



**EAST TEXAS A&M**  
UNIVERSITY

**CHEM 547-01B: Advanced Instrumental Analysis I**

**CLASS TIME:** Mon/Wed/Fri 11:00-11:50am

**LOCATION:** STC 313

**INSTRUCTOR:** Laurence Angel, STC 341

**CONTACT:** Phone: 903-886-5391, Laurence.Angel@etamu.edu

**OFFICE HOURS:** Mon-Fri 4:00-5:00pm

**CLASS MATERIAL:** **Quantitative Chemical Analysis, 8<sup>th</sup> edition, Daniel C. Harris. ISBN: 9781429254366.** Supplementary articles handed out during the semester.

**COURSE DESCRIPTION:** The course will provide students with the knowledge and skills needed to conduct instrumental analyses, understand instrument design and analyze instrumental results. Over the duration of the course, you will be expected to learn the theory behind a range of instrumental techniques, instrumentation hardware and data analysis techniques. The class will cover advanced methods in mass spectrometry, ion mobility, high performance liquid chromatography, gas chromatography, laser spectroscopy, and fluorescence spectroscopy. The student will be required to develop critical reading skills, develop technical writing skills and present instrumental techniques and results from scientific articles to the instructor and the class. The class is assessed by the completion of assignments, presentations of research articles and four exams. The class is 3 semester hours.

**STUDENT LEARNING OUTCOMES:** Students will gain the necessary knowledge of the principles of the selected instrumental scientific research. The knowledge will include the instrument design and analyses techniques of mass spectrometry, ion mobility, high performance liquid chromatography, laser spectroscopy, fluorescence and hyphenated techniques.

**1: Graduate students should demonstrate expertise (breadth and depth) in providing a thorough understanding of the chemical, theoretical and operational principles related to this range of instrumental techniques.**

**2: Graduate students should demonstrate an ability to work independently and complete assignments within the given time-frame.**

**3: Graduate students should demonstrate the ability to assimilate and disseminate their scientific knowledge through presentations, reports and exams.**

**COURSE REQUIREMENTS, ASSIGNMENTS AND GRADING:**

**Presentations:** (25% each - total 25%)

**Exams:** 5 exams (15% each - total 75%)

## Presentations Scoring Rubric (100%)

	<b>Far Exceeds Standards</b>	<b>Exceeds Standards</b>	<b>Below Standards</b>	<b>Fails to Meet Standards</b>
<b>Completeness of presentation: introduction, experimental, results, discussion, references. (40%)</b>	Superior completeness: student's presentation of the article was extraordinarily thorough <b>(40)</b>	Complete: student's presentation of the article covered mostly all aspects <b>(34)</b>	Mostly complete but with gaps in some areas: student's presentation was missing some key points <b>(30)</b>	Incomplete in most respects <b>(25)</b>
<b>Focus and detail on instrumental techniques (30%)</b>	Instrumental techniques were described in extraordinarily specific detail <b>(30)</b>	Instrumental techniques were described in almost complete detail <b>(26)</b>	Instrumental techniques description was mostly complete but there were gaps <b>(22)</b>	Instrumental techniques description was inadequate <b>(18)</b>
<b>Presentation quality (30%)</b>	Presentation was extraordinarily clear and insightful <b>(30)</b>	Presentation was clear and effective <b>(26)</b>	Presentation was unfocused <b>(22)</b>	Presentation failed to communicate in an adequate manner <b>(18)</b>

**A:** >90.0; **B:** 80.0 - 90.0; **C:** 70.0 – 79.9; **D:** 60.0 – 69.9; **F:** <60.0

## Tentative Schedule of Topics:

Week	Topics
1-2	Introduction to Mass Spectrometry (MS)/Interpretation of mass spectra
3	Types of Mass Spectrometers/Chromatography-Mass Spectrometry
4	Biological-Mass Spectrometry, Ion Mobility Spectrometers (IM)
5	Special Topic: Quadrupole - Ion Mobility - Time-of-Flight MS
6	Methods of High Performance Liquid Chromatography <b>Exam 1</b>
7	HPLC-MS techniques
8	Special Topic: HPLC-MS and Protein Characterization
9	Spring Break
10	Gas Chromatography (GC) / GC-MS Methods <b>Exam 2</b>
11	Special Topic: GC-MS and CO <sub>2</sub> -Enhanced Oil Recovery
12	Luminescence: Fluorescence and Fluorescence Quenching <b>Exam 3</b>
13	Spectroscopic Instrumentation
14	Special topics: Fluorescence Quenching and Ligand Interactions
15	Lasers <b>Exam 4</b>
16	Quantum Chemistry, Term Symbols and Photoelectron Spectroscopy
17	Special Topics: Photoelectron Spectroscopy and Electronic States
18	Finals Week: <b>Exam 5</b>

