CHM 6180 **SPRING 2014**

BIOANALYTICAL CHEMISTRY (3 CR)

www.chem.ufl.edu/~atoth/CHM6180.doc

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Class Times: M,W, F, Period 4 (Mon, Wed, Fri:10:40 -11:30 am) **Room**: MAT 105

Description: The course will cover the fundamentals of modern analytical techniques, with focus on techniques emerging at the forefront in bioanalysis. The course will cover basics of theories behind the methods and will emphasize applications in bioanalysis. Class discussions based on individual and group presentations of literature articles are part of the course. In addition written summaries of current literature articles will be part of the class. Attendance at Analytical Seminars and PittCon is advised as part of the course.

Outline: Basics of instrumental analytical measurement techniques
Spectroscopic techniques
Applications of fluorescence
"Other" molecular spectroscopies-role of fingerprints
Homogeneous vs heterogeneous measurement techniques
Electroanalytical measurements with ultramicro- and nanoelectrodes as sensors
Mass spectrometry
Role of interfaces and miniaturization in mass spectrometry
Separations techniques
Miniaturization and speed in separations
Micromachined devices and microfluidics
In vivo and cellular measurements-cellular stress and signaling
Immunosensors
Detection of glucose in in-patient diabetic monitoring
DNA sensors
Analytical methods of proteomics
Nanotechnology in bioanalysis

Grade: The course grade will be determined by two take home progress exams and the comprehensive final. The first exam will be given after "Other" molecular spectroscopies-role of fingerprint section. The second exam will be given after the "Micromachined Devices" section part of the class. Progress exams will be posted on-line and will be announced a week in advance before being posted.
The final will be based on a literature article. The final will be posted at the end of classes and is due on the date scheduled for the final.
In addition the class presentations and written homeworks will be graded. The presentations dates will be announced approximately a week in advance; the due dates for homeworks will be announced in the assignments.

Each exam is worth 25% of the course grade. The homeworks and oral presentations are worth 25% of the final grade.

Reference texts (no required text):

1. *Principles of Instrumental Analysis,* Skoog, Holler and Nieman, Saunders Publishing, Fifth Edition, 1998.
2. *Contemporary Instrumental Analysis,* KA and JF Rubinson, Prentice Hall, 2000.
3. *Bioanalytical Chemistry,* SR Mikkelsen and E Corton, Wiley, 2004.
4. *Electroanalytical Methods for Biological Materials,* A Brajter-Toth, JQ Chambers, Eds. Marcel Dekker, 2002.
5. *Mass Spectrometry of Biological Materials, BS Larsen,* CN McEwen Eds. Marcel Dekker, 2nd Edition, 1998.

Other Information: In addition to the reference texts, references to research and review articles will be given throughout the semester. These will be posted at www.chem.ufl.edu/~atoth/refrs.doc