

## CHEMISTRY 4461

### INSTRUMENTAL CHEMICAL ANALYSIS

**Instructor:** Purnendu K. (Sandy) Dasgupta

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**Office Hours:** Tuesday afternoons

**Laboratory Instructors:** Kevin Schug ([KSchug@uta.edu](mailto:KSchug@uta.edu)), Xiyun (Richard) Guan ([Xguan@uta.edu](mailto:Xguan@uta.edu))

**Text:** Quantitative Chemical Analysis, 7<sup>th</sup> Ed (about \$134 new)

Daniel C. Harris

This is the same text used for quantitative Analysis (Chem 2335)

**Grading:** 600 points Lecture, 500 points Lab

Lecture: Midterm Exam 250 points

Final (comprehensive) 350 points)

### LECTURE TOPICS

Introduction to Spectrometry, UV-VIS/Molecular Spectroscopy/Fluorescence  
Spectrometry/Spectrometers (Ch 18-20)

Extra Stuff: Liquid Core Waveguides (*TrAC Trends Anal. Chem.* **2004**, 23, 385-392)

Stochastic Sensors (Guan)

Atomic Spectrometry, Absorption and Emission, ICP and other sources (Ch 20-21)

Introduction to Separations and Gas Chromatography (Schug, Chapters 23, 24)

Liquid and Ion Chromatography (Chapters 25, 26)

Electrophoretic Methods and Microchips (chapter 26)

Mass Spectrometry (Ch 22)

Flow and Batch Processing Methods (Supplementary Material: [www.flowinjection.com](http://www.flowinjection.com),  
[www.globalfia.com](http://www.globalfia.com))

August 24 Mon: Getting to know each other. Survey Form. Discussion of expectations and grading schemes. Exams. Introduction to Instrumental Analysis

August 26 Wed: Introduction to Spectroscopy

August 31 Mon: Molecular Spectroscopy, UVIS

Sept 02 Wed: Molecular Spectroscopy , UVIS/IR

Sept 07 Mon: Labor day

Sept 09 Wed: Guest Lecture: Dr. Richard Xiyun Guan: Stochastic Nanosensors

Sept 14 Mon: Molecular Emission Spectroscopy Fluorescence/Phosphorescence/Luminescence

Sept 16 Wed: Atomic Spectroscopy: Emission

Sept 21 Mon: Guest Lecture: Dr. Kevin Schug: Introduction to Separations

Sept 23 Wed: Guest Lecture: Dr. Kevin Schug: Gas Chromatography

Sept 28 Mon: HPLC: Stationary phases and modes

Sept 30 Wed: HPLC Detectors

Oct 5 Mon: HPLC variants: SEC/GPC. TLC/HPTLC /Flash Chromatography

Oct 7 Wed: Ion Chromatography

Oct 12 Mon Ion Chromatography

Oct 14 Wed Interim Review

Oct 19 Mon Midterm Examination (Grades given before Oct 30, last day to drop classes)

Oct 21 Wed: Electrophoretic Methods

Oct 26 Mon: Capillary Electrophoresis

Oct 28 Wed Microchip and Microfluidic Platforms

Nov 2 Mon Mass Spectrometry

Nov 4 Wed Mass Spectrometry

Nov 9 Mon: Flow analysis SFA / FIA

Nov 11 Wed Flow Analysis Components and systems

Nov 16 Mon Sequential Analyzers, Zone fluidics, Hybrid flow Analyzers, Discrete Analyzers

Nov 18 Wed: Electrochemical Analyzers

Nov 23 Mon: Review and addition: Optical Spectrometry

Nov 25 Wed: Review and addition: Separation Science

Nov 30 Mon: Review and addition: Mass Spec/Electrochem/Flow –Batch analysis

Dec 2 Wed: Final Review: Final exam Discussion

Midterm may be scheduled outside of class depending on common time availability

Final Exam is scheduled Dec 7 M 8-1030A

You can bring one 8x 10 sheet of paper to any exam, with whatever written on it.

You will not have a cell phone in class turned on

You will not have earbuds in your ear while in class

There may be unannounced pop quizzes/take home quizzes for extra credit.