

Instrumental Analysis Laboratory
Chemistry 422/708
Fall, 1998

Time & Place:

Monday (Rooms 106 & 404)
Wednesday (conference room & Room 404)
1:00-4:50 PM

Instructor:

Dr. X. Nancy Xu
Office: Room 201, Alfriend Chemistry building
Tel: 683-5698
Email: xhxu@odu.edu
Office hour: 5:00-6:00 PM every Wednesday in Room 201
Research interests: <http://www.odu.edu/~chem/Xu.htm>

Objectives:

The main goals of this course are to provide students with opportunities to perform chemical analysis using analytical instrumentation, to understand the principles of measurements, to have an overview of updated applications of modern instrumental analysis, and to learn how to design their own future experiments.

Course Description:

- (1) Reading materials (e.g., chapters in the textbook, research papers and brief instrument manual) are assigned to each laboratory and should be read **prior to** performing the laboratory experiments.
- (2) Instructor will give a concise lecture, a brief demonstration and ask **many** questions on each experiment at 1:00-1:20 PM on Monday and Wednesday.
- (3) Students will perform experiments, measure and record the scientific data independently. Each student must have a laboratory notebook. Students are encouraged to ask questions and exchange ideas and experience.
- (4) Students must always maintain a clean working environment (e.g., balance, glassware, bench, equipment, ect.) to meet the analytical analysis standard. Each student must clean up the working area after each experiment.
- (5) Students must write their lab report. Each lab report must include: (A) *Introduction* describing the principles of measurements and the brief overview of applications; (B) *Experimental* describing methods and chemicals; (C) *Results and Discussion* presenting and explaining the data; (D) *Future Experiments* proposing to do any further experiments by your own. You can rely upon your imagination or literatures.
- (6) The entire lab reports including the text and plots must be prepared using a computer and written as a professional research paper.
- (7) Students will defend one of their favorite proposed experiments by the end of semester. It should be a 15-minute oral presentation.

Evaluation:

The performance will be evaluated based upon the criteria listed above.
Grade will be given on each lab report.

Schedule

Group A (Monday)	Group B (Wednesday)	Experiment
Aug. 31	Sept. 2	Introduction; reading assignments; making solutions.
*Sept. 7 (Labor Day, no lab)	Sept. 9	Molecular UV/vis Adsorption Spectroscopy (1) Measurement of extinction coefficient of R6G and Ru(bpy) ₃ ²⁺ (2) Determination of limit of detection (LOD)
Sept. 14	Sept. 16	
Lab report due on Sept. 23		
Sept. 21	Sept. 23	Molecular Fluorescence Spectroscopy (1) Measurement of excitation and emission spectra of R6G and Ru(bpy) ₃ ²⁺ (2) Determination of limit of detection (LOD)
Sept. 28	Oct. 1	
Oct. 5	Oct. 8	Electrochemiluminescence of Ru(bpy) ₃ ²⁺ (1) Lecture & demonstration (2) Study of ECL concentration dependence
Lab report due on Oct. 21		
Oct. 12	Oct. 14	Atomic spectroscopy (1) Determination of Zinc in serum (2) Measurement of limit of detection
Oct. 19	Oct. 21	
Lab report due on Oct. 28		
Oct. 26	Oct. 28	Electrochemistry: (1) Cyclic voltammetry (2) Square wave voltammetry (3) Differential pulse voltammetry
Nov. 2	Nov. 4	
Lab report due on Nov. 11		
Nov. 9	Nov. 11	Separations/Chromatography (1) Separation of R6G and DNA-R6G using HPLC (2) Determination of separation efficiency and detection limit
Nov. 16	Nov. 18	
Nov. 23	*Nov. 25 (holidays) no lab	
Nov. 30	Dec. 2	(3) Separation of R6G and DNA-R6G using CE-LIF (4) Determination of separation efficiency and detection limit
Dec. 9	Oral presentation on one of your proposed experiments.	
Lab report due on Dec. 14		