Chemistry 480
PRACTICAL INSTRUMENTAL TECHNIQUES COURSE SYLLABUS
SPRING 2016

INSTRUCTOR:	Dr. Alice Suroviec	**OFFICE HOURS**:
Office:	SCI 304A	MWF: 11:00am – noon
Phone:	706-238-5869	TR: 9:00am – 11:00am
Email:	asuroviec@berry.edu	M: 1:00pm – 4:00pm

TIME: Lecture: F 2:00 – 3:00 pm SCI 214; Lab: W 1:00– 5:00pm SCI 239.

REQUIREMENTS:

TEXTS: *Principles of Instrumental Analysis* (6th Ed.), by Skoog, Holler and Neiman, Harcourt-Brace, 2007.

LAB: A laboratory notebook with numbered pages.

CALCULATOR: A scientific calculator.

COURSE DESCRIPTION: Analytical chemistry is the branch of chemistry that typically focuses on two questions: "What?" and "How much?" This course will deal specifically with how these questions are answered using modern chemical instrumentation. Prerequisite: CI

PURPOSE OF THE COURSE: Practical Instrumental Techniques will introduce the basic instrumental methods that will be encountered in graduate and industrial settings. This course seeks to achieve the following goals: introduce the four basic areas of instrumental methods, examine the differences between the instrumental methods as well how the methods are different yet complimentary to each other. A successful student will understand the advantages and limitations of the instrumental methods and be able to choose the most appropriate instrument to solve an analytical problem.

STUDENT LEARNING OUTCOMES: The student will understand have a thorough introduction to the basics of instrumental analysis; to develop scientific writing skills, critical thinking and interpersonal skills through laboratory experiences. Students will demonstrate their knowledge of appropriate instrumental analysis principles and their ability to apply these principles to analytical problems.

ASSESSMENT MEASURES: Upon satisfactory completion of this course, the student will demonstrate competency in this course by their performance on post-lab write-ups, lab reports, lab notebook evaluations and written exams.

METHOD OF INSTRUCTION:

Lecture – A one-hour lecture each week will introduce the next week's laboratory activity and explain the background and procedure behind the new technique(s).

Laboratory – The focus of the lab will be on learning both new instrumental methods and method development. Two-thirds of the laboratory classes will be on learning new methods or learning to use instruments for different applications. The last third of the laboratory classes will be an independent project where the techniques that have been learned in the first half will be applied to a problem chosen by the student.

ATTENDANCE POLICY: It is expected that class attendance with be 100% and that full attention will be given while present in class. The student will be held responsible for the material presented ad any assignments made during a class session s/he was not able to attend. While lecture attendance, failure to attend lecture will leave you unprepared for lab that week. Lab attendance is absolutely mandatory. If you have to miss a lab due to a predetermined event (participation in Berry College athletic events, graduate/professional school interviews etc.), meet with the instructor as far in advance as possible to make alternative arrangements. If you miss a lab due to illness or family emergency, be prepared to provide proper documentation in order to be accommodated. *A student who has been absent continuously for three consecutive class sessions will be reported to the Registrar and is subject to administrative removal from the course*.

GRADES: The course grade will be based on the total points accumulated from the three regular exams, the laboratory, homework and quizzes, a final project and the final exam. Each of these will be weighted as follows:

Post-labs	12 x 20 pts	240 pts
Written Exams	2 x 50 pts	100 pts
Lab notebook	2 x 25 pts	50 pts
Independent Project		60 pts
TOTAL		**450 pts**

Total points accumulated will determine final grades. Grades will be assigned according to the following scale after being rounded to the nearest whole number:

Points	Percent (%)	Letter grade
418 – 450	93 – 100	A
405 – 417	90 – 92	A-
390 – 404	87 – 89	B+
373 – 389	83 – 86	B
360 – 372	80 – 82	B-
346 – 359	77 – 79	C+
328 – 345	73 – 76	C
315 – 327	70 – 72	C-
301 – 314	67 – 69	D+
270 – 300	60 – 66	D
269 or less	59 or less	F

POST-LABS: for each lab, you will complete a brief write-up that will be due at the **beginning of the following lab session.** The summaries should adhere to the following format, written in paragraph form:

Introduction: What was the point of the experiment? In other words, what questions were you seeking to answer in this lab? What did you learn from the procedures that you performed?

