

CHEM 490/684B Bioanalytical Chemistry Fall Semester 2012

Instructor: Dr. Ryan J. White
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Lectures: MWF 9:00 – 9:50, MEYR 272
Office Hours: T,Th 9:00-10:00 or by
appointment

<p>Important Dates: September 3 – Labor Day (No Class) September 12 – Last day to drop without a grade of “W” November 22 – 25– Thanksgiving Break (No Class) December 11 – Last day of classes</p>	<p>October 12 – <i>Exam I</i> November 16 – <i>Exam II</i> December 14 – <i>Exam III</i> 8:00 AM – 10:00 AM</p>
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Course Description: Bioanalytical chemistry is the development and application of chemical measurements and instrumentation to study biochemical and biological problems. With this in mind, this course is designed to survey modern bioanalytical chemistry with specific focus on the physical principles and practical aspects of core and emerging bioanalytical techniques.

Course Objective: By the end of this course, you will be able to: 1) *identify* the most useful technique for a given bioanalytical problem, 2) *interpret* and use the results from a given bioanalytical technique, 3) *understand* the physical, chemical and instrumental fundamentals underlying these measurements, and 4) *critically assess* advances within the field of bioanalytical chemistry.

Tentative Lecture Schedule:

<u>Week</u>	<u>Topic</u>	<u>Exams</u>
08/27	Introduction/Principles of biochemical analysis	
09/03	Bioconjugate Chemistry of Proteins and Nucleic Acids	
09/10	Separations	
09/17	Separations	
09/24	Spectroscopy of biological systems	
10/01	Spectroscopy of biological systems	
10/08	Immunological methods	Exam I
10/15	Surface-based methods	
10/22	Surface-based methods	
10/29	Electrochemistry in bioanalytical chemistry	
11/05	DNA Sequencing	
11/12	Biological mass spectrometry	Exam II
11/19	New Frontiers: Biosensors	
11/26	New Frontiers: Nanoscience in biological analysis	
12/03	Oral Presentations (see below for more information)	
12/10	Last day of class	Exam III

Course Requirements:

Problem Sets: Problem sets are due at the beginning of lecture one week after being assigned. You are welcome to work together on the assignments, but the work you submit must be your own and not copies from another individual. Late or copied assignments will not be accepted.

Literature Reports: A brief, typed summary (no more than one page) of a *current* journal article (published within the last year) is due every Monday, unless otherwise noted, before lecture begins. All reports should be submitted online using the Blackboard system (the reports can be written on an article taken from any chemistry or physics journal as long as the article is related to an interesting and novel aspect of modern bioanalytical chemistry. The report should concisely summarize, *in your own words*, the technique developed, the key discoveries reported and the importance of the discovery to bioanalytical chemistry. *Do not paraphrase the article* and do not describe experimental details unless they are truly necessary in understanding the conclusions presented. In your report please include the title of the article and cite the article in ACS format. **No reports are due on exam weeks.** Reports submitted late or that exceed one, single-spaced typed page will not be accepted.

Written Report (684B students only): A written report summarizing work in a current area of bioanalytical chemistry will be due on Friday, November 30th. Please submit a five to six page, single-spaced, 12-pt font (including figures) report that critically accesses at least two articles from the same field, preferably by different authors. The report should include a title and a brief introduction describing the field in general and the significance of the science reported. Avoid paraphrasing and *do not copy or plagiarize* the articles as this will result in a grade of zero. A discussion of *your assessment of the work* and its relevance to bioanalytical chemistry should be included. These articles (and any supporting articles) should be cited using standard ACS formatting. Do not use review articles and do not pick a topic that is specifically being covered in this class. **All topics must be approved by Prof. White by Friday October 26th.**

Oral Report: Each student will give an oral presentation summarizing work in a current area of bioanalytical chemistry (for 684B students this will be based on your written report). The presentation should be 15 minutes including ~2-3 minutes for questions. The presentation should include an introduction of the material describing the relevant background information, a summary of the techniques and methods, and conclusions. Questions from the presentations *will appear on the final exam.*

Grading:

CHEM 490	% of Grade	CHEM 684B	% of Grade
Exams	50	Exams	50
Problem Sets	15	Problem Sets	10
Oral Presentation	15	Oral Presentation	15
Literature Reports	10	Written Report	10
Class Participation	10	Literature Reports	10
		Class Participation	5

Policies:

Academic Integrity: You are encouraged to work together on homework and studying, however, all assignments turned in must be original work of the individual submitting the assignment. By enrolling in this course, each student assumes the responsibilities of an active participant in UMBC's scholarly community in which everyone's academic work and behavior are held to the highest standards of honesty. Cheating, fabrication, plagiarism, and helping others to commit these acts are all forms of academic dishonesty, and they are wrong. Academic misconduct could result in disciplinary action that may include, but is not limited to, suspension or dismissal. To read the full

Student Academic Conduct Policy, consult the UMBC Student Handbook (page. 7), the Faculty Handbook (Section 14.4), or for graduate courses, the Graduate School website.

Makeups: Makeups will be given in accordance with University policy: a signed and readable note on letterhead paper from a physician, a police report, a certificate from a funeral home, etc. are required to be on file.

Accommodations: UMBC is committed to eliminating discriminatory obstacles that disadvantage students based on disability. Student Support Services (SSS) is the UMBC department designated to receive and maintain confidential files of disability-related documentation, certify eligibility for services, determine reasonable accommodations, develop with each student plans for the provision of such accommodations, and serve as a liaison between faculty members and students regarding disability-related issues. If you have a disability and want to request accommodations, contact SSS in the Math/Psych Bldg., room 213 or at 410-455-2459. SSS will require you to provide appropriate documentation of disability. If you require accommodations for this class, make an appointment to meet with me to discuss your SSS-approved accommodations.