, cancer modeling and clinical aspects of human cancer. Lecture: three hours per week.

#### **Course Rationale:**

This course provides an introduction and overview of major areas and topics in cancer biology. It will build on the knowledge presented in previous courses, such as BIOL1114 and 3034. In particular, it will apply that knowledge to a major concern in the modern world. The course will be suitable for students with a general interest in the topic, as well as providing significant background for students wishing to pursue medical or research careers in the extensive field that is cancer.

#### **Course Objectives:**

By the end of the course, you will be able to:

- 1. Describe the major factors leading to the initiation of cancer;
- 2. Describe the impact of genetics and the human genome project on our understanding of familial cancer;
- 3. Understand the technologies currently in use in cancer genetics and cancer biology;
- 4. Discuss the role of retinoblastoma and p53 gene products in normal and malignant development;
- 5. Describe the interrelationship of chromosomal instability and defects in mitosis;
- 6. Describe sources and repair of genetic damage;
- 7. Understand the complexities of cell signaling in the normal and cancerous cell;
- 8. Describe how hormone receptors control gene transcription;
- 9. Describe the relationship of cell signaling and the cytoskeleton;
- 10. Describe the process of angiogenesis and how cancer cells leave their initial site and metastasize;
- 11. Understand the clinical aspects of cancer, and the problems of treatment;
- 12. Describe the impact of high throughput analyses to cancer biology and treatment; and
- 13. Describe site-specific studies of cancer.

### Grading Criteria:

Lecture Tests (5)	30% (the 4 best test scores will constitute the
	final score)
Final	30%
Essays (3)	30%
Class participation/report for L40-42	10%

### Grading Scale:

Grades of A, B, C, D, or F will be assigned in an absolutely fair and impartial fashion for respective averages

85-100 %	Α
75-85	В
65-75	С
55-65	D
<55	F

Additional credit toward a higher grade can, at any time, be earned through extra study. Volunteer service and extra educational participation such as blood donation, community-based reading program participation, attendance at guest lectures, etc. can be submitted for consideration in cases where a student is within 1.0% of the next higher grade. Otherwise, 84.999% is a "B" and 85.001% is an "A". The main source material for tests will be from the lectures, with some supplementary material from the associated reading guide. The Powerpoint Presentations are your main study guide, with the key topics section at the end of each lecture acting as the areas that you are definitely expected to know. Three unexcused absences from lectures and/or tests will result in being dropped from the course with a grade of F\* for excessive absences.

#### Lecture Tests:

There will be five 40 minute Tests. The lowest test grade will be dropped. Tests will be a mixture of multiple-choice, fill in the blank and short answer questions. Make-up tests will be allowed, subject to scheduling issues, and notice.

#### Homework:

There are three open-book homework assignments. These are designed to cover course material, but are also designed to encourage the student to read around the subject. This homework will be assessed for scientific content, how the student answered and interpreted the question (showing the thought process involved) and essay style. These assignments are designed to be instructional and help to develop scientific essay writing skills. Further details will be given out early in the course.

#### Final Exam:

The final exam will be comprehensive. It will follow a format similar to the lecture test, and include multiple choice questions, complete the statement, short answers and essay type questions. Details will be provided later in the course.

#### **Class participation for L40-L42:**

"Lectures" 40 - 42 are "Site specific Cancer studies". These bring together parts of the course and three specific chapters in the main text book to apply them to studies of breast, prostate and lung cancer. Class members will be asked to put forward views on how genetics, and biology interrelate to epidemiology and medical aspects of these cancers. A short summary report (2-3 pages) for each site will be submitted at the end of each class.

# **Tentative Lecture Schedule**

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Class	Date	Topics
1	Week 1	Introduction, The Nature of Cancer
2		Clinical Aspects I: Pathology
3		Clinical Aspects II: Incidence of Cancer
4	Week 2	Origins of Cancer I: Chemical Carcinogenesis
5		Origins of Cancer II: Physical Agents in human carcinogenesis
6		Origins of Cancer III: Viral Carcinogenesis
7	Week 3	Clinical Aspects III: Epidemiology, Etiology and prevention
8		Molecular Techniques I: DNA methodologies
9		Introduction to bioinformatics
10	Week 4	Test 1: Lectures 1-8
11		The human genome mapping project
12		The Cancer Genome I: Hereditary Cancers
13	Week 5	The Cancer Genome II: Leukemias
14		The Cancer Genome III: Solid Tumors
15		Molecular Techniques II: Cell culture
16	Week 6	Test 2. Lectures 9-14
17		The Cancer Genome IV: nRB control of the cell cycle
18		The Cancer Genome V: P53 the guardian of the cell
19	Week 7	The Cancer Genome VI: Cell immortalization and telomerase
.,	Essay 1 due	
20	25549 1 440	The Cancer Genome VI <sup>1</sup> Mitosis and chromosomal abnormalities
21		The Cancer Genome VII: Defects in DNA repair pathways
22	Week 8	Cell Biology of Cancer I: Principles of cell signaling pathways
23		Test 3. Lectures 15-19
$\frac{23}{24}$		Cell Biology of Cancer II. Growth factors and their recentors
25	Week 9	Cell Biology of Cancer III: Gene regulation
26		Cell Biology of Cancer IV: The Wnt pathway and colon cancer
27		Cell Biology of Cancer V: The cytoskeleton
28	Week 10	Cell Biology of Cancer VI. The Extracellular matrix
29	Essay 2 due	Molecular Techniques III: Modeling cancer
30	155 <i>uj 1</i> uue	Angiogenesis
31	Week 11	Test 4. Lectures 20-28
32		Metastasis I
33		Metastasis II
34	Week 12	Clinical Aspects IV: Genetic Counseling
35		Molecular techniques IV: High throughput technologies
36		Clinical Aspects V. Biomarkers in Cancer
37	Week 13	Clinical Aspects VI: Clinical Trials
38		Clinical Aspects VII: Cancer Treatment
39		Test 5: Lecture: 29-36
40	Week 14	Site-specific Cancer study: Breast
10	Essay 3 due	She speente cunter study. Breast
41	_000, 0 <b>uu</b>	Site-specific Cancer study: Prostate
42		Site-specific Cancer study: Lung
43	Week 15	Review for Key Topics
44		Review for Key Topics