

## CHEM.5140 Advanced Analytical Chemistry

**Instructor:** Dr. David K. Ryan (978) 934-3698 Phone David\_Ryan@uml.edu  
Olney 520 (978) 934-3569 Fax [http://faculty.uml.edu/David\\_Ryan](http://faculty.uml.edu/David_Ryan)

### Syllabus

- Class 1 Course overview, Potentiometry: Reference & Indicator Electrodes
- Class 2 Potentiometry (continued), Membrane electrodes
- Class 3 Potentiometry (continued)
- Class 4 Electrochemistry (Voltammetry) - Electrode Kinetics, Mass Transport
- Class 5 Electrochemistry - Mass Transport, Other Fundamentals
- Class 6 Electrochemical Techniques - Overview
- Class 7 Electrogravimetry
- Class 8 Chronoamperometry, Chronopotentiometry, Coulometry
- Class 9 Voltammetry (stirred), Voltammetry (unstirred), Cyclic Voltammetry
- Class 10 Polarography (Direct Current)
- Class 11 Polarography (DC, AC, Normal Pulse, Differential Pulse)
- Class 12 Anodic Stripping Voltammetry, Square Wave Voltammetry, Concluding remarks
- Class 13 Molecular Spectroscopy - Properties of Electromagnetic Radiation
- Class 14 Exam #1
- Class 15 Properties of Electromagnetic Radiation (continued)
- Class 16 Quantitative Aspects of Absorption
- Class 17 Types of Spectroscopy, Sources
- Class 18 Wavelength Selection (Filters, Monochromators)
- Class 19 Prisms, Gratings (Tuesday)
- Class 20 Gratings (continued), Interferometer, Detectors
- Class 21 Detectors (PMT, Noise, Image Detectors, IR)
- Class 22 Exam #2
- Class 23 Student Presentations
- Class 24 Theory of Molecular Absorption
- Class 25 Absorption by Organic Molecules
- Class 26 Inorganic Absorption (Charge Transfer, Ligand Field)
- Class 27 Applying UV-vis Spectroscopy (Qualitative, Quantitative)
- Class 28 Luminescence & Fluorescence Spectroscopy

Exam #3 will be given the week after the last class at 8:00 AM in Olney 518.