CHEM 370 Lecture Syllabus

Instructor: Al Fischer, PhD
Office Hours: By appointment; see my availability and schedule an appointment on Calendly. You will be able to choose to meet on Zoom or at my office during scheduling. (No need to email or ask - just schedule!)
Asking Questions: Ask general questions on Piazza
Email: dfischer@wcu.edu
Availability: Email, Piazza, and office hours are the best ways to find me; my devices turn on Do Not Disturb at 9 PM.

Overview

CHEM 370 - Instrumental Analysis (Lecture) is an introduction to common techniques of instrumental analysis. It is designed to prepare students for careers as chemical and/or forensic *analysts* and will further introduce them to the field of *analytical chemistry* as it relates to chemical instrumentation. Students will study the theoretical, electrical, and mechanical underpinnings of the most common methods of instrumental analysis. Topics covered include spectroscopy, mass spectrometry, separation science, and data analysis. Grades of 'C' or better in both CHEM-232 (Quantitative Analysis) and CHEM-242 (Organic Chemistry II) are prerequisite to this course. This lecture course is meant to be taken in conjunction with *CHEM 370 - Instrumental Analysis (Lab)*.

Student Learning Outcomes

To achieve a satisfactory grade, students will:

- Summarize the theoretical bases of common analytical techniques, including spectroscopic, spectrometric, and separation methods.
- Summarize the electro-mechanical operation of common analytical equipment, including spectrometers, data acquisition devices, and chromatographs.
- Examine "hyphenated techniques" to reveal how instruments can be combined to achieve complex analysis goals.
- Select appropriate instrumental methods for a given analyte, sample matrix, and detection regime.
- Utilize statistical methods to draw robust conclusions from data, especially those generated during chemical analysis.

Required Course Materials

Text Book: Granger, R. M., Yochum, H. M., Granger, J. N., & Sienerth, K. D. (2017). *Instrumental Analysis*. Oxford University Press. (WCU rental book available at bookstore)

Supplementary Book: Harvey, D.T. (2008) *Analytical Chemistry 2.1* (free online)

Lab Manual: Fischer, D.A. (2020) *Chem 370 Lab Manual* (free online)

Miscellaneous: A scientific calculator not on a phone (for exams, a TI-XX will work but a simple $10 Casio *fx*-300 will work just as well).

Technology: Students will need a laptop computer meeting Chemistry and Physics' minimum computer requirements. Students will be required to use Julia + Pluto and may wish to install these on their computer; both are freely available for for all operating systems. Alternatively, student may use Julia + Pluto via WCU's STEM VCAT (officially supported option for the course). A web browser and internet connection capable of streaming video will be necessary for submitting homework assignments and accessing course materials.

The program OpenChrom allows you to process chromatographic and mass spectrometric data on your personal computer. This is not required but can speed up your data processing.

We will use Piazza for class discussion. The system is highly catered to getting you help fast and efficiently from classmates and your instructor. Rather than emailing questions to the teaching staff, I encourage you to post your questions on Piazza. If you have any problems or feedback for the developers, email team@piazza.com. Find our class page at here.

Grading

Your final grade for the semester will be weighted thusly:

- Lecture: 70%
- Discretionary: 5%
- Laboratory: 25%

Your **lecture grade** will be calculated as the total points you earned divided by the total points available (x 100%). For exams, quizzes, and classwork, each question or assignment will specify the number of points available. For homework, all questions will be graded on the point system of: 0 (did not attempt), 1 (attempted but entirely incorrect), 2 (incorrect, but close), or 3 (perfect), unless otherwise specified.

Discretionary points are determined at the end of the semester based on participation, effort, attendance, and overall respect for your peers/classmates, your instructor, and their time, both inside and outside the classroom.

See the lab syllabus for information on how your laboratory grade is determined.

Grading Scale

Number Range	Letter Grade
97-100	A+
93-96.9	A
90-92.9	A-
87-89.9	B+
83-86.9	B
80-82.9	B-
77-79.9	C+
73-76.9	C
70-72.9	C-
67-69.9	D+
63-66.9	D
60-62.9	D-
<60	F

These grades indicate levels in quality from excellent to unsatisfactory. Students are responsible for knowing class attendance, withdrawal, and drop-add policies and procedures.

