

CHEM 370 Lecture - Instrumental Analysis I - Syllabus

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. A web browser and internet connection capable of streaming video will be necessary for submitting homework assignments and accessing course materials.

This course will utilize the computational software Julia in conjunction with Pluto for data processing, statistical computations, and some assignments. Students may access these software on WCU's STEM VCAT (recommended and supported by your instructor), or may install them free of charge on their own computers if desired.

The program OpenChrom allows you to process chromatographic and mass spectrometric data on your personal computer. This is not required but some students like it.

Course Communication

We will be using 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: <https://piazza.com/wcu/fall2021/chem370/home>.

Much of the course content will be delivered via the course website and Canvas. Announcements and graded work will often be returned via Canvas and/or WCU email; students should check these frequently.

COVID19 Policies

As of August 2021, it is anticipated that the course will be conducted entirely in person. However, during all in-person meetings, students *must*:

- Wear a face mask at all times (see "Masking for a Friend" statement below), per WCU policy.
- "Get vaccinated or get tested", per UNC System policy.
- 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 progresses.

Masking for a Friend

As the WCU Community Creed articulates, members of the WCU community are expected to live by high standards of academic and personal integrity and embrace their responsibility as a member of the Catamount community. In recognition of this responsibility, and in response to the best available science and current guidance from the Centers for Disease Control and Prevention, every student must wear a mask or other cloth face-covering that covers their nose and mouth while in this classroom. Students who do not have a mask will be asked to leave the classroom and only return when they follow this basic public health recommendation. Following this simple, science-based guideline will help ensure the safety of the entire Catamount community.

Note that masks do little to protect the person wearing the mask; rather, they minimize the chances that someone who is already sick will spread the disease to others. When you come to class in your mask, you're not only protecting your friends, peers, and instructors in the room with you, but also their friends, family, and loved ones, especially those in high-risk populations. Students who miss class because they are not

wearing a mask will not be able to make up the work missed. Students who do not have masks can obtain them at the locations below:

- University Center - Main Information Desk (2nd floor)
- Hunter Library - Circulation Desk
- Belk Building – CET Dean’s Office (Room 161)
- Health and Human Sciences Building – CHHS Dean’s Office (Room 201)
- Biltmore Park Instructional Site – 3rd floor Information Desk

The mask/face covering requirement for students is an expectation of our student code of conduct and violations are subject to code of conduct proceedings and disciplinary action. Faculty and staff will communicate with the Department of Student Community Ethics regarding students who do not honor the requirement.

Grading

Grading Methods

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.

Submitting Assignments

Most assignments will be submitted electronically. Unless otherwise specified, assignments are due at 23:59:59 on the due date.

- 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 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 software. However:

- Assignments are accepted up to 7 days *early* and students are encouraged to submit assignments before the due date. 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. Exceptions cannot be used on pass/fail assignments.
- 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.
- An exception to this rule occurs when the assignment is due on the last day/weekend before finals; these assignments will not be accepted late.

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 policies in *Fine Print*, below). Due dates/times are computer-enforced.

The Fine Print...

Course Policies

Classroom Expectations: The shared learning space of the college classroom is built on respect for each other and each other's learning. Learning together means our actions can intentionally and unintentionally distract others from their learning goals. As responsible learners who respect the rights of others and vow to minimize avoidable distractions such as: non-academic technology use, coming in late, sleeping, off-topic discussions, doing other homework, eating, etc.

Attendance: You 'attendance' to lecture will be judged by your successful completion of the quizzes contained in the course videos (see "Grading" for additional information). Attendance to all face-to-face sessions is strongly encouraged as much as possible given the current public health crisis. ***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.***

You should arrange *excused absences* with your instructor ***ahead of time***. An excused absence is any official University-sanctioned event, a contagious sickness, or medical issue that either presents a severe limitation to your ability to attend class or puts the health/safety of others in the class at risk. You are responsible for learning the topics covered during your absence.

Inclement Weather & Other Emergencies (including COVID19): Please check the University website for campus closings during times of bad weather, local, state, or national emergencies, and/or pandemics. Your health and 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 and/or Microsoft Teams if class must be canceled when the University has not officially closed and/or if we are otherwise unable to meet in person.

Composition-Condition Marks: Proper mastery of the English language will be considered when assessing written work. A student whose written work fails to meet acceptable standards will be assigned a composition-condition (CC) mark by the instructor on the final grade report. All undergraduates who receive two CC grades prior to the semester in which they complete 110 hours at WCU are so notified by the registrar and are required to pass English 300 or English 401 before they will be eligible for graduation. This course must be taken within two semesters of receiving the second CC and must be passed with a grade of C (2.0) or better. Students needing assistance with writing are encouraged to get help from WaLC. All written work submitted for this class may be checked with SafeAssign.

