



## **CHEM 547: Advanced Instrumental Analysis I**

**CLASS TIME:** MW 10:30-11:45a

**LOCATION:** STC 313

**INSTRUCTOR:** Laurence Angel, SCI 341.

**CONTACT:** Phone: 5391, Laurence.Angel@tamuc.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 will be handed out during the semester.

**COURSE DESCRIPTION:** The course will provide students with the knowledge and skills needed to conduct instrumental research, 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 material to the instructor and the class. The class will be 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 design and analysis 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 and Reports:** (8% each - total 40%)

**Exams:** 4 exams (15% each - total 60%)

**A:** >85.0; **B:** 75.0 ~ 84.9; **C:** 65.0 ~ 74.9; **D:** 55.0 ~64.9; **F:** <55.0

**Tentative Schedule of Topics:**

Week	Topics
1	Types of Mass Spectrometers (MS)
2	Biological-Mass Spectrometry, Ion Mobility Spectrometers (IM)
3	Special Topic: Quadrupole - Time-of-Flight MS
4	Introduction HPLC <b>Exam 1</b>
5	High Performance Liquid Chromatography -MS (HPLC-MS)
6	Special Topic: HPLC-MS and Protein Characterization
7	Introduction GC <b>Exam 2</b>
8	Gas Chromatography (GC) /Advanced GC-MS Methods
9	Spring Break
10	Special Topic: GC-MS and Metabolite Characterization
11	Introduction to Lasers: The ruby laser <b>Exam 3</b>
12	Lasers, Quantum Chemistry and Term Symbols
13	Special Topic: Photoelectron Spectroscopy
14	Luminescence: Fluorescence and Quenching
15	Special topic: Fluorescence Quenching and Ligand Interactions
16	Make-up and Review Week
17	Finals Week <b>Exam 4</b>

***COURSE AND UNIVERSITY PROCEDURES/POLICIES*****Interaction with Instructor Statement**

The instructor's communication response time and feedback on assessments will be completed by the next scheduled meeting time.

**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.

***University Specific Procedures*****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 in the [Student Guidebook](http://www.tamuc.edu/Admissions/oneStopShop/undergraduateAdmissions/studentGuidebook.aspx).  
<http://www.tamuc.edu/Admissions/oneStopShop/undergraduateAdmissions/studentGuidebook.aspx>

Students should also consult the Rules of Netiquette for more information regarding how to interact with students in an online forum: [Netiquette](http://www.albion.com/netiquette/corerules.html)  
<http://www.albion.com/netiquette/corerules.html>

### **TAMUC Attendance**

For more information about the attendance policy please visit the [Attendance](#) webpage and [Procedure 13.99.99.R0.01](#).

<http://www.tamuc.edu/admissions/registrar/generalInformation/attendance.aspx>

<http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/13students/academic/13.99.99.R0.01.pdf>

### **Academic Integrity**

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

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

<http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/13students/undergraduates/13.99.99.R0.03UndergraduateAcademicDishonesty.pdf>

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

<http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/13students/graduate/13.99.99.R0.10GraduateStudentAcademicDishonesty.pdf>

### ***ADA Statement***

#### **Students with Disabilities**

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**

Texas A&M University-Commerce

Gee Library- Room 162

Phone (903) 886-5150 or (903) 886-5835

Fax (903) 468-8148

Email: [studentdisabilityservices@tamuc.edu](mailto:studentdisabilityservices@tamuc.edu)

Website: [Office of Student Disability Resources and Services](#)

<http://www.tamuc.edu/campusLife/campusServices/studentDisabilityResourcesAndServices/>

**Nondiscrimination Notice**

Texas A&M University-Commerce 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 Texas A&M University-Commerce 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 A&M-Commerce 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.

Web url:

<http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/34SafetyOfEmployeesAndStudents/34.06.02.R1.pdf>

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

***TECHNOLOGY REQUIREMENTS*****LMS**

All course sections offered by Texas A&M University-Commerce 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)

YouSeeU Virtual Classroom Requirements:

<https://support.youseeu.com/hc/en-us/articles/115007031107-Basic-System-Requirements>

***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@tamuc.edu](mailto:helpdesk@tamuc.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 TAMUC 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>