Grading Technology

Some items may be graded by computer software. Any answers not in the specified format will not be graded. Written work may be checked for plagiarism using computer software. Plagiarism will NOT be tolerated (see Academic Integrity section, below). Due dates/times are automatically enforced by Canvas.

Turning Things In

Most assignments will be submitted electronically. Unless otherwise specified, assignments are due at 23:59:59 on the due date and late work is not accepted. A list of anticipated assignments is available in the Canvas site for the course, but is subject to change as needed.

Submitting Assignments

When turning in assignments:

- Files should be uploaded to each assignment page on Canvas.
- Files should be of the types and quantity specified in the assignment.
- Files should be given a clear, logical filename that reflects the assignment name.
- Files may be sorted automatically by a computer. Therefore, any files not named appropriately, not in the specified format, or submitted elsewhere (e.g. email) may not be graded.
- Any electronic assignments turned in via hardcopy will not be graded.

Submissions that do not follow these guidelines may incur point deductions.

Late Work

Late work is not accepted in this course. Due dates are automatically enforced by Canvas. However:

- Assignments are accepted *early* and students are encouraged to submit assignments before the deadline. Extra credit of 5% per assignment is granted for assignments submitted more than 24 hours early!
- Each student is granted one exception to the late policy. You must fill out a late work exception form to use your exception. You may use this exception for any reason, but bear in mind future exceptions aren't guaranteed. All work, regardless of whether an exception has been used, must be turned in no later than the last day of classes prior to finals week.
- If you experience *extenuating circumstances* (e.g. a medical emergency, professionally diagnosed illness, or death in the family) or a *university-sponsored absence* you may ask to be considered for an extension on a case-by-base basis. Communication of the issue to your instructor and identification of when you plan to turn in the assignment are important in such circumstances. For university-sponsored absences, exceptions should be arranged *before* your absence or will not be granted.

Course Policies

COVID-19: At the time of this writing, it is expected that all lab activities will occur in person. During all in-person meetings, students *must*:

- Wear a face mask at all times (must be 'lab use only' - see "Masking for a Friend" statement below). See WCU's mask policy for more information.
- Practice good hygiene practices and follow CDC guidelines to minimize spread of COVID19.
- Avoid coming to class if you experience and cold, flu, or COVID19 symptoms, have been diagnosed with COVID19, or have been in contact with someone who's tested positive for COVID19 within the last 14 days.

Note that these policies are subject to changes as the COVID19 pandemic continues to develop.

Laboratory Behavior: Students are expected to attend each lab period and participate fully in that day's activity. Students should respect the rights of others and minimize avoidable distractions.

Never bring food or drink into the laboratory. This includes sealed bottles and items inside backpacks – leave them outside the lab! Do not chew gum, use tobacco products, or apply cosmetics in the lab. Do not place personal items inside fume hoods or where they may come into contact with chemicals. Keep walkways clear of chairs, bookbags, etc. (place them in cubbies!). Wash your hands before leaving lab, and never wear gloves or lab coats outside the lab!

The sparing use of cell phones during lab sessions is permitted but discouraged. If you must, please use your cell phone outside the laboratory, and never leave an experiment unattended to do so! Likewise, do not place your cellphone in a fume hood or on a chemical bench!

In an effort to maintain a productive work environment for all students, please refrain from playing music, videos, etc., in the classroom/laboratory.

Proper Laboratory Attire: Students must arrive to lab wearing appropriate attire. Students without appropriate attire will be asked to leave and will not be able to complete the activity for the day (and will be counted absent).

- Wear eye protection at all times (whenever you are in the room).
- Wear closed-toed shoes that fully cover your feet up to the ankle at all times.
- Wear long pants that extend over the top of your shoes at all times.
- Wear a hair tie for long hair.
- Never wear tank tops, sleeveless shirts, shorts, or sandals.

