

ANALYTICAL INSTRUMENTATION

CHEM. 361

Spring 2001

LECTURE: T Th 10–11:15 am, in \cap **S-1-025** \cap (The Green Lab)

INSTRUCTOR: Shelley Foster

OFFICE: S-1-087 LAB: S-1-100

PHONE: office 287-6096 lab 287-6184

OFFICE HOURS: If you want to see me, feel free to come find me anytime.

However, you are GUARANTEED to find me in my office or lab on both
TUESDAY AND THURSDAY evenings at 5:00 pm.

E-MAIL: michelle.foster@umb.edu

LABORATORIES: Thursday 2–5 pm. However, there is a very good chance that
some of the labs will run over, so, to be on the safe side, try not to have much
planned until 6:00 on Thursdays. This way we can all take our time. Rooms
will be noted on lab handouts.

TEXT: *Analytical Chemistry*, Eds. Kellner, Mermet, Otto and Widmer, Wiley-
VCH Verlag Gmbh, Weinheim, FDR Germany, 1998.

GRADING:	Laboratory work and reports	40%
	(each Lab worth 5%)	
	Pre-Labs	10%
	Exam 1	10%
	Exam 2	10%
	Exam 3 (i.e. final exam)	10%
	Independent Project	20%
	Proposal worth 6%	
	Report worth 7%	
	Presentation worth 7%	

Everyone is expected to come up with and do an independent project. Preliminary ideas are due on March 27 and the final Proposal will be due on April 12. You will have available to you any and all instruments used in the lab during the lab periods on April 19, 26, and May 3. Additional time may be scheduled. Fifteen-minute talks presenting your project and data will be given during the last three days of class, and the final report will be due on May 17.

Organization of the Class

This class breaks very nicely into four separate sections.

First: Introduction [Part I of the text]

Labs: None

Second: Physical Analysis [Part III of the text]

Labs: AAS

AFM

FTIR

NMR

Third: Chemical Analysis [Part II of the text]

Labs: DSC/TGA

Electrochemistry

HPLC

Kinetics

Fourth: Computer Analysis & Total Analysis Systems [Parts IV and V of text]

Labs: None, but during this time you will be doing your independent project.

Labs

This class is too big for everyone to do the same lab on the same day. The whole point of this class for you to get experience on the instruments. Therefore, you will break into four separate groups and each group will be performing a different experiment on any given day. I will pass around a sign-up sheet the week before a lab section and you will sign up for the lab your group wants to do. For this purpose, we will split the lab portion of the class into the two sections, Physical and Chemical Analysis. During the first four lab periods we will be doing the Physical Analytical Labs (AAS, AFM, FTIR, and NMR). During the second four lab periods we will be doing the Chemical Analytical Labs

(DSC/TGA, Voltametry, HPLC, and Kinetics). It is your responsibility to sign up for all four labs in each of the two sections. During the last section you will be doing your independent project.

At the beginning of each lab period, the instructor will cycle through the groups, pick up the pre-labs and check everyone out on the instruments. Throughout the rest of the period I will make regular “rounds” through the lab sections.

No one is allowed to start a lab until the pre-lab has been completed and handed in. You CAN NOT blow off the pre-lab. They are very important, especially since you will be performing the majority of the lab unsupervised.

Lab reports are due one week after completing the lab. You will lose 5% of your lab grade for every day the report is late.

Tentative Schedule**Instrumental Analysis****Spring 2001**

Jan. 30	Introduction
Feb. 1	Aims and Importance of Analytical Chemistry, Ch 1
Feb. 6	The Analytical Process, Ch 2
Feb. 8	QC and QA, Ch 3 <i>Physical Lab #1</i>
Feb. 13	Elemental Analysis, Ch 8
Feb. 15	Compound and Molecular Analysis (UV-Vis), Ch 9.1 <i>Physical Lab #2, P#1 due</i>
Feb. 20	Compound and Molecular Analysis (IR and Raman), Ch 9.2
Feb. 22	Compound and Molecular Analysis (NMR), Ch 9.3 <i>Physical Lab #3, P#2 due</i>
Feb. 27	Compound and Molecular Analysis (Mass Spec), Ch 9.4
Mar. 1	Surface Analysis, Ch 10 <i>Physical Lab #4, P#3 due</i>
Mar. 6	Surface Analysis, Ch 10
Mar. 8	Structural Analysis, Ch 11 <i>Chemical Lab #1, P#4 due</i>
Mar. 13	Exam 1
Mar. 15	Fundamentals of Chemical Analysis, Ch4 <i>Chemical Lab #2, C#1 due</i>
Mar. 20	<i>Spring Break</i>
Mar. 22	<i>Spring Break</i>
Mar. 27	Chromatography, Ch 5 Preliminary Proposal for Independent Project DUE
Mar. 29	Chromatography, Ch 5 Preliminary Proposal Returned <i>Chemical Lab #3, C#2 due</i>
April 3	<i>Individual Work on Independent Project Proposal, no lecture</i>
April 5	<i>Individual Work on Independent Project Proposal, no lecture</i>
April 10	Kinetics and Catalysis, Ch 6
April 12	Methods of Chemical Analysis and Applications, Ch 7

Final Proposal for Independent Project Due

Chemical Lab #4, C#3 due

April 17 Methods of Chemical Analysis and Applications, Ch 7

April 19 Methods of Chemical Analysis and Applications, Ch 7

Independent Project, C#4 due

April 24 **Exam 2**

April 26 Computer-Based Analytical Chemistry, Ch 12 and 13

Independent Project

May 1 Total Analysis Systems, Ch 14 and 15

May 3 Process Analytical Chemistry, Ch 16

Independent Project

May 8 Presentations

May 10 Presentations

May 15 Presentations

May 17 **Independent Project Report Due**

Unknown **Exam 3**