

## Chem 528 Chemical & Biochemical Characterization Methods II, Summer 2025

Please, click on the following link to access A&M-Commerce Covid 19 Information,  
<https://new.tamuc.edu/coronavirus/>

**COURSE DESCRIPTION:** Chemical & Biochemical Characterization Methods II, 3 semester hours. The course focuses on physical and chemical properties of solid materials using instrumentations and techniques that are not common in the traditional chemistry laboratory, such as XPS, SEM, Thermal analysis, etc.

**CLASS TIME AND LOCATION:** Flexible schedule to review online videos and reading assignments.

**INSTRUCTOR:** Dr. Ben Jang; SCI 335, x5383, ben.jang@tamuc.edu

**OFFICE HOUR:** T 7-9pm or by appointment.

**GOALS OF THE COURSE:** Introduce the students to the advanced instrumentation techniques for material characterization. The instrumentation techniques include X-ray Photoelectron Spectroscopy and Auger Electron, X-ray Diffraction, Transmission and Scanning electron Microscopy, Macro and Micro Thermal Analysis, Physical and Chemical Adsorption, In-situ Techniques, etc. Presenting the theory and application of different instrumentation techniques toward peers effectively is an important goal.

### **COURSE REQUIREMENTS, ASSIGNMENTS, AND GRADING:**

**Textbook:** Material Characterization techniques, by Sam Zhang, Lin Li and Ashok Kumar, CRC Press, Taylor & Francis Group, ISBN 978-1420042948

**References:** Characterization of Solid Materials and Heterogeneous Catalysts, edited by Michel Chel and Jacques C. Vedrine, Wiley VCH, ISBN 978-3527326877

#### **Grading Procedure:**

Project presentations: 40%  
Midterm Exam: 30%  
Final Comprehensive Exam: 30%

A:  $\geq 90.0$ ; B: 80.0 ~ 89.9; C: 70.0 ~ 79.9; D: 60.0 ~ 69.9; F:  $< 60.0$

### **LEARNING OUTCOMES / COURSE OBJECTIVES**

1. Familiar with various instrumentation techniques for material characterization.
2. Understanding the theory and application of the techniques covered.
3. Capable of analyzing the data obtained from specific instrumentation techniques.

4. Capable of extracting important parametric information from literature related to specific instrumentation techniques.
5. Capable of summarizing instrumentation techniques with examples in a report format.
6. Capable of presenting literature of instrumentation techniques clearly to peers.
7. Capable of extending the application of instrumentation techniques learned to other scientific problems.

### **Class Schedule: (Tentative)**

<b>Week</b>	<b>Lecture/Activities</b>	<b>Exam/presentation</b>
WK 1	X-ray Photoelectron Spectroscopy	
WK 2	Auger Electron	
WK 3	X-ray Diffraction	
WK 4	Transmission Electron Microscopy	
WK 5	Scanning Electron Microscopy	Midterm exam
WK 6	Thermal Analysis	Project presentation #1
WK 7	Surface area, porosity, and adsorption	
WK 8	Chemisorption	
WK 9	In-situ Techniques	Project presentation #2
WK 10		Final Exam

### **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.

## **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>

### **Interaction with Instructor Statement**

Communication for course correspondence will be via TAMUC email. It is expected that all responses should be within 48 hours.

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

### **Syllabus Change Policy**

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### **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:

<https://www.britannica.com/topic/netiquette>

### **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](#)

[Undergraduate Student Academic Dishonesty Form](#)

<http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/documents/13.99.99.R0.03UndergraduateStudentAcademicDishonestyForm.pdf>

[Graduate Student Academic Dishonesty Form](#)

<http://www.tamuc.edu/academics/graduateschool/faculty/GraduateStudentAcademicDishonestyFormold.pdf>

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

### **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**

Texas A&M University-Commerce

Velma K. Waters Library Rm 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.