Course Overview

Welcome to ST 529D: Research and Documentation! This course has several goals. It is designed, first of all, to help you plan and write your independent study! In addition, it provides you with an overview of research and citation practices in various fields, with particular attention given to the sciences and science education. Finally, this course provides you with research strategies you can apply when teaching research and citation to your students. Course topics include, but are not limited to, the following:

- Formulating a research goal and research questions
- Strategies for planning and executing a research project (e.g., “storyboarding”) and for conducting research.
- Differences in research design (quantitative, qualitative, and mixed methods).
- Ethical research practices (including the use of human participants in research).
- Technology use in research (e.g., using electronic library databases and bibliographic software such as Mendeley; using Google Documents and Word Reviewing for collaborative writing; creating PowerPoint presentations; using SurveyMonkey, Google Documents, and other online data collection programs, etc.).
- Correct use of research sources, including research citation.
- Strategies for writing and editing a research proposal or project.
While this course delivers content on designing and carrying out a research project, it also includes semi-structured writing activities intended to guide you through the process of writing your projects.

Please note: This is NOT a “go-at-your-own-pace” course. Each module will have a deadline.

**Required Texts**


You may also use the new Creswell (2014) 4th edition. Either version works.

*Other course readings will be given out electronically or in class.*

Note: While it is not required for this course, you might consider picking up a copy of the APA Publication Manual (6th edition).

**Technology and Course Structure**

Course lessons, activities, and additional readings will all be placed on NMT’s Canvas. In the “File” section, you will see a “Module Checklist” that contains the readings and activities for each module. I would advise consulting this checklist at the beginning of each module for a complete list of activities for that module.

In the “Course Lecture Links,” (which you will find both on the “Home” page and under “Pages”), please view “Module 00_Overview” for more course information.

**Major Course Projects**

This course consists of five major projects. More detailed assignment sheets can be found in the “Major Project Assignment Sheets” folder in the “Files” tab.

- **IRB (“Research Ethics”) Training.** Students will complete the National Institute of Health’s (NIH) online tutorial on *Protecting Human Subject Research Participants*. Online modules can be found at the following address: [http://phrp.nihtraining.com/users/login.php](http://phrp.nihtraining.com/users/login.php)

- **IRB Application.** All students must complete New Mexico Tech’s IRB application for using human subjects in a research study.

- **Literature Review Draft.** You will select a subject for your independent study, collect and scan/read through research on that subject, and write a review summarizing this research. * Literature reviews will be approximately 1100-1400 words. Your draft literature review will eventually be revised as part of your Research Proposal.

- **Short Research Proposal.** Students are required to complete the short proposal form required by the MST office to approve your IS project idea.
• **Long Research Proposal.** You will write a proposal for an independent study or thesis. Proposals must have clearly articulated goals and research methods and a well-designed research protocol. * (Approx. 2200 – 2800 words)

• **5-Minute “Power” Presentation.** Students will prepare a very brief presentation of their IS projects (w/ short, 4-5 slide PowerPoint) to be delivered electronically

*Students who have already collected data for their independent studies may contract individually with me to complete their final write-up for this class. We will agree on an amount of writing comparable to the literature review and research proposal. All other assignments must be completed as indicated in the syllabus and assignment sheets.

**Smaller Course Assignments**

• **Course Readings.** Assigned readings must be completed by class time on the day they are due. Additional readings will be distributed in class or via Moodle in PDF format.

• **Tasks/Storyboarding Exercises.** Throughout the semester, we will have a number of activities that help us process course content and/or that demonstrate salient research principles. Students are expected to participate productively in these class activities.

• **Peer Review.** You will be asked to comment on your peers’ work on our class discussion board. Your participation in informal peer review sessions will count toward your “Tasks/Storyboarding” grade

**Grading Policy**

Your final grade is based on the grade breakdown indicated below:

1. Literature Review Draft 15%
2. Long Research Proposal 45%
3. IRB Training 5%
4. IRB Proposal 10%
5. Tasks/Storyboarding 10%
6. Presentation 10%
7. Short research Proposal 5%

**NOTE:** you must complete and submit each major assignment in order to pass this course. The grading scale is as follows: A (93-100%), A- (90-92%), B+ (88-89%), B (83-87%), B- (80-82%), C+ (78-79%), C (73-77%), C- (70-72%), D+ (68-69%), D (63-67%), D- (60-62%), F (less than 60%).

**Course Policies**

**Late Submissions.** You are expected to complete all assigned work in a timely manner. Please contact me about emergencies that prevent your completion of an assignment.
**E-mail.** You will be expected to use your NMT email address. Please check this email frequently or have it forwarded to another address.

**Video Lessons.** Some (not all) modules have video lessons. I will provide you with the accompanying PowerPoint. However, I would strongly advise against only reading the PowerPoints and not viewing the videos, as the videos have additional information and explanation.