Methods: Do not provide a lot of experimental detail. What techniques were used, and how did they help to answer the questions posed in the introduction?

Results and Discussion: Provide any graphs, pictures, or data tables that were generated for the lab. Then, describe each one. Make sure that any pictures, graphs, etc. are properly labeled.

The length of these assignments will vary since pictures and graphs take up extra space, but you should be able to limit the amount of text to 2 - 3 double – spaced pages.

LAB NOTEBOOKS: You will be expected to keep a detailed recorded of your experiments, observations and results. *You must use pen with black ink and your notebook!!* Even though you will have a typed procedure available for download, you will need to record everything you actually did in your notebook. Graphs and data tables can be printed and taped into th notebook. To make sure you are staying current on your notebooks, as they will be collected twice during the course of the semester and graded. These collections will be *unannounced!*

EXAMS: There will be a written midterm on **March 4th.** The midterm will cover material presented in lecture and/or in lab. There will also be a cumulative final given on **April 15th.**

FINAL PROJECT: This lab project can be done either as an individual or as a pair. This project includes the design, completion and poster presentation. I will be available for consultation on this project. These projects will use the analytical instruments in the department and analyze a problem interesting to you. Some suggestions are: concentration of iron/calcium in supplements, lead in ground water, compositions of wood by IR. I would recommend J. Chem. Ed. for more ideas. The project idea must be submitted by **February 28th**. Presentation will in lab on **April 27th** and the grade will be based on the same criteria as the regular labs but including originality and reasonable results and conclusions.

FERPA: Berry College's statement of compliance with the 1974 Federal Family Educational Rights and Privacy Act (FERPA or the Buckly Amendment) states: "Grades should not be distributed or posted in any fashion that permits identification of the student by anyone other than the student." To facilitate the distribution of the graded quizzes and homework, I will pass those back in class unless you explicitly tell me otherwise. Exams are private, so I will always hand these back individually.

ADDITIONAL ACCOMMODATIONS: Students with disabilities who believe that they may need accommodations in this course are encouraged to contact the Academic Support Center in Krannert Room 329 (ext. 4080) as soon as possible to ensure that such accommodations are implemented in a timely fashion.

ACADEMIC INTEGRITY: Each student is expected to adhere to the policies outlined in the college's academic handbook. Cheating of any kind will not be tolerated. As in all of my classes, students will be asked to sign an integrity pledge on each quiz/exam. The pledge reads as follows:

"I affirm that I have neither committed nor witnessed a violation of academic integrity in the completion of this quiz/examination."

Any student found to have violated academic integrity will be subject to the following:

First Offense: A drop of one whole letter grade in the final course grade and a report filed to the Academic Dean's office.

Second Offense: Removal from the course, automatic failure in the course and a report filed to the Academic Dean's office.

TENTATIVE SCHEDULE:

LAB DATE	LAB TOPIC	LECTURE DATE	LECTURE TOPIC
1/13/16	DATA ANALYSIS	1/15/16	INTRODUCTION TO SPECTROSCOPY
1/20/16	SIGNAL TO NOISE ANALYSIS	1/22/16	ATOMIC SPECTROSCOPY
1/27/16	ATOMIC SPECTROSCOPY	1/29/16	INFRARED SPECTROMETRY
2/3/16	FTIR OF POLYMERS	2/5/16	UV-VIS SPECTROMETRY
2/10/16	UV-VIS OF 2 SYSTEMS	2/12/16	FLUORESCENCE
2/17/16	FLUORESCENCE OF COUGH SYRUP	2/19/16	INTRODUCTION TO SEPARATIONS
2/24/16	ION EXCHANGE CHROMATOGRAPHY	2/26/16	GAS CHROMATOGRAPHY
3/2/16	ION CHROMATOGRAPHY	3/4/16	EXAM
3/16/16	GC OF NICOTINE	3/18/16	LIQUID CHROMATOGRAPHY
3/23/16	HPLC OF ENERGY DRINKS	3/25/16	INTRODUCTION TO ELECTROCHEM
3/30/16	ELECTROCHEM OF ASCORBIC ACID	4/1/16	POTENTIOMETRY
4/6/16	INDEPENDENT	4/8/16	VOLTAMMETRY
4/13/16	INDEPENDENT	4/15/16	EXAM
4/20/16	PROJECT PRESENTATION		