



The mission of Concord University is to provide quality, liberal arts based education, to foster scholarly and creative activities and to serve the regional community (<http://www.concord.edu/academics/>).

**Instructor:** Dr. Marwa Abdel Latif, Assistant Professor of Chemistry  
**Office:** Science Hall Rm. 402A  
**Office Hrs.:** MW 10 – 11:30 & F 10 – 12      **Other hours by appointment Only**  
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**Email:** [mabdellatif@concord.edu](mailto:mabdellatif@concord.edu)      **(Must include CHEM 352 in Subject line)**  
**Dep. Web:** <http://www.concord.edu/physci/node/2>

**Course Title:** Instrumental Analysis

**Course CRN # and Section, Credit Hours:** CHEM 352 20249 01

**Semester Taught (including year):** Spring 2019

**Room Number (if applicable):** Science 400

**Course Time (if applicable):** MWF 1:00 PM – 1:50 PM

**Course Management System:** Moodle

**Hardware/Software Needed:** Microsoft Word, Excel, Calculator

**Prerequisites:** CHEM 351, Physics 102 or 202 (pre or co-requisite)

**Co-requisite:** CHEM 358

**Text requirements:** *Undergraduate Instrumental Analysis*, 7<sup>th</sup> Ed. (required)

Calculator required and some exercises will require computer access Registration on Moodle at [moodle.concord.edu](http://moodle.concord.edu)

**Course Description/Rationale:**

Welcome to the study of instrumental analysis and problem solving in the context of chemistry. For the purpose of examinations, the course content is defined by (a) the lectures, (b) the relevant chapters in the text, (c) the problem assignments, and (d) any other specific assignments that are made.

**Concord University Educational Goals:**

**Skills:** Proficiency in interpreting data, integrating information, formulating ideas, thinking critically, and communicating with others, as demonstrated by the following competencies:

1. An ability to employ appropriate observational, logical, analytical, computational, creative, and critical thinking skills within and across academic disciplines; and to apply these skills in problem solving.
2. An ability to analyze, synthesize, and integrate elements, information and ideas.
3. An ability to evaluate elements, information, and ideas on the basis of appropriate criteria.

**Knowledge:** Familiarity with principles underlying academic discourse in various fields, as demonstrated by the following capabilities:

1. An awareness of the fundamental characteristics and properties of the physical universe.

**National Standards:** American Chemical Society Exam

**Learning Outcomes:**

As a result of taking the course, the student should be able to:

- Demonstrate an understanding of fundamental principles in instrumental analytical chemistry
- Illustrate proper propagation of error for mathematical calculations
- Interpret experimental results and draw reasonable conclusions
- Distinguish among a variety of instrumentation and their applications
- Assess the reliability of results and recognize sources of error for each instrument
- Assess application of an instrument for identification of an unknown
- Demonstrate proper use of mathematical formulas and analytical tests for data analysis
- Demonstrate appropriate use of microsoft excel for data analysis

**Course Requirements:**

- **Homework Assignments:**

Homework Assignments: Problem assignments are made to accompany some of the lecture material. Online assignments using Sapling will be assigned weekly in addition to collected homework problems assigned from the textbook. Expect frequent short assignments designed to make sure you keeping up to date, including instrument characterization worksheets and multimedia review worksheets. **Grades assigned for each portion of the homework will vary based on the covered topic.** The key to success in this class is working large quantities of problems! NOTE: You may use a graphing calculator but you are recommended to become acquainted with the use of TI-30X IIS by Texas Instruments as you might be required to use it for your ACS standardized Exam (Final Exam).

- **Tests and Quizzes:**

Three tests will be given throughout the semester as listed in the course outline. The lowest exam grade can be replaced with a make-up, non-mandatory fourth exam provided by the instructor at the end of the course. All exams are mandatory including the final exam. **The**

**three tests will be given during scheduled lecture time.** Exam might include a take-home portion to be completed and submitted by the due dates established by the instructor. Not all exams will have a take-home portion. The midterm exams will be mostly questions similar to homework problems: some calculations, some instrumental questions, and some sample preparation and data prediction and interpretation questions; partial credit will be awarded for showing relevant work.

