

CHM 412—Instrumental Methods of Analysis

Course Syllabus

Instructor: Dr. Radha Narayanan

Office: Pastore Hall, Room 318

Phone #: 401-874-2298

Email: rnarayanan@chm.uri.edu

Office Hours: M 10-11 AM, W 2-3 PM, also by appointment or email

Textbook:

1. “Principles of Instrumental Analysis” by Skoog, Holler, Crouch

Lecture notes and problems worked in class will be posted in the URI WebCT. The link to the URI WebCT homepage is available on my chemistry department course website:

http://www.chm.uri.edu/show_content.php?topic=CHM412_Spring_2009&from=forcurrests&email=rnarayanan

Topics:

- Introduction to Instrumental Methods
- Signals and Noise
- Optical Atomic Spectroscopy
- Atomic Absorption Spectroscopy
- Atomic Fluorescence Spectroscopy
- Atomic Emission Spectroscopy
- Ultraviolet-Visible Spectroscopy
- Fluorescence Spectroscopy
- Infrared Spectroscopy
- Raman Spectroscopy
- Introduction to Electroanalytical Methods
- Potentiometry
- Voltammetry
- Mass Spectrometry
- Liquid Chromatography
- Colorimetry
- Turbidometry
- Nephelometry

Grading:

Problem Sets: 4 (15% each)—60% overall

Exams: 4 (10% each)—40% overall

Lecture Schedule:

1/21/09—Introduction to Instrumental Methods (Ch. 1)
1/23/09—Introduction to Instrumental Methods (Ch. 1), Problem Set #1 Assigned
1/26/09—Signals and Noise (Ch. 5)
1/28/09—Introduction to Spectroscopic Methods (Ch. 6)
1/30/09—Introduction to Spectroscopic Methods (Ch. 6)
2/2/09—Introduction to Optical Atomic Spectroscopy (Ch. 8)
2/4/09—Introduction to Optical Atomic Spectroscopy (Ch. 8)
2/6/09—Atomic Absorption and Atomic Fluorescence Spectroscopy (Ch. 9)
2/9/09—Atomic Absorption and Atomic Fluorescence Spectroscopy (Ch. 9)
2/11/09—Atomic Emission Spectroscopy (Ch. 10)
2/13/09—Atomic Emission Spectroscopy (Ch. 10), Problem Set #1 Due
2/18/09—Brief Review
2/20/09—Exam #1—topics in Ch. 1, 5, 6, 8, 9, 10
2/23/09—Introduction to Ultraviolet-Visible Molecular Absorption Spectrometry (Ch. 13), Problem Set #2 Assigned
2/25/09—Introduction to Ultraviolet-Visible Molecular Absorption Spectrometry (Ch. 13)
2/27/09—Applications of Ultraviolet-Visible Molecular Absorption Spectrometry (Ch. 14)
3/2/09—Molecular Luminescence Spectroscopy (Ch. 15)
3/4/09—Molecular Luminescence Spectroscopy (Ch. 15)
3/6/09—Introduction to Infrared Spectroscopy (Ch. 16)
3/9/09—Introduction to Infrared Spectroscopy (Ch. 16)
3/11/09—Applications of Infrared Spectroscopy (Ch. 17)
3/13/09— Raman Spectroscopy (Ch. 18)
3/23/09—Raman Spectroscopy (Ch. 18), Problem Set #2 Due
3/25/09—Brief Review
3/27/09—Exam #2 (Ch. 13, 14, 15, 16, 17, 18)
3/30/09— Molecular Mass Spectrometry (Ch. 20), Problem Set #3 Assigned
4/1/09— Molecular Mass Spectrometry (Ch. 20)
4/3/09— Liquid Chromatography (Ch. 28)
4/6/09— Liquid Chromatography (Ch. 28)
4/8/09— Colorimetry, Turbidometry, Nephelometry (handout), Problem Set #3 Due
4/10/09—Brief Review
4/13/09— Exam #3 (Ch. 20, 28, handout)
4/15/09— Introduction to Electroanalytical Methods (Ch. 22), Problem Set #4 Assigned
4/17/09— Introduction to Electroanalytical Methods (Ch. 22)
4/20/09—Potentiometry (Ch. 23)
4/22/09—Potentiometry (Ch. 23)
4/24/09—Voltammetry (Ch. 25)
4/27/09—Voltammetry (Ch. 25), Problem Set #4 Due
4/29/09—Brief Review

Final Exam: Ch. 22, 23, 25

General Policies:

The work that you turn in for the problem sets should be based on your own individual effort. For the exams, only standard scientific calculators will be permitted. Calculators with graphing and data storage functions will not be permitted during the exam. For the exams, you may prepare one handwritten 8.5 x 11 in. sheet with notes, formulas, etc. on the front side only to use during the exam.