APPLICATION FOR NEW COURSE

1. Submitted by College of Arts & Sciences Date 1/10/02
Department/Division offering course Chemistry

2. Proposed designation and Bulletin description of this course:
   (a) Prefix and Number CHE 553
   (b) Title* Chemistry and Molecular Biotechnology
*NOTE: If the title is longer than 24 characters (including spaces), write a sensible title (not exceeding 24 characters) for use in transcripts:

* Chem. Mol. Biotechnology

(c) Lecture/Discussion hours per week 3
(d) Laboratory hours per week 0
(e) Studio hours per week 0
(f) Credits 3

(g) Course description
This course focuses on the chemical aspects of biotechnology development. Current topics in biotechnology are emphasized through extensive reading and classroom discussion of the most recent scientific literature. Biotechnology development in fields as diverse as agriculture, the environment, and medicine will be covered.

(h) Prerequisites (if any): An introductory course in biology, biological chemistry, or biochemistry; and CHE 232; or consent of instructor.

(i) May be repeated to a maximum of ___________________________ (if applicable)

4. To be cross-listed as: ___________________________ Signature, Chairman, cross-listing department

5. Effective Date: Fall 2002 (semester and year)

6. Course to be offered ☑ Fall ☐ Spring ☐ Summer

7. Will the course be offered each year? ☑ Yes ☐ No
(Explain if not annually)

8. Why is this course needed:

The department’s new strength in biological chemistry will bring in students wanting instruction in biotechnology. The attendance in this course (under the CHE 580 designation) has doubled (from 6 to 12) over the past year, and we fully expect it to keep growing. Also, there is no equivalent course being offered in other departments.

9. (a) By whom will the course be taught? Stephen Testa

(b) Are facilities for teaching the course now available? ☑ Yes ☐ No
If not, what plans have been made for providing them?
10. What enrollment may be reasonably anticipated? ________10-25__________

11. Will this course serve students in the Department primarily? ☐ Yes ☑ No

Will it be of service to a significant number of students outside the Department? If so, explain.

☑ Yes ☐ No

Approximately half the students taking the course (under the CHE 580 designation) are from other departments. There is a wide interest from these other programs in having their students learn the chemical aspects of biotechnology, which the Chemistry Department is uniquely qualified to teach.

Will the course serve as a University Studies Program course? ☐ Yes ☑ No

If yes, under what Area? ________________________________________

12. Check the category most applicable to this course:

☐ traditional; offered in corresponding departments elsewhere;
☑ relatively new, now being widely established
☐ not yet to be found in many (or any) other universities

13. Is this course part of a proposed new program? ☑ Yes ☐ No

If yes, which?

14. Will adding this course change the degree requirements in one or more programs?* If yes, explain the change(s) below:

______________________________________________________________

15. Attach a list of the major teaching objectives of the proposed course, outline and/or reference list to be used.

16. If the course is a 100-200 level course, please submit evidence (e.g., correspondence) that the Community College System has been consulted.

17. Within the Department, who should be contacted for further information about the proposed course?

Name ___________________________ Phone Extension _______7-7076_____

*NOTE: Approval of this course will constitute approval of the program change unless other program modifications are proposed.
Signatures of Approval:

Boyle E. O'Leary
Department Chair

Dean of the College

Date of Notice to the Faculty

*Undergraduate Council

Date

*University Studies

Date

*Graduate Council

Date

*Academic Council for the Medical Center

Date

*Senate Council Chair

Date of Notice to University Senate

*If applicable, as provided by the Rules of the University Senate

ACTION OTHER THAN APPROVAL:
CHE 553 Chemistry and Molecular Biotechnology

Student Learning Outcomes

What the students will know by taking this course

- Fundamental chemical principles
- Broad based understanding of molecular biotechnology and its development
- Importance and uses of chemistry in molecular biotechnology development
- How to independently read and understand the current scientific literature
- Knowledge of the most up to date molecular biotechnology research

What the students should be able to do as a result of taking this course

- Apply chemical principles for the development of new molecular biotechnology
- Formulate rational and critical opinions and judgments about scientific principles
- Discuss and debate these formulations
- Read and understand the current primary literature
- How to write a review paper