<b>Test 1</b>	<b>February 9</b>	<b>Friday 1 PM – 1:50 PM</b>
<b>Test 2</b>	<b>March 9</b>	<b>Friday 1 PM – 1:50 PM</b>
<b>Test 3</b>	<b>April 13</b>	<b>Friday 1 PM – 1:50 PM</b>
<b>Final Exam</b>	<b>May 10</b>	<b>Friday 11:15 AM – 1:45 PM</b>

Final Exam will be assigned during the Finals Week. Students will take the instrumental ACS test for their final. Students who score an average of 90% or above for the cumulative grade prior to the Finals Week are still required to take the Final Exam. Although you may choose to replace your lowest exam grade, you are not allowed to replace the grade of the Final Exam. Quizzes will be given periodically throughout the semester each week. The dates will be announced in the prior lecture.

**Grading:**

Three in-class tests	35%
Cumulative final exam	15%
Homework	35%
In-class participation	5%
<u>Quizzes</u>	<u>10%</u>
Total of	100%

**Grading Scale:**

$\geq$	$\geq$	$\geq$	$\geq$	$\geq$
<b>90 – 100 %</b>	<b>80 - 89%</b>	<b>70 - 79%</b>	<b>60 – 69 %</b>	<b>60% - Below</b>
<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>

**Course Policies:**

- **Absence Policy:**

Absences: You must take the tests on the specified dates, unless your absence is excused due to extended illness, emergency, or a university conflict. A request for an excused absence due to emergency or illness must be made in writing immediately upon your return to class by completing a "Request for Excused Absence Form" available from the Instructor. For an absence due to a University conflict, the request must be made in advance of the test and a note from the coach must be provided. You have the option of dropping the zero received on a missed test or taking a makeup test. All make-up exams will be scheduled on a case-to-case basis following the original assigned date for the exam if a valid excuse and documentation were provided. Generally speaking, only documented University conflicts and severe illness or family

emergencies as documented by the Dean of Students will be acceptable excuses for missing a test or exam.

- **Electronic Assignment Submission:**  
Some assignments require on-line submission via Moodle. On-line assignments must be completed in a timely fashion. An excuse for "technological difficulties" (internet was down, etc.) is not acceptable.
- **Late Assignments:**  
Assignments that are not submitted at the specified times will be considered late. There will be a 20% deduction for every day late.
- **Safety:**  
Few occasions will require us to be in the laboratory areas. You are recommended to always be prepared for these occasions. All appropriate safety guidelines will be adhered to strictly. Safety goggles must be worn at all times in the laboratory. In addition, the student must dress appropriately. Shoes that entirely cover your feet and clothing that entirely covers your torso and legs must be worn. Shoes with high heels, shorts, dresses/skirts, and long, flowing clothing will not be permitted in the lab. No exceptions will be permitted. Consult with the instructor if you have any questions. Students who do not follow safety instructions may have points deducted, be asked to leave without the possibility of make up or be dropped from the course.
- **Electronic Device Policy:**  
All cell phones must be turned off. The instructor reserves the right to make point deductions from your grade for using non-class related electronics during class. In some cases, the student might be dismissed without a warning if the behavior is disruptive to other classmates. Be professional and be respectful of your classmates.
- **Moodle Policy:**  
It is your responsibility to refer to Moodle for announcements: reminders of homework assignments due, help sessions, and tests, etc.

You should also find the following resources on the Moodle

- Copy of our Syllabus
  - Homework Information
  - Outline of Lecture Notes – commonly posted after the chapter is concluded
  - Solutions to quizzes and tests
  - Worksheets – optional extra problems to practice if applicable
  - Gradebook: Test grades will updated after each exam and it will include all the work submitted up to that date.
- **Field Trips** to Virginia Tech and ACS Radford meeting: The ACS meeting is commonly schedule on a Wednesday early in April and you should expect to miss all classes from 10 am to 10 pm on that day, you will get an officially approved

absence form to show your instructors. You should arrange for your transportation.

