

CHEM 595 - Research Lit & Techniques, Spring 2023

Course Description: Three semester hours. Students learn about current research by studying articles in the primary literature and preparing a scholarly review of primary literature, preparing a grant proposal or doing a smaller research project.

Class Time and Location: Lecture: TBA
Laboratory: as needed

Instructor: Dr. Stephen Starnes; Science 339, 903-886-5389, Stephen.starnes@tamuc.edu

Office Hours: TR: 11:00 am – 12:00 pm, MWF: 10:00 am – 11:00 am, or by appointment

Goals of the Course: The goal of this course is to provide students an overview of research methods in general, as well as specific methods typically utilized in chemistry research. Students will learn to critically read and analyze research articles. Students are to critically review background literature and/or conduct laboratory research and prepare scientific reports. The students will work directly with Professor Starnes in the chemistry department to review and select a specific topic as the project. The final project will demonstrate a mastery of knowledge in instrumentation, chemical theories and/or applications of different research methods to accomplish the project.

STUDENT LEARNING OUTCOMES:

At the successful completion of the course, students should

1. Understand the basic tenets of scientific research in various areas of investigation in chemistry.
2. Be able to identify strengths and weaknesses in the formal presentation of scientific research.
3. Be able to critically examine methods and data analysis with specific regard to the conclusions drawn by the investigators.
4. Develop skills for effective use of various literature search methods and databases such as SciFinder Scholar and Web of Science.
5. Develop skills to effectively sort and organize a large body of literature.
6. Be able to prepare professional scientific reports of journal publication quality. The final report could be the basis for a review article or grant proposal over a scientific topic of current research interest.
7. Demonstrate understanding of ethical issues and conduct in research related to human subjects if the project involves human subjects. Indicated by completion of Responsible Conduct in Research/IRB training
8. Demonstrate understanding of ethical issues and responsible conduct of research if the project involves applied chemistry research methods. Indicated by completion of Responsible Conduct in Research training.
8. Compose a literature review over a research topic or write an in-depth research-based grant proposal including :
 - a. Abstract or executive summary^[1-1]
 - b. Rationale^[1-1]
 - c. Summary of previous related studies^[1-1]

d. Description of the population and/or sample^[L]_[SEP]

e. Methods to be used^[L]_[SEP]

f. Budget^[L]_[SEP]

g. Timeline/Scope of Work

9. Students will be able to formulate a hypothesis or identify a scientific problem. ^[L]_[SEP]

10. Students will synthesize the literature to develop a comprehensive discussion of the problem or hypothesis that they developed. ^[L]_[SEP]

11. Students will communicate their understanding of the problem and their synthesis of the literature in their final paper or proposal.

12. Demonstrate principles of academic integrity and intellectual ownership.

Textbooks

No text is required. Readings for the course will be obtained from contemporary peer-reviewed journals that feature research from the discipline of chemistry or chemical education.

Recommended textbooks for your perusal:

Locke, L. F., Silverman, S. J., & Spirduso, W. W. (2010). *Reading and understanding research* (3rd ed.). Thousand Oaks, California: SAGE Publications. ISBN 978-1-4129-7574-2.

American Psychological Association. (2010). *Publication manual of the American Psychological Association* (6th ed.). Washington, DC: Author. ISBN 978-1-4338-0561-5

Feedback on assignments

For most of your assignments, I will save your work, then use the “track changes” feature on the document itself to make corrections, write comments, etc. I will then return the document back to you so you will have written feedback from me. USE this information to improve your work on future assignments.

Grading: Course Requirements and Assignments:

	Possible Points
First Draft – Table of Contents and Overview of Final Paper ^[L] _[SEP]	100
Mid-term Draft Over Final Paper	100
Description of a <i>request for proposal (RFP)</i> for a grant-funded project (if completing a research proposal)	100
Completion of RCR/IRB modules (if completing a research proposal that involves human subjects)	100
Grant proposal or Final paper	400

Your Grade (%) = Points Earned out of 800

A: ≥90.0; **B:** 80.0 ~ 89.9; **C:** 70.0 ~ 79.9; **D:** 60.0 ~69.9; **F:** <60.0

Reference List: (15% of final paper/proposal grade)

Each student will conduct a literature review for their chosen article topic and will construct an appropriate reference list. A minimum of 20 appropriate external sources must be located related to the article topic. Of these sources, a minimum of 15 must be from peer reviewed scholarly journals. **Wikipedia and other related web sites/sources are not appropriate and will not**

count towards the required minimum.

Final Paper/Proposal

Each student will select a research problem and/or topic and prepare a paper or research proposal suitable for publication. The paper or research proposal should adhere to APA style. The paper should be well organized and include 1) title page, 2) abstract, 3) introduction, including review of literature, 4) methods section, 5) results section, 6) discussion/conclusion section, and 7) reference list. The paper should cite a minimum of 20 sources, 15 of which must be from peer-reviewed papers. All sources cited must be included in the reference list. **Failure to cite the appropriate source can result in a zero on this assignment.** The paper shall be created in Microsoft Word following the manuscript instructions and APA style.

Scientific Writing: A synopsis and tutorial on scientific writing, including the use of APA format is available from the Online Writing Lab at Purdue University (<http://owl.english.purdue.edu/>). Personal face-to-face assistance with editing and format suggestions is available from the on-campus Writing Center at A&M-Commerce. (See description on next page)“The Writing Center (or the “Communication Skills Center”) offers writers free, one-on-one assistance. We welcome *all* writers, majors, and disciplines—undergraduate and graduate students alike. In fact, we work from the premise that all writers, no matter their ability level, benefit from the feedback of knowledgeable readers. The Writing Center staff is trained to provide writers with just this service. In short, we are here to help you help yourself. In order to ensure the most effective session possible, we offer visitors the following suggestions: (1) Get started on your writing project early, and visit the Writing Center at least one day before your final draft is due. You will need time to work with the ideas and suggestions generated in your tutorial sessions. (2) Bring a written copy of your assignment, any relevant readings, and one or two specific questions or concerns you would like to discuss with us. We are located in the Hall of Languages, Room 103 (903-886-5280) and online at <http://www7.tamu-commerce.edu/litlang/CSC/index.htm> .”

Course Topics to Review

Course Overview
Database searching, Human Subjects approval/IRB (for those considering a Chemical Education related topic), Responsible Conduct of Research information, Formulating a research question/hypothesis (discussion of possible topics), Discussion of research methods
Purpose of research in chemistry, Scope of projects, Ethics overview, ACS style guide overview for scientific writing in chemistry

Literature review and references, Critiquing Research conclusions, funding, Presenting research results

TECHNOLOGY REQUIREMENTS

LMS – myLeo Online – D2L Brightspace

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

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.

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

The best way to communicate with the instructor is via e-mail: stephen.starnes@tamuc.edu or stop by the instructor's office (Science 339) for clarification of course material and expectations.

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.

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>

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](#)

<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

Gee Library- Room 162

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

Fax (903) 468-8148

Email: 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.

A&M-Commerce Supports Students' Mental Health

The Counseling Center at A&M-Commerce, 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