MEMORANDUM

To: Kathy Turner, Chair
    Undergraduate Curriculum Committee

Through: Gordon L. Nelson, Ph.D.
         Dean, College of Science
         or Hamid K. Rassoul, Ph.D.
         Associate Dean, College of Science

Through: Mark Bush, Ph.D.
         Chair of the Department of Biological Sciences

From: Richard R. Sinden, Ph.D.
      Professor, Department of Biological Science

Date: January 17, 2008

Subject: Approval of a New Course in Biology

I request approval of a new Biology course –

**Special Topics in Molecular Biology, BIO 4150** (suggested number)

This course is needed to provide additional courses for Molecular Biology and Pre Professional Biology Majors. At present, there are not many electives or choices for these majors. This will provide one option. It is designed to allow flexibility of advanced, special topics in the area of molecular biology. While it is not possible to cover all areas not presently covered by the current departmental offerings in one course, this course will allow faculty to focus on about 3 important areas, and these areas may change from year to year. This will allow the flexibility of any professor with expertise in molecular biology to teach the course.

Immediately, the course will also provide undergraduate teaching opportunities for Dr. Sinden.

Topics will vary from year to year but they will include important current topics in molecular biology that impact the field of molecular biology (or molecular genetics) and human health. Depending on the breadth of the topic, 3-4 topics will be covered. Topics included at present include:

- Molecular Mechanisms of DNA Mutagenesis
- DNA repair mechanisms (prokaryotic and eukaryotic)
- Functional organization of DNA in eukaryotic cells
- Eukaryotic DNA replication mechanisms, including initiation
- Mechanisms of genome instability leading to cancer and human genetic disease

Attached find:
- A Course Request that has been approved by Liz Fox.
- A tentative syllabus.
This course is available for student registration only after the approval process has been completed.

SUBJECT: BIO  
COURSE NO.: 4051  
CREDIT HOURS: 3  
TERM TO BE ADDED TO THE FILE: Fall 2008  

CLASS HOURS:  
LECTURE HOURS:  
LAB HOURS:  
CONTACT HOURS (CEU ONLY):  

DEPARTMENT: Biological Sciences  
SCHEDULE TYPE: Special Topics  

☐ COLLEGE OF AERONAUTICS-23  
☐ COLLEGE OF PSYCHOLOGY AND LIBERAL ARTS-25  
☐ COLLEGE OF BUSINESS-24  
☒ COLLEGE OF SCIENCE-26  
☐ COLLEGE OF ENGINEERING-01  
☐ UNIVERSITY COLLEGE EXTENDED STUDIES-27  

COMPUTER TITLE: Restricted to 25 characters, including spaces  
Spec Topics Molecular Bio  

CATALOG TITLE: Special Topics in Molecular Biology  

CATALOG DESCRIPTION OF COURSE: Limited to 350 characters, including spaces  
Covers current and import topics in cell and molecular biology. May include mechanisms of DNA mutagenesis, DNA damage, prokaryotic and eukaryotic DNA repair schemes, eukaryotic DNA organization and function, eukaryotic DNA replication mechanisms, genome instability associated with human disease.  

In addition, you may attach a course syllabus and/or more detailed description.  

REQUIREMENTS:  
☒ Prerequisite BIO 4010  
☐ Corequisite  
☐ Prerequisite  
☐ Corequisite  
☐ Prerequisite  
☐ Corequisite  

GRADES TO BE ISSUED:  
☒ A,B,C,D,F  
☐ A,B,C,D,F,CEU  
☐ CEU  
☐ S,U  
☐ P,F  
☐ Other  

ADDITIONAL RESTRICTION:  
(e.g., Major, Class Level, Department Head Approval)  

If this course replaces a course currently offered in BANNER, please indicate old course information  

SUBJECT: Alpha Prefix (e.g., CSE)  
COURSE NO. (e.g., 301)  

APPROVALS: Upon completion of appropriate department approvals, submit form to Chair, Graduate Council, 
or Chair, Undergraduate Curriculum Committee for approval below and forward to Catalog Director.  