**TECHNOLOGY REQUIREMENTS****LMS**

All course sections offered by East Texas A&M University have a corresponding course shell in the myLeo Online Learning Management System (LMS). Below are technical requirements

**LMS Requirements:**

<https://community.brightspace.com/s/article/Brightspace-Platform-Requirements>

LMS Browser Support:

[https://documentation.brightspace.com/EN/brightspace/requirements/all/browser\\_support.htm](https://documentation.brightspace.com/EN/brightspace/requirements/all/browser_support.htm)

Zoom Video Conferencing Tool

[https://inside.tamuc.edu/campuslife/CampusServices/CITESupportCenter/Zoom\\_Account.aspx?source=universalmenu](https://inside.tamuc.edu/campuslife/CampusServices/CITESupportCenter/Zoom_Account.aspx?source=universalmenu)

**ACCESS AND NAVIGATION**

You will need your campus-wide ID (CWID) and password to log into the course. If you do not know your CWID or have forgotten your password, contact the Center for IT Excellence (CITE) at 903.468.6000 or [helpdesk@etamu.edu](mailto:helpdesk@etamu.edu).

Note: Personal computer and internet connection problems do not excuse the requirement to complete all course work in a timely and satisfactory manner. Each student needs to have a backup method to deal with these inevitable problems. These methods might include the availability of a backup PC at home or work, the temporary use of a computer at a friend's home, the local library, office service companies, Starbucks, a ETAMU campus open computer lab, etc.

**COMMUNICATION AND SUPPORT**

If you have any questions or are having difficulties with the course material, please contact your Instructor.

**Technical Support**

If you are having technical difficulty with any part of Brightspace, please contact Brightspace Technical Support at 1-877-325-7778. Other support options can be found here:

<https://community.brightspace.com/support/s/contactsupport>

**STUDENT RESPONSIBILITIES FOR COURSE****CWID and Password**

You will need your campus-wide ID (CWID) and password to log into the course. If you do not know your CWID or have forgotten your password, contact the Center for IT Excellence (CITE) at 903.468.6000 or [helpdesk@etamu.edu](mailto:helpdesk@etamu.edu).

**Technology-Related Issues**

Personal computer and internet connection problems do not excuse the requirement to complete all course work in a timely and satisfactory manner. Each student needs to have a backup method to deal with these inevitable problems. These methods might include the availability of a backup PC at home or work, the

temporary use of a computer at a friend's home, the local library, office service companies, Starbucks, a ETAMU campus open computer lab, etc.

## **TECHNOLOGY REQUIREMENTS AND SUPPORT**

### **Minimal Technical Skills Needed**

Students will need reliable computer and internet access for this course. Students must be able to effectively use myLeo email, myLeo Online D2L, and Microsoft Office.

### **Learning Management System (LMS) – D2L**

All course sections offered by East Texas A&M University have a corresponding course shell in the myLeo Online Learning Management System (LMS). Below are the technical requirements:

- View the [Learning Management System Requirements Webpage](#).
- Learn more on the [LMS Browser Support Webpage](#).

### **Technical Support**

If you are having technical difficulty with any part of Brightspace, please contact Brightspace Technical Support at 1-877-325-7778. Other support options can be found on the [Brightspace Support Webpage](#).

## **COMMUNICATION AND SUPPORT**

### **Interaction with Instructor Statement**

If you have any questions or are having difficulties with the course material, please contact your instructor. Correspondence will always be through university email (your “myLeo” mail) and announcements in myLeo online (D2L). You will not RECEIVE email through D2L, so be sure to check your ETAMU email for communication. Students are encouraged to check university email daily.

### **Include the Following in Emails with Instructor:**

- Course name and subject in the subject line
- Salutation (Good afternoon, Dr. Jackson)
- Proper email etiquette (no “text” emails – use proper grammar and punctuation)
- Student name and CWID after the body of the email (possibly add to student signature on email)

## **COURSE AND UNIVERSITY PROCEDURES/POLICIES**

### **Syllabus Change Policy**

The syllabus is a guide. Circumstances and events, such as student progress, may make it necessary for the instructor to modify the syllabus during the semester. Any changes made to the syllabus will be announced in advance.