After-hours Instrument Access: You may occasionally want to conduct analyses outside of class time. The instrument lab is open from 8AM to 4PM M-F; please plan your work to fit within that time (it's OK to start a run at the end of the day and leave it to run overnight). If you are completing work outside of class you must work with a lab partner who is also familiar with the instrument you're working on. *Never work in the lab alone!* Likewise, please refrain from bringing guests into the instrument lab unless they have specifically passed the instrument safety training. If you will require significant help on the instrument please schedule a time to meet with your instructor or the Instrumentation Specialist in advance.

Pregnancy: Certain chemicals can have severe harmful effects on unborn children. Any student who is pregnant or might have become pregnant and wished to avoid these hazards should notify her TA or instructor before conducting any laboratory work so that proper safety precautions can be taken.

Attendance: Please email your instructor *ahead of time* if you encounter circumstances that absolutely prevent you from making it to lab on time. Attendance to all class periods is mandatory. Absences from group work sessions may incur a loss of points up to a zero for the assignment and deductions in the student's participation grade.

If you experience any symptoms of COVID-19, cold, flu, or other contagious sickness please do NOT come to class! Likewise, do not attend if you have been in contact with someone who has tested positive for COVID-19 or is suspected to have COVID-19. Please maintain diligent communication with your instructor during these situations and appropriate accommodations will be made.

Inclement Weather: Please check the University website for campus closings during times of bad weather. Your safety is a priority when traveling. Use common sense when attempting to get to campus and notify your instructor if you are unable to safely make it. Announcements will be made via e-mail if class must be canceled when the University has not officially closed.

Institutional Policies

Course Recording and Broadcasting: Course recording is bound by University Policy 122. Students should request prior permission of their isntructor before recording and class meetings.

Accommodations for Students with Disabilities: Western Carolina University is committed to providing equal educational opportunities for students with documented disabilities and/or medical conditions. Students who require accommodations must identify themselves as having a disability and/or medical condition and provide current diagnostic documentation to the Office of Accessibility Resources. Please contact the Office of Accessibility Resources, 135 Killian Annex, (828) 227-3886 or by email. Visit the OAR website at http://accessibility.wcu.edu/ for more information.

Academic Integrity Policy and Reporting Process: This course follows the guidelines set forth in WCU's Academic Integrity Policy. Refer to the policy for specific rules and sanctions!

Written work may be checked for plagiarism using computer software. Plagiarism will NOT be tolerated and will by handled according to WCU's academic honesty policy.

Community Vision for Inclusive Excellence: All members of the WCU community are expected to embrace WCU's mission of inclusive excellence. See the Community Vision for Inclusive Excellence.

Resources

Getting Help

WCU provides many resources to help students succeed. *All* students are encouraged to take advantage of these resources, regardless of their academic standing! A few are listed below.

- **Office Hours and Piazza** - don't hesitate to ask your instructor and classmates for help! See the top of this document for more information.
- **Writing and Learning Commons (WaLC)** for help and feedback on writing. Visit tutoring.wcu.edu or call 828-227-2274.
- **Math Tutoring Center** for help with calculations and math. For more information, visit mtc.wcu.edu or call 828–227–3830.
- **Counseling and Psychological Services (CAPS):** CAPS is here to help if you're experiencing mental health worries such as anxiety, depression, insomnia, trouble concentrating, relationship problems, and more. For more information about CAPS, visit https://www.wcu.edu/experience/health-and-wellness/caps/index.aspx or call 828-227-7469. Additionally, you may call the Western NC 24-hour crisis line at 888-315-2880 or the Suicide Prevention Lifeline at 800-273-8255.

University Dates

- **Academic Calendar** The University academic calendar can be found at here. It includes dates for all breaks, University closures, final exams, etc.
- **Final Exam:** The University final exam schedule can be found on the Registrar's webpage. Note there is no final exam for the lab portion of Chem 370 (but there may be for the lecture portion).

This syllabus and the course schedule are subject to revision as needed. Students will be notified of changes and are responsible for adhering to the modifications.