Originator  
Date  
1/17/08  
Richard K. Sinok  
Department/Program Chair  
Date  
1/17/08  
Harriet K. Keen  
Dear or Associate Dean  
Date  
1/18/08  
Chair, Undergraduate Curriculum Committee  
Date  

CATALOG DIRECTOR:  
These changes/additions have been made for the University/Extended Studies Catalog and entered into the BANNER term named above.  

Catalog Director  
Date  

REGISTRAR'S USE ONLY:  
SCACRSE  
SCADETL  
SCAPREQ  
SCABASE  
SCABRES  
Operator Init  
Date  

Florida Institute of Technology - Office of the Registrar  
150 West University Boulevard, Melbourne, FL 32901-6975 • (321) 674-8114 • Fax (321) 674-7827  
RG-271-5081
Special Topics in Molecular Biology
BIO 4150

Dr. Richard R. Sinden, Professor
Florida Institute of Technology, Department of Biology
8:00-8:50 A.M. Monday, Wednesday & Friday

Room: Olin LSB 129

Topics will vary from year to year but they will include important current topics in molecular biology that impact the field and human health. Depending on the breadth of the topic, 3-4 topics will be covered.
Topics included at present include:
- Molecular Mechanisms of DNA Mutagenesis
- DNA repair mechanisms (prokaryotic and eukaryotic)
- Functional organization of DNA in eukaryotic cells
- Eukaryotic DNA replication mechanisms, including initiation
- Mechanisms of genome instability leading to cancer and human genetic disease

This course will be an important addition for both molecular biology and pre-professional majors.

The accompanying syllabus illustrates typical class organization for selected topics (Two topics presented in detail as an example of course material)

Class Organization: For each major topic, we will predominantly have lectures (with time for questions). At the end of each topic we will have a review and Discussion period, prior to the exam. However, we may take an occasional class time for discussion, if needed. When we have discussions, I expect students to ask questions that go beyond the course material. Students will be graded on class participation.

Evaluation: Students will be evaluated on the basis of:
1. (20%) In-class participation, including discussions and questions. (If you are not present you can not receive credit for this section.)
2. (50%) Exams (3 throughout the course)
3. (30%) Final Exam:
4. Tentative. A Research Paper may be assigned (to be determined).

Text: A Basic text on Cell and Molecular Biology will be used. At present it is planned to use that assigned for Cell Biology BIO 4301. Assorted primary papers and reviews will supplement the text and are expected to be read.

Prerequisites: BIO 4010 (Biochemistry I) is required.

Philosophy and Course Objectives: I do not stress memorization, but some knowledge retention is required. I expect students to understand the course material and have a functional, working knowledge of the subject matter.

See separate notes on Academic dishonesty and plagiarism.
## Tentative Syllabus for BIO 4150 for Fall 2008

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 1</td>
<td>Aug 18</td>
<td>Introduction/Overview/Expectations</td>
</tr>
</tbody>
</table>
| 2, 3  | Aug 20, 22 | **TOPIC 1**  
Significance and Mechanisms of DNA Mutagenesis  
Significance and Rate of Mutation  
Mutations:  
A. Classifications,  
B. Types (point, frame-shifts, additions/deletions, inversions, rearrangements, complex, expansions) |
| Week 2 | Aug 25, 27, 29 | **Mechanisms of Spontaneous Mutation Based on DNA Chemistry**  
A. Review of DNA structure and chemistry  
B. Wobble, Tautomerization, and Ionization Cause "Deviant" Base Pairs  
C. Mechanisms of base substitutions: Transitions, Transversions  
D. depurinations, depyrimidations, deaminations |
| Week 3 | Sept 3, 5  | **Holliday**  
Sept 1, Labor Day  
**Mechanisms of Induced Mutations**  
A. Base analogs  
B. Base Modifications  
C. Alkylating agents (anti-cancer agents)  
D. Intercalating agents  
E. Ultraviolet radiation  
F. Ionizing radiation |
| Week 4 | Sept 8, 10, 12 | **Mechanisms of Induced Mutations** (continued)  
Polymerase Misbehavior: Errors During Replication (begin, see below) |
| Week 5 | Sept 15, 17, 19 | **Polymerase Misbehavior: Errors During Replication**  
A. Mechanisms of Base substitutions and frameshifts  
B. Slipped Mispairing, simple  
C. Slipped Mispairing and DNA secondary Structure  
D. Strand switching - quasipalindrome corrections  
E. Mechanism of repeat expansion |
| Week 6 | Sept 22 | **TOPIC 2**  
DNA Repair Mechanisms  
Overview and relevance to human disease  
**Topic 1 Review and Discussion**  
**Topic 1 Exam** |
| 15    | Sept 24  | **DNA Repair Mechanisms**  
Overview and relevance to human disease |
| 16    | Sept 26  | **DNA Repair Mechanisms**  
A. Overview of Basic Repair Schemes (mainly prokaryotic review)  
1. Base Excision Repair (glycosylases)  
2. Nucleotide excision repair (repair endonucleases and enzymes)  
3. Double strand break repair (homologous, recombination) |
| 17    | Oct 1, 3  | **DNA Repair Mechanisms**  
Overview and relevance to human disease |
Week 8
21, 22, 23 Oct 6, 8, 10 DNA Repair Mechanisms
A. Overview of Basic Repair Schemes (mainly prokaryotic review)
   4. Cross-link repair
   5. mismatch repair
   6. Inducible & Error-prone repair

