CHEM 421L – Instrumental Analysis Lab (Spr 2023)  SSMB 321

*Note: this syllabus is subject to change by the instructor. Any changes will be announced in class, by email, and on OAKS*

**Section 01**  
Wed 1:00 – 4:00 PM

**Section 02**  
Thurs 1:40-4:40 PM

Instructor: Dr. Jay G. Forsythe (“Dr. Jay” or “Dr. Forsythe;” he/him)  
Office: SSMB 112  
Office Hours: Email to set up appointment; can Zoom or meet in SSMB lobby/courtyard (w/ masks)  
Email: forsythejg@cofc.edu  
Phone: 843-953-5052

CHEM 421 lecture is a pre- / co-requisite for this course. We will meet in SSMB 321 and in other rooms on the 3rd floor, depending on the experiment. You will need to bring the following to lab each week:

- Safety glasses, goggles, or face shield
- Lab coat
- Nitrile gloves
- Composition book / laptop / tablet to serve as laboratory notebook (up to you)
- Calculator (any type is fine)

**SAFETY CONSIDERATIONS:**

If you do not have the appropriate safety gear, you will not be allowed to work in the lab. **No exceptions.**

Always remember, safety first!

- **Do not come to lab if you are sick and/or test positive for COVID-19.** Let the instructor know as soon as possible that you will miss lab.
- **You must wear your safety glasses / goggles / face shield at all times in the lab.**
- **Long pants are required.**
- **Footwear must provide adequate protection to the entire foot.** Sandals, open-toed shoes, mesh-top shoes, cloth shoes, or shoes with high or narrow heels are inappropriate for lab and will not be permitted. No skin should be visible below the knees.
- **Socks are required.** If you wear leggings and ankle socks to class, you will be asked to leave until you have socks that cover your ankles.
- **You are advised to tie back long hair and wear shirts that offer full coverage.**
- **Lab coats are required to cover your arms and protect your clothes.**
- **Nitrile gloves must be worn when working with solutions and other reagents.**

**STUDENT LEARNING OUTCOMES:**

- To perform instrumental analytical methods including spectroscopic, chromatographic, and electrochemical methods, given instructions for using a particular instrument model, accessories, and software.
- To interpret data from an instrument and incorporate it into writing that communicates results effectively.
- To determine and communicate experimental results appropriately using safe laboratory practices, calculations, significant figures, units, graphs, and laboratory notebook use.

**ASSIGNMENTS:**

Procedures and details about each assignment will be distributed on our course OAKS page beforehand. You are expected to read the procedure in advance and be prepared for each lab. Some experiments will take multiple weeks.
For each experiment, a combined PDF of the assignment and data will be uploaded to OAKS and graded together. Make sure to keep a good lab notebook – it should provide a full record of what was performed each week such that someone else could repeat it later. Data should be recorded in your notebook soon after it is generated. Calculations should be in the notebook as well. In the case that repeated calculations are performed, one example calculation of each type should be provided.

**TENTATIVE LIST OF EXPERIMENTS (subject to change):**

- Using basic electronic components
- Build-your-own spectrometer
- Detection of trace cocaine by GC-MS on paper money (2 weeks)
- Protein molecular weight determination by MALDI-TOF-MS and/or ESI-MS (2 weeks)
- HPLC separation and quantitation of UV-absorbing components in sunscreen (3 weeks)
- Raman spectroscopy of inorganics
- Quantitation of acetaminophen in children’s medicine by cyclic voltammetry

**ATTENDANCE POLICY:**

Because attendance is crucial for a laboratory course, you are expected to be present each week if you are able. However, do not attend lab if you are experiencing any illness, symptoms, or need to quarantine due to a possible COVID exposure. If this situation arises, stay home, and inform the instructor that you will not be able to attend due to one of the following four reasons: health, emergency, technology, or personal. The instructor will work with you to determine the appropriate accommodations, including the possibility of an alternative assignment. If more than three labs are missed, then it is possible you will have to withdraw from the course.

**PARTICIPATION:**

During this lab course, you have an opportunity to use expensive instrumentation which is not common at the undergraduate level. You will learn key skills desired by employers. For example, having experience in HPLC or MALDI-TOF MS is something you can put on your CV that will make you an attractive candidate. Don’t waste this opportunity! Ask questions about what the instrument is doing and how. The primary goal of this course is to give you hands-on training with as many instruments and techniques as possible because these are used every day by scientists in research and industry.

**SNAP ACCOMMODATIONS:**

Please send me an email (as soon as possible) if you have been approved to receive accommodations through SNAP. Instructors must be informed of any accommodations in advance in accordance with SNAP office policies. Please consult the Student Guide to SNAP Services for more information: [http://disabilityservices.cofc.edu/policies/index.php](http://disabilityservices.cofc.edu/policies/index.php).

**GRADING POLICY:**

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Weekly assignments / data / notebook 70%
Safety and participation 15%
Lab final 15%
Total 100%

**LAB FINAL:**

The lab final will be held during the final period of the semester. It will be a synchronous, in-person exam based on lab procedures, data, and conclusions. This exam is open lab notebook, but you must work alone.
ACADEMIC INTEGRITY:

Lying, cheating, attempted cheating, and plagiarism are violations of our Honor Code that, when identified, are investigated. Each incident will be examined to determine the degree of deception involved. Incidents where the Instructor determines the student’s actions are related more to a misunderstanding will handled directly by him. A written intervention designed to help prevent the student from repeating the error will be given to the student. The intervention, submitted by form and signed both by the Instructor and the student, will be forwarded to the Dean of Students and placed in the student's file.

Cases of suspected academic dishonesty will be reported directly by the Instructor and/or others having knowledge of the incident to the Dean of Students. Students should be aware that unauthorized collaboration – working together without permission – is a form of cheating. Unless the instructor specifies that students can work together on an assignment, quiz and/or test, no collaboration during the completion of the assignment is permitted. Other forms of cheating include possessing or using an unauthorized study aid (which could include accessing information via a cell phone or computer), copying from others’ exams, fabricating data, and giving unauthorized assistance. Research conducted and/or papers written for other classes cannot be used in whole or in part for any assignment in this class without obtaining prior permission from the instructor. Students can find the complete Honor Code and all related processes in the Student Handbook at: http://studentaffairs.cofc.edu/honor-system/studenthandbook/index.php.