How this course will enhance the students ability of think

- Enhance knowledge of chemistry and molecular biotechnology
- Studying the literature with an effort to enhance critical thinking
- Studying the lay media’s representation of biotechnology to enhance critically thinking
- The paper they write will help them develop the ability to think independently
Chemistry and Molecular Biotechnology

CHE 553 (previously CHE 580-004): Fall 2001 Syllabus

Instructor: Dr. Stephen Testa
Office: Room 315 Phone: 7-7076
Email: testa@pop.uky.edu
Place: Mondays and Wednesdays from 12 to 12:50 PM in CP-345
Textbook: Molecular Biotechnology, by Glick and Pasternak

Details and Grading

The class is divided into three sections. The first section will be review (Chapters 1-5). The last two sections will typically cover a topic each Wednesday, and will cover a related paper the following Monday. Come prepared to discuss the paper. The tests will be based on the corresponding chapters and the papers. The three tests will make up 60% of the final grade. In addition, each student will be responsible for writing a short review of an area of biotechnology. The review will make up 20% of the final grade. The topic must be approved by me by September 17. 10% of your final grade will be based on your contribution to class discussions. The remaining 10% of your grade will be based on a 5 minute class presentation of your review. Each unexcused day late for anything will result in a 15% reduction for that grade. Final grades will be curved, but only once all the grades are in.

Attendance

Attendance is mandatory. After the first unexcused absence, each additional two will result in a single letter reduction in your Final Grade. Please see me ahead of time if you must miss a class, especially on a test day. It is your responsibility to schedule a make-up test with me.

Office Hours

My office hours are for one hour after each class. If you need to speak with me at other times, you can stop by my office and see if I am available or you can make an appointment.

Material

This class will use the “Molecular Biotechnology” textbook extensively. All handouts and papers will be on reserve in the Chemistry-Physics library. It is expected that the text chapters and papers be read prior to our discussion of them in class.
CHE 553 (previously CHE 580-004): Fall 2001 Schedule

August 22: Organizational Meeting
August 27: Discussion of Reviews; Chapters 1-2: Introduction
August 29: Chapter 3: The Central Dogma of Molecular Biology
September 3: Labor Day (No Class)
September 5: Chapter 4: Recombinant DNA Technology
September 10: Chapter 5: DNA Techniques
September 12: Paper #1
September 17: Test I (Pick review topic)

September 19: Chapters 6-8: Protein Engineering
September 24: paper #2
September 26: Chapters 9-11: Therapeutics
October 1: Chapters 9-11: Therapeutics
October 3: paper #3
October 8: Chapter 13: Environmental
October 10: paper #4; (review discussion)
October 15: Chapter 14-15: Crop Growth
October 17: paper #5, #6
October 22: Test II

October 24: Chapter 17-18: Engineering Plants
October 29: paper #7
October 31: Chapter 19: Transgenic Animals
November 5: paper #8
November 7: Chapter 21: Human Biotechnology
November 12: paper #9, #10
November 14: paper #11
November 19: class presentations (5 minutes)
November 21: class presentations (5 minutes)
November 26: Test III (hand in papers)
Teaching Objectives for Chemistry and Molecular Biotechnology

Biotechnology is a rapidly advancing field that is based on knowledge from multiple disciplines. The student will be exposed to these advances through extensive reading of the current literature, backed by an introductory textbook. The multidisciplinary nature of molecular biotechnology is emphasized through class discussions, which is designed to take advantage of the students’ varied educational backgrounds. A primary objective, therefore, is not only that the students learn and understand recent advances in the field, but that they appreciate the multidisciplinary aspects of conducting such research. With this in mind, particular emphasis will be placed on providing the students with the requisite knowledge of the chemical aspects involved. The students will demonstrate their knowledge of chemistry as it applies to molecular biotechnology through tests, a written paper, and a class presentation. At the conclusion of this course, the students will be expected to have a firm grasp of the fundamental chemical principles that are (often repeatedly) applied in developing such technology.