

## APPLICATION FOR NEW COURSE

1. Submitted by College of Arts and Sciences Date October 13, 2006

Department/Division offering course Chemistry

2. Proposed designation and Bulletin description of this course

a. Prefix and Number CHE 554 b. Title\* Biological Chemistry Laboratory

\*NOTE: If the title is longer than 24 characters (including spaces), write

A sensible title (not exceeding 24 characters) for use on transcripts Biological Chemistry Lab

c. Lecture/Discussion hours per week 0 d. Laboratory hours per week 6

e. Studio hours per week \_\_\_\_\_ f. Credits 2

g. Course description

An introductory biological chemistry laboratory course. Areas of experimentation will include spectroscopic methods, electrophoresis, chromatography, and isolation and characterization of biological macromolecules.

h. Prerequisites (if any)

CHE 232, CHE 550 or CHE 552, and a physical chemistry course at or above the 400 level, or consent of instructor

i. May be repeated to a maximum of N/A (if applicable)

4. To be cross-listed as

\_\_\_\_\_  
Prefix and Number

\_\_\_\_\_  
Signature, Chairman, cross-listing department

5. Effective Date Spring 2008 (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 American Chemical Society (ACS), our certifying agency, recommends that Chemistry departments offer an undergraduate biochemistry laboratory. This course is not, offered by any other department at UK.

With the addition of just this one course, the Chemistry Department can provide all the courses needed by undergraduates to earn an ACS-certified Chemistry BS degree with an official Biochemistry option. This option is currently being offered at almost all of our benchmark institutions

9. a. By whom will the course be taught? A faculty member in the Chemistry Department.

b. Are facilities for teaching the course now available?  Yes  No

If not, what plans have been made for providing them?

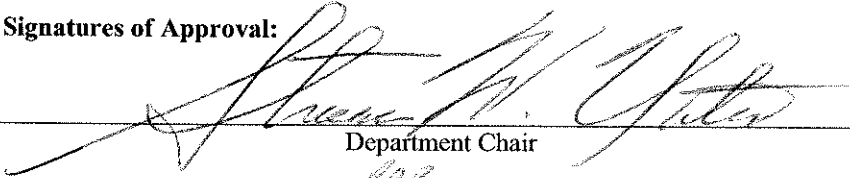
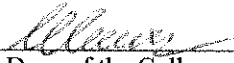
## APPLICATION FOR NEW COURSE

10. What enrollment may be reasonably anticipated? 20 students per section; one section per year.
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?  Yes  No  
If so, explain.  
No other UK department offers an equivalent course. Therefore, this course will be of interest to undergraduates in a variety of  
departments that have an interest in undergraduate biological chemistry techniques. This course will not be required, however,  
in any other department.
- 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 applicable to the requirements for at least one degree or certificate at the University of Kentucky?  Yes  No
14. Is this course part of a proposed new program:  Yes  No  
If yes, which?  
Not a new academic program, but rather an official, approved Option within our current BS degree with a major in Chemistry.  
The proposed course is not required in our standard BS degree, although students in that Option and in our BA degree may well opt to take this course.
15. Will adding this course change the degree requirements in one or more programs? \*  Yes  No  
If yes, explain the change(s) below  
\_\_\_\_\_  
\_\_\_\_\_
16. Attach a list of the major teaching objectives of the proposed course and outline and/or reference list to be used.
17. If the course is a 100-200 level course, please submit evidence (e.g., correspondence) that the Community College System has been consulted.  Check here if 100-200.
18. If the course is 400G or 500 level, include syllabi or course statement showing differentiation for undergraduate and graduate students in assignments, grading criteria, and grading scales.  Check here if 400G-500.
19. Within the Department, who should be contacted for further information about the proposed course?  
Name Carolyn P. Brock, DUS Phone Extension 7-1959

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

**APPLICATION FOR NEW COURSE**

**Signatures of Approval:**

 _____ Department Chair	 _____ Dean of the College	<u>10/18/06</u> _____ Date
		<u>10/31/06</u> _____ Date
		<u>10/24/06</u> _____ 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

# Biological Chemistry Laboratory

Instructor: Dr. Stephen Testa  
Office: Room 315 Phone: 7-7076  
Email: [testa@uky.edu](mailto:testa@uky.edu)  
Place: Wednesdays and Fridays from 1:00 PM to 3:50 PM in CP-345  
Textbook: Experimental Biochemistry (3<sup>rd</sup> Edition), Switzer and Garrity.

## Teaching Assistants

To Be Determined

## Details and Grading

There are a total of 14 lab reports due in this class. All reports are of equal value, and they add up to 70% of your final grade. 10% of your grade is based on prelabs, which must be approved by your TA before entering the lab for any given experiment. 15% will be based on your final exam grade. 5% will be up to the discretion of the instructor and/or the lab TAs regarding all measures of laboratory conduct. Labs are due at the beginning of class on the Wednesday following the conclusion of the experiment.

Lab reports are graded by your TA, although any comments or concerns you have regarding such grading should be brought to your instructor's attention (after first discussing the matter with your TA). Information concerning how to write your reports, as well as an example report, will be provided separately.

Because this is a 500-level class, differentiation must be made between the expectations for undergraduate and graduate students. Because this is an introductory laboratory class, however, all students will be expected to complete all assignments. Therefore, this differentiation will manifest itself in 2 ways.