Institutional Policies

Course Recording and Broadcasting: Students may make visual or audio recordings (Recording) of any class related content, using any approved recording device (e.g., smart phone, computer, digital recorder, etc.) upon the **prior permission of the instructor** and subject to the following restriction(s). The Recording, along with the video capture of visible course materials (e.g., visible PowerPoint slides and/or visible lecture notes), shall be limited to the student's personal, course related, educational use and shall be subject to all applicable copyright laws and institutional policies. The student may not transfer, transmit, or otherwise disseminate the Recording to any third party, including classmates, without the permission of the instructor. Any violation of these restrictions, or any other restriction verbally communicated by the instructor, may subject the student to the provisions of the WCU Academic Integrity Policy, the WCU Code of Student Conduct or both.

Accommodations for Students with Disabilities: Western Carolina University is committed to providing equal educational opportunities for students with disabilities. The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights for persons with disabilities. Among other things, this legislation requires that students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact the Office of Accessibility Resources located in Killian Annex or call 828-227-2716. For additional information, visit go.wcu.edu/oar.

Academic Integrity Policy and Reporting Process: This policy addresses academic integrity violations of undergraduate and graduate students. Graduate students should read inside the parenthesis below to identify the appropriate entities in charge of that step of the process. Students, faculty, staff, and administrators of Western Carolina University (WCU) strive to achieve the highest standards of scholarship and integrity. Any violation of the Academic Integrity Policy is a serious offense because it threatens the quality of scholarship and undermines the integrity of the community. While academic in scope, any violation of this policy is by nature, a violation of the Code of Student Conduct (Code) and will be addressed as outlined in that document. If the charge occurs close to the end of an academic semester or term or in the event of the reasonable need of either party for additional time to gather information timelines may be extended at the discretion of the appropriate academic Dean. Instructors have the right to determine the appropriate academic sanctions for violations of the Academic Integrity Policy within their courses, up to and including a final grade of "F" in the course in which the violation occurs.

Definitions:

- *Cheating*: Using, or attempting to use, unauthorized materials, information, or study aids in any academic exercise.
- *Fabrication*: Creating and/or falsifying information or citation in any academic exercise.
- *Plagiarism*: Representing the words or ideas of someone else as one's own in any academic exercise.
- *Facilitation*: Helping or attempting to help someone to commit a violation of the Academic Integrity Policy in any academic exercise (e.g. allowing another person to copy information during an examination).

Additional information is available on the Student Success website under Student Community Ethics: <http://www.wcu.edu/experience/dean-of-students/academic-integrity.aspx>.

Community Vision for Inclusive Excellence Statement: The diverse perspectives encountered at WCU are an important part of the preparation of students for roles as regional, national, and global leaders who contribute to the improvement of society. It is expected that members of the WCU community will not only coexist with those who are different from themselves, but also nurture respect and appreciation of those differences. We encourage civil discourse as a part of the learning enterprise, and as a campus we do not tolerate harassing or discriminating behavior that seeks to marginalize or demean members of our community. WCU encourages all to clearly express their own views while at the same time seeking to understand the varieties of style, identity, and opinion that are held in any diverse community. In order for us to sustain a learning environment that promotes and values freedom of expression, we have a shared charge to accept personal responsibility for our actions, reactions, and speech, while seeking to learn from the actions, reactions, and speech of others.

Student Resources

Counseling and Psychological Services (CAPS): College students often experience issues that may interfere with academic success such as juggling responsibilities, relationship concerns, sleep problems, or feelings of anxiety, hopelessness, or depression. There are many resources on campus to assist you in managing your academic and emotional well being. We encourage you to take advantage of these resources. However, if you find yourself struggling and you need professional support, please contact Counseling & Psychological Services (CAPS). Students must call 828-227-7469 to schedule an appointment with the main office during normal business hours (Monday through Friday, 8am-5pm). For after-hours and weekend care, call 828-227-7469 and follow the prompts. Additionally, you may call the Western NC 24-hour crisis line at 888-315-2880 or the Suicide Prevention Lifeline at 800-273-8255. For more information about the services CAPS offers, visit <https://www.wcu.edu/experience/health-and-wellness/caps/index.aspx>.

The Writing and Learning Commons (WaLC) located in Belk 207, provides free course tutoring, writing tutoring, writing fellows, Supplemental Instruction, academic skills consultations, international student consultations, and online writing resources for all students. To schedule appointments for any of these services, visit tutoring.wcu.edu or call 828-227-2274.

The Mathematics Tutoring Center in 214 Killian Annex provides free drop-in tutoring for mathematics courses and subject matter, course-specific tutoring appointments, and graduate and professional exam preparation resources.

In addition to services provided by the WaLC and MTC, students also will have access to non-WCU tutors through Brainfuse.

Academic Calendar: The University academic calendar can be found at wcu.edu/learn/academic-calendar.aspx. It includes dates for all breaks, University closures, final exams, etc.

Final Exam: The University final exam schedule can be found on the wcu.edu/learn/academic-services/registrars-office/.

Syllabus Updates

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.