

Chemistry 314 Instrumental Analysis  
Spring 2015  
Professor Alanah Fitch  
Room 418, 83119, [afitch@luc.edu](mailto:afitch@luc.edu)

**Description:**

This is the capstone, writing intensive, service learning class for chemistry majors. This class is intended to integrate all core concepts from previous classes while simultaneously providing hands-on experience on common chemical instrumentation. The class can best be described as a “finishing class”. Students leaving this class will be able to successfully survive a job interview for an industrial position and will be able to describe a research project for a graduate or medical school interview. The first 2/3 of the class are devoted to providing *analytical thinking* and *professional* training so that the student may solve a field environmental question related to lead with full quality control and assignment of uncertainty and validity to those results, as prepared by the student in the final 1/3 of the semester.

**Textbooks:**

Optional, in the years that I require the textbook students tell me that they didn't need it. In the years that I make the textbook optional students tell me that they did need it. You are now within 6 months of being a certified professional. Use your own discretion:  
Skoog Holler and Crouch: Principles of Instrumental Analysis  
Web source (exceptionally good): Analytical Digital Sciences Library  
Very Useful: Robert de Levie: How to Use Excel in Analytical Chemistry or equivalent text.

**Materials and Equipment to Be Supplied by the Student and brought to all classes**

- Flash drive, pencils, calculator
- Lab-book with carbon tear out sheets
- Laptop computer with a database, preferably Excel (available through Open Office)

**Responsibility of Students for Preparation and Cleanliness**

- Students are expected to arrive with a working knowledge of the content of the assigned lab and be ready to begin promptly in order to complete the various tasks.
- *T.A.s will check the lab book to determine that each student has written a synopsis of the work to be accomplished.*
- Grades can drop if laboratory cleanliness is not adhered to. Each group is responsible for the cleaning of all lab ware used and to return the equipment to the appropriate space. If this becomes an issue the groups, semester grade may be lowered by a full grade.

### **Groupings and Schedule**

In order to allow each student hands on access to the equipment each lab is split into 2 to 3 groups, each group having no more than 3 participants. The groups will follow DIFFERENT schedules throughout the semester as indicated on the next page. 2 labs deal with manipulation of data.

Working in groups is not easy. We expect you to make an honest effort to evaluate your own contribution and that of your partners to the group. At week three you will be given an opportunity to restructure. If an individual performs so poorly within a group that they are not “desirable” they will be expected to complete the work on their own with no decrease in the amount of work.

### Grading

Grade	%	Points
A	90	900
B	80	800
C	70	700
D	60	600

Grades of + and – are assigned at the discretion of the instructor.

If an exam is missed for documented illness the two exams will be combined in a weighted average to make up for the missed exam:

$$(1.1) \quad Exam_{3,mis\text{sed}} = 0.66Exam_{best} + 0.34Exam_{worst}$$

No make-up exams are given.

The “lecture” section is designed to move along as closely as possible with the work in the lab. Time is allotted in each lecture section to discuss concepts and data obtained within the lab, as a result each student is expected to come to class prepared to ask questions and discuss the material from lab. Students will be asked to present data as they have obtained it.

Lecture material made available as we proceed through the labs, below:

Activity					Points
Labs	Lab	Responsibility	Type	Revisions Required (allowed)	point value
1	Statistics	Group	Full Lab	Required (2)	50
2	Digital Filtering	Group	Full Lab	Required (2)	50
3	Phone Spec	Group	Full Lab	Required (2)	50
4	UV-Vis	Group	Full Lab Exec.	Required (2)	50
5	IC	Individual	Sum	Required (1)	50
6	IR	Group	Full Lab Exec.	1 allowed	50
7	Raman	Individual	Sum Exec.	1 allowed	50
8	AA	Individual	Sum	0 allowed	50
9	GCMS	Group	Full Lab	0 allowed	50
3 Exams					300
Project & Presentation					150
Homework					100
Total					1000

Week	Date (Mon)	Group 1	Group 2	Group 3	Exams
1	18-Jan	No lab: Monday is MLK Day			
2	25-Jan	Excel Statistics	Meet in Flanner Hall 129		
3	1-Feb	Excel digital filtering	Meet in Flanner Hall 129		
4	8-Feb	Phone spectroscopy	Meet 1/2 hr 129; move to 314		<b>Exam 1: Statistics and Digital Filtering</b>
5	15-Feb	UV-Vis	IR	Raman	
6	22-Feb	IR	Raman	UV-Vis	
7	29-Feb	Raman	UV-Vis	IR	
	7-Mar	Spring Break			
8	14-Mar	AA	ASV	IC	<b>Exam 2: UV-Vis, calibrations, IR, Raman</b>
9	21-Mar	ASV	IC	AA	
	24-Mar	Easter Weekend			
10	28-Mar	IC	AA	ASV	
11	4-Apr	GCMS	Projects	Projects	
12	11-Apr	Projects	GCMS	Projects	
13	18-Apr	Projects	Projects	GCMS	<b>Exam 3 AA, ASV GCMS</b>
14	25-Apr	Projects	Projects	Projects	
	6-May				Friday; Final 9-11 am

**Fitch Schedule (and office hours)**

Time	Monday	Tuesday	Wednesday	Thursday	Friday
8:30					
10:25					
11:15					
11:30				Chem 380	
12:35	Chem		Chem 314		Chem 314
1	314				
1:40	Chem		Chem 314	Office Hours	Office
2:30	314 Lab		Lab		Hours
3:45	Fitch		Reichert		
5:30	TA		TA		
	Grp				
	Mtg				