Week 9
Holliday - Fall Break October 13, Columbus Day
October 13-14 (Short Break!)
24, 25 Oct 15, 17 DNA Repair Mechanisms
B. Adaptive Repair

Week 10
26, 27, 28 Oct 20, 22, 26 Excision Repair in Eukaryotic cells
A. Excision Enzymes
B. Associated Human Genetic Diseases
C. Double strand break repair
   1. Recombination
   2. homologous end joining
   3. nonhomologous end joining

Week 11
29, 30, 31 Oct. 27,29, 31 Excision Repair in Eukaryotic cells
C. Double strand break repair (continued)
   1. Recombination
   2. homologous end joining
   3. nonhomologous end joining
D. Mismatch repair in mammalian cells
E. Error Prone polymerases

Week 12
32 Nov 3, Topic 2 Review and Discussion
33 Nov 5 Topic 2 Exam
34 Nov 7 TOPIC 3

Week 13
35, 36, 37 Nov. 10, 12, 14 TOPIC 3

Week 14
38, 39, 40 Nov. 17, 19, 21 TOPIC 3

Week 15
41 Nov 22 TOPIC 3
Holliday November 26-28 Thanksgiving, Thursday, November 27 - Eat more turkey!!

Week 16
42 Dec 1 Topic 3 Review and Discussion
43 Dec. 3 Topic 3 Exam

Study Days December 6-7

Week 17
Exam Week December 10-15
Florida Institute of Technology

Academic Honesty Agreement

Academic dishonesty includes: plagiarism; cheating—giving, receiving, or sharing information during an in-class or take-home exam, test, or quiz, using unauthorized material (like notes) during an exam, submitting the same paper (or different versions of what is substantially the same paper) for more than one course—fabricating written work, sources, research and/or results; helping another student commit an act of academic dishonesty; and lying to protect another student who has committed an act of academic dishonesty.

According to Florida Tech’s Student Handbook, “all forms of academic dishonesty, including cheating, fabrication, facilitating academic dishonesty and plagiarism . . . are subject to disciplinary action up to and including suspension or expulsion from the university.”

I have received, read, and understand the Florida Tech booklet Academic Dishonesty, Cheating, and Plagiarism. Further, I understand that I am responsible for knowing all Florida Tech rules and regulations concerning academic dishonesty and that ignorance of these rules and regulations is not an excuse for a violation of said rules. If I have any questions or doubts, I realize that it is my responsibility to keep seeking an answer until I understand.

I understand that I am bound by this policy to act with honesty and integrity, and that I must do my own work. I also understand that if I commit any act of academic dishonesty, my professor can assign me an “F” grade in this course and may recommend that I be suspended or expelled from the university.

Signed,

(Student’s signature)   (Student’s name – Printed)

Sinden BIO 4150: Special Topics in Molecular Biology
Fall, 2007
Instructor & Course number

Date