### **Student Conduct**

All students enrolled at the University shall follow the tenets of common decency and acceptable behavior conducive to a positive learning environment. The [Code of Student Conduct](#) is described in detail online in the [Student Guidebook](#).

Students should also consult the [Rules of Netiquette Webpage](#) for more information regarding how to interact with students in an online forum.

**ETAMU Attendance**

For more information about the attendance policy, please view the [Attendance Webpage](#) and the [Class Attendance Policy](#)

**Academic Integrity**

Students at East Texas A&M University are expected to maintain high standards of integrity and honesty in all their scholastic work. For more details and the definition of academic dishonesty see the following procedures:

[Undergraduate Academic Dishonesty University Procedure 13.99.99.R0.03](#)

[Undergraduate Student Academic Dishonesty Form](#)

[Graduate Student Academic Dishonesty University Procedure 13.99.99.R0.10](#)

[Graduate Student Academic Dishonesty Form](#)

**Use of Artificial Intelligence**

East Texas A&M University acknowledges that there are legitimate uses of Artificial Intelligence, ChatBots, or other software that has the capacity to generate text, or suggest replacements for text beyond individual words, as determined by the instructor of the course.

Any use of such software must be documented. Any undocumented use of such software constitutes an instance of academic dishonesty (plagiarism).

Individual instructors may disallow entirely the use of such software for individual assignments or for the entire course. Students should be aware of such requirements and follow their instructors' guidelines. If no instructions are provided the student should assume that the use of such software is disallowed.

In any case, students are fully responsible for the content of any assignment they submit, regardless of whether they used an AI, in any way. This specifically includes cases in which the AI plagiarized another text or misrepresented sources

**Students with Disabilities-- ADA Statement**

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you have a disability requiring an accommodation, please contact:

**Office of Student Disability Resources and Services**

East Texas A&M University  
Velma K. Waters Library Rm 162  
Phone (903) 886-5150 or (903) 886-5835  
Fax (903) 468-8148  
Email: [studentdisabilityservices@etamu.edu](mailto:studentdisabilityservices@etamu.edu)  
Website: [Office of Student Disability Services](#)

**Nondiscrimination Notice**

East Texas A&M University will comply in the classroom, and in online courses, with all federal and state laws prohibiting discrimination and related retaliation on the basis of race, color, religion, sex, national origin, disability, age, genetic information, or veteran status. Further, an environment free from discrimination on the basis of sexual orientation, gender identity, or gender expression will be maintained.

**Campus Concealed Carry Statement**

Texas Senate Bill - 11 (Government Code 411.2031, et al.) authorizes the carrying of a concealed handgun in East Texas A&M University buildings only by persons who have been issued and are in possession of a Texas License to Carry a Handgun. Qualified law enforcement officers or those who are otherwise authorized to carry a concealed handgun in the State of Texas are also permitted to do so. Pursuant to Penal Code (PC) 46.035 and ETAMU Rule 34.06.02.R1, license holders may not carry a concealed handgun in restricted locations.

For a list of locations, please refer to the [Carrying Concealed Handguns On Campus](#) document and/or consult your event organizer.

Pursuant to PC 46.035, the open carrying of handguns is prohibited on all East Texas A&M University campuses. Report violations to the University Police Department at 903-886-5868 or 9-1-1.

**East Texas A&M Supports Students' Mental Health – Counseling Services**

The Counseling Center at East Texas A&M University, located in the Halladay Building, Room 203, offers counseling services, educational programming, and connection to community resources for students. Students have 24/7 access to the Counseling Center's crisis assessment services by calling 903-886-5145. For more information regarding Counseling Center events and confidential services, please visit [www.tamuc.edu/counsel](http://www.tamuc.edu/counsel)

**Mental Health and Well-Being**

The university aims to provide students with essential knowledge and tools to understand and support mental health. As part of our commitment to your well-being, we offer access to Telus Health, a service available 24/7/365 via chat, phone, or webinar. Scan the QR code to download the app and explore the resources available to you for guidance and support whenever you need it.



As an Institutional Member of the National Association of Schools of Music, East Texas State A&M University supports the Association's commitment to student health and wellness. The following web address provides links to information for resources related to physical and mental well-being, as well as assists in offering preventative measures that students can take to avoid serious and/or chronic conditions: [Musician Health and Safety - East Texas A&M University](#)