- **Helpful Hints and Considerations:** Take care of yourself! Meet your spiritual, nutritional, sleep, and recreational needs. You need logical, rational thinking as much as, if not more than, your memory, to do well in this course.

Read the chapter material before the lecture and after the lecture. Taking notes as you read is highly recommended. Study multiple days each week, at minimum you should be reading or reviewing the textbook each day that class is held. If you don't understand one concept keep trying and consult classmates or your instructor, this class builds on itself and it is important not to get lost or behind!

Learn from your mistakes. If you do not correctly answer a homework or exam problem, mark the question, get the answer, and answer the question again a few days later. I will sometimes repeat a question and having figured out the answer on your second try can really pay off!

Advanced courses are designed to challenge you to think in depth about fundamentals in chemistry. Train yourself to be focused, become flexible for any changes, be positive about learning, and become curious about knowledge. If you lack these characteristics, any course can become challenging but not rewarding! It is all about you and your development of the learning skills.

**Course Timeline:** (Note: Schedule is subject to change with advanced notice)

Timeline and topic coverages are subjected to change as seem necessary by the professor. Students are highly recommended to read the chapters prior to attempting the homework problems.

Timeline	Topics	Assigned Chapters
	<b>Introduction to Instrumental Chemistry</b>	Read Chapter 1
<b>Week 1 – Week 5</b> (January 14 – February 15) <i>January 21 – Holiday</i> <b>Test 1 – February 9</b>	<b>Spectroscopy – Introduction</b>	Read Chapter 2
	<b>IR/Raman Spectroscopy</b>	Read Chapter 4
	<b>UV-Vis/Fluorescence Spectroscopy</b>	Read Chapter 5
<b>Week 6 – 8</b> (February 18 – March 8)	<b>AA/AE Spectroscopy</b>	Read Chapter 6 & 7
<b>Week 9</b> (March 11 – March 15)	<b>No classes – Spring Break</b>	
<b>Week 10 – 12</b> (March 18 – April 1)	<b>Electrochemistry</b>	Read Chapter 15
<b>Week 12 – Week 13</b> (April 3 – April )	<b>Mass Spectroscopy</b>	Read Chapters 9 & 10
<b>Week 14</b> (April 15 – April 19) <b>Test 3 – April 13</b>	<b>X – Ray Spectroscopy</b>	Read Chapter 14
<b>Week 15 – 16</b> (April 22 – May 3)	<b>Separation Techniques</b>	Read Chapters 11, 12, & 13 Complete assignments

**Materials from Chapters might be adjusted as needed to cover the majority of the topics. Chapter 3 titled “Magnetic Resonance Spectroscopy” will be covered in the laboratory portion of the course. In case of cancellation of lecture due to weather increments, unplanned events, or required completion of a chapter, video instructions will be uploaded for you to review prior to the next lecture. In addition, the order of the chapters are subjected to change based on the process in the course.**

### **Accessibility/Accommodations:**

Concord University is committed to responding to the needs of students with disabilities as defined by the Americans with Disabilities Act. Please inform your instructor at the beginning of the class semester if you have a disability and are requesting accommodations. It is your responsibility to self-disclose that you are requesting accommodations. The University and instructor will provide you with a reasonable accommodation. You should register with CU’s Disability Services Office, located in the Athens campus Jerry and Jean Beasley Student Center, Bottom Floor, across from the Campus Post Office. The Disability Services Office phone is 304-384-6086 or you can email the Director, Nancy Ellison, at nellison@concord.edu for assistance.