- 1) Laboratory Reports: Graduate students will have had more experimental experience than undergraduates, and are expected to show this experience in their lab reports. To this end, graduate students' reports will contain a prelab section (which consists of an introduction and a material and methods section), a results section, and a discussion section. Undergraduate students will provide similar reports, except that the results and discussion sections will be combined.
- 2) Grading: Assigned letter grades for each assignment, for the final exam, and for the final grade will be calculated independently for undergraduate and graduate students. This way, the grades of one group does not in any impact the grades of the other group. In addition, if possible, one TA will grade undergraduate reports and another will grade graduate reports. Finally, the final exam will have short essay questions, and the undergraduates will be required to answer a smaller number of them than the graduate students.

## Attendance

Attendance is mandatory. After the first *unexcused* absence, each additional *unexcused* absence will result in a single letter reduction in your final grade. Anyone more than 10 minutes late to class will be considered absent and will not be able to participate on that particular day. Because of the nature of preparing for biological chemistry experiments, they are difficult to make up on an individual basis. Therefore, students will be permitted to make up excused absences by completing the alternative experiments planned on the days marked 'Open Lab Day'. Note that these experiments could include the exact experiment that was missed.

## Office Hours

My office hours are 30 minutes before and after each class. If you need to speak with me at any other times, you can stop by my office and see if I am available or you can make an appointment. Remember, I am here to help you with this class. If you need help, I expect you to tell me.

## Course Material

This class will use the textbook "Experimental Biochemistry" (3<sup>rd</sup> Edition), Switzer and Garrity, W. H. Freeman and Company, New York. Most of the material needed for this course will be provided for you on the days you need them. Details regarding material you must purchase will be outlined separately.

## Grading Scale for Graduate Students

100 – 90% = A

89.9 – 80% = B

79.9 – 70% = C

< 69.9% = E

# Biological Chemistry Laboratory

## Tentative Schedule

January 10	(Week 1; Day 1):	Introduction to this course
January 12	(Week 1; Day 2):	Safety
January 17	(Week 2; Day 1):	Learn basic techniques
January 19	(Week 2; Day 2):	Laboratory Assignment #1: Photometry - Protein Absorption (Exp 1)
January 24	(Week 3; Day 1):	Laboratory Assignment #2: Chromatography - Protein Separation (Exp 2)
January 26	(Week 3; Day 2):	Laboratory Assignment #3: Acid-Base Properties of Amino Acids (Exp 5)
January 31	(Week 4; Day 1):	
February 2	(Week 4; Day 2):	Laboratory Assignment #4: Electrophoresis – SDS Page of Proteins (Exp 4)
February 7	(Week 5; Day 1):	Laboratory Assignment #5: Western Blot to identify an Antigen (Exp 18)
February 9	(Week 5; Day 2):	
February 14	(Week 6; Day 1):	Laboratory Assignment #6: Study of the Properties of $\beta$ -Galactosidase (Exp 7)
February 16	(Week 6; Day 2):	
February 21	(Week 7; Day 1):	Laboratory Assignment #7: Purification of Glutathione-S-Transferase (Exp 10)
February 23	(Week 7; Day 2):	
February 28	(Week 8; Day 1):	Laboratory Assignment #8: Experiments in Clinical Biochemistry (Exp 16)
March 2	(Week 8; Day 2):	
March 7	(Week 9; Day 1):	Open Lab Day
March 9	(Week 9; Day 2):	Open Lab Day
March 14	Spring Break	
March 16	Spring Break	
March 21	(Week 10; Day 1):	Laboratory Assignment #9: Antibodies and ELISA (Exp 17)
March 23	(Week 10; Day 2):	
March 28	(Week 11; Day 1):	Laboratory Assignment #10: Constructing a Recombinant Plasmid (Exp 21)
March 30	(Week 11; Day 2):	
April 4	(Week 12; Day 1):	Laboratory Assignment #11: Transformation with Bacterial DNA (Exp 20)
April 6	(Week 12; Day 2):	
April 11	(Week 13; Day 1):	Laboratory Assignment #12: The Polymerase Chain Reaction (Exp 24)
April 13	(Week 13; Day 2):	
April 18	(Week 14; Day 1):	Laboratory Assignment #14: Student-Initiated Experiment Day
April 20	(Week 14; Day 2):	
April 25	(Week 15; Day 1):	Open Lab Day
April 27	(Week 15; Day 2):	Open Lab Day

May X Final Exam

Note that Laboratory Assignment #13: BioInformatics (Exp 25), will be assigned early in the semester and students will work on it independently throughout the course.

**Information for Proposed Course (CHE 554)**  
**Biological Chemistry Laboratory**

**Major Teaching Objectives**

- 1) The students will obtain a hands-on, experimental introduction to the technologies currently being used by practicing Biological Chemists. This includes the 5 'Important General Techniques' outlined by the American Chemical Society (see reference below): error and statistical analysis of experimental data, spectroscopic methods, electrophoretic techniques, chromatographic separations, and the isolation and characterization of biological macromolecules.
- 2) This course will further introduce the student to the following ACS recommended advanced techniques (see reference below): enzyme kinetics, immunoassay methods, DNA cloning, and plasmid isolation.

**Student Outcomes**

- 1) At the conclusion of the course, the student will be expected to have obtained a working knowledge of experimental biological chemistry. This class will be geared towards juniors, and so will provide a solid foundation for them to conduct independent research in biological chemistry (under the direction of a faculty mentor) in their senior year.
- 2) At the conclusion of the course, the student will be expected to have obtained independence with regard to planning, conducting, and analyzing experiments, as well as with regard to reporting scientific data. This will be determined throughout the course, and will be exemplified via a student-designed and initiated final experiment.
- 3) Students will learn safety procedures and practices specifically as they relate to biological chemical research and the handling and disposal of biological materials.

Reference for the American Chemical Society Guidelines

<http://www.chemistry.org/portal/a/c/s/1/acdisplay.html?DOC=education\cpt\guidelines.html>