**Ethical Conduct.** The administration, faculty, and your fellow students at New Mexico Tech expect you to act ethically. This includes not cheating, falsifying information, or plagiarizing, actions which may result in you receiving a failing grade for the class, or sending you before the Disciplinary Board for more severe treatment. Other non-ethical acts may also be cause for disciplinary action. See the New Mexico Tech Student Handbook for more information and a more complete description. ([http://www.nmt.edu/nmt-student-handbook](http://www.nmt.edu/nmt-student-handbook))

**Syllabus and Schedule.** The syllabus and schedule may be subject to change depending on the needs of the class. Therefore it is extremely important to check with me or with a classmate about assignments if you miss a class. You are responsible for what goes on in class when you are absent!

**NMT Writing Center & Oral Presentation Center.** Students are reminded that the Writing and Oral Presentation Center is open for graduate students. Representatives from the center will visit and participate in our class regularly. Students are welcome (and encouraged) to work on any class projects with center staff. Also, students are encouraged to visit the center for any writing or communication tasks related to their research or other classes. The Writing & Oral Presentation Center is located in 017 Fitch Hall (right next to my office). Students are welcome to drop in, though it is best to e-mail first: write@nmt.edu.

If you are looking for a quiet place to work and/or are interested in coming into Socorro for a day or two, you are welcome to write in the Writing Center. Just e-mail me beforehand, and we will schedule time for you.

**MST Program Goals and Objectives**

**MST Program Goals**

1. Encourage MST students to incorporate MST experiences into curriculum development.
2. Provide access to innovative and current classroom, laboratory, and field experiences in science, mathematics, engineering, and technology.
3. Provide examples of applications of the subject matter to industrial, technological, and environmental problems of the real world.

**MST Program Objectives**

1. To enhance the development of dynamic learning communities comprised of university faculty, MST students, and students of MST students.
2. To provide current, applicable Science, Technology, Engineering, and Mathematics (STEM) content to MST students, consistent with principles of effective practice in facilitating adult learning including the promotion of collaborative spirit among NMT faculty, students, and STEM professionals; the respect of students' uniqueness and separateness; provision of opportunities for the systemic and altering process of exploration and investigation, i.e. reflection on action, more exploration and investigation, more reflection on action; and last, the encouragement of self-directed learning that considers alternate ways of thinking, learning, and assessment.

3. To enhance classroom teaching and learning through the acquisition of in-depth STEM content knowledge and mastery of successful, effective pedagogical strategies and approaches.

4. To enhance the development of the abilities of MST students to apply vertically integrated curriculum through utilization of national teaching and content standards and Advanced Placement, thus contributing to the development of the educational pipeline carrying students to STEM careers.

5. To provide research opportunities for teacher-participants and their students in collaboration with university faculty.

6. To provide distance learning opportunities via webcasting and frequent on-line interaction between university faculty, teacher-participants, and their students.

The communication courses (ST 529 and ST 530) fill a unique role in the MST program in addition to helping meet general program objectives. Outcomes for these courses include the following:

1. MST students learn strategies for integrating Oral and Written Communication into K-12 STEM classrooms.

2. Students learn primary and secondary research strategies essential for completing their capstone Independent Studies and other local classroom research and assessment scenarios.

3. Students learn ethical practices for using and referencing material from secondary sources and for conducting research and assessments with human subjects.

4. Students learn to adapt oral and written communication to a diverse array of audiences for a variety of purposes.

5. Students practice writing as a process and learning successful composing strategies (prewriting, writing, revising, editing, and evaluating).

6. Students gain a rich understanding of grammar, syntax, and word choice.
Tentative Course Schedule

Note: Please pay attention to the dates for the modules below and in the module checklists on the NMT Course Portal.

**Module 1—Overview of Research Strategies & Research Ethics (Jan 18 – Jan 24)**
*Topics*
- Overview of research approaches
- Discussion of research ethics and IRB
*Assignments (Due Jan 25)*
- Profiles
- Storyboarding exercise 1

**Module 2. Surveying the Literature (Jan 25 – Feb 7)**
*Topics*
- Collecting and scanning the literature
- Using library databases
- Using bibliographic software
- Taking notes on and organizing the literature
*Assignments Due (Due Feb 8)*
- *Research Design* chs. 2 & 7
- Storyboarding exercise 2
- IRB training

**Module 3. Overview of Research Methods: Quantitative, Qualitative, and Mixed (Feb 8 – Feb 21)**
*Topics*
- Research Questions
- Discussion of qualitative, quantitative, mixed methods
- Data collection tools
*Assignments (Due Feb 22)*
- *Research Design* chs. 8, 9, and 10
- Continue collecting research on topics
- Methods task
- Storyboarding exercise 3

**Module 4. Analyzing Data; Writing a Literature Review (Feb 22 – Mar 6)**
*Topics*
- Data Analysis
- Writing a literature review
- Introduction to APA
- Quoting, paraphrasing, summarizing
Assignments (Due Mar 7)
  • Annotated outline of literature review

Module 5. Proposals, Writing, and Literature Review Workshop (Mar 7 – Mar 20)
  • Research proposals: Nuts and bolts
Assignments (Mar 21)
  • Literature review draft

Module 6. Peer Review and Teacher Feedback; Style, Mechanics, and Technical Editing (Mar 21 – Apr 3)
  • Peer review sessions
  • Teacher feedback
Assignments (