### **Academic Dishonesty**

Academic dishonesty is morally unacceptable as well as destructive to the learning and teaching atmosphere. Academic dishonesty includes the giving or receiving of improper help on examinations or assignments, falsifying documents, and plagiarism (the act of stealing and using, as one’s own, the ideas or the expression of the ideas of another). Such dishonesty can lead to a variety of penalties — including but

not limited to failure of assignment, failure of course, loss of institutional privileges, or dismissal from the University. (See University Catalog Academic Policies and Procedures.)

### **Concord University Honor Code**

A Concord University Honor Code was approved by students, staff, faculty, administration, and the CU Board of Governors. The Code states:

*"As a member of the Concord University Community I will act with honesty and integrity in accordance with our fundamental principles and I will respect myself and others while challenging them to do the same."*

The Honor Code is intended to unite the Concord community behind a culture of honesty, integrity, and civility.

### **Class/Online Attendance Policy**

Regular class attendance is part of a student's academic obligation at Concord. Irregular attendance may affect academic performance adversely and is detrimental to the atmosphere of a class. (See University Catalog Academic Policies and Procedures.)

### **Emergency Alert System**

In an effort to increase safety and security on our campus, Concord University encourages everyone to register for instant text message alerts. Alerts will only be used for security and safety notices. All students, faculty, and staff are eligible to receive text message alerts on their cell phones or email alerts. Please contact the IT Help Desk for further assistance (304-384-5291).

### **Emergency Information**

Emergency/courtesy telephones are located at the main entrance of each residence hall and at various other locations on campus. Emergency telephones can be identified by the flashing blue light and will provide the user with a direct link to Public Safety at the press of a button. To report an on-campus emergency, call 304-384-5357 or 911. The Office of Public Safety is located on the bottom floor of the Rahall Technology Center. For further emergency information go to: <http://www.concord.edu/administration/office-public-safety>.

### **Inclement Weather Policy**

As a general policy, the University will remain in normal operations during adverse weather conditions. In the event of severe weather conditions, the following may occur:

<u>University</u>						<u>Closure</u>
No	students	or	employees	are	to	report.

<u>Classes</u>						<u>Cancelled</u>
Students do NOT report	BUT	employees are expected to report	to work	at their normal time.		

<u>Operating</u>	<u>on</u>	<u>an</u>	<u>Inclement</u>	<u>Weather</u>	<u>Delay</u>
Under this schedule, all 8 a.m. classes will start at 10 a.m. Students and faculty will follow the Inclement Weather Schedule. (See <a href="http://www.concord.edu/emergency-alerts">http://www.concord.edu/emergency-alerts</a> for Athens/Beckley Inclement Weather Schedules.)					

*\*Announcements invoking the late schedule or other options referenced above are aired on area radio and television stations and are sent as text and email messages to those enrolled for this service.*

### **Student Conduct**

In classrooms, online, laboratories, and during any activities that are part of course requirements, students are expected to observe reasonable rules of conduct.

### **Sexual Harassment & Assault**

Federal law, Title IX, and Concord University policy prohibits discrimination, harassment, and violence based on sex and gender (Including sexual harassment, sexual assault, domestic/dating violence, stalking, sexual exploitation, and retaliation). If you or someone you know has been harassed or assaulted, you can receive confidential counseling support through the Concord University Counseling Center (304-384-5290). Alleged Violations can be reported non-confidentially to the Concord University Title IX Coordinator at 304-384-6327 or [titleix@concord.edu](mailto:titleix@concord.edu). Reports to Campus Security can be made at (304-384-5357). As an employee at Concord University, I am a mandatory reporter which means I must report any sexual misconduct I am made aware of. This includes verbal or written (such as in an assignment) disclosures of sexual harassment or sexual assault.

### **Technology Services**

Contact the CU Help Desk at extension 5291 from campus or 304-384-5291 off campus. You may also e-mail [cuhelpdesk@concord.edu](mailto:cuhelpdesk@concord.edu).

### **Syllabus Disclaimer**

**"This syllabus is subject to change based on the needs of the class. Please check it regularly. It is your responsibility to remain updated with the materials and announcements made by the instructor during lecture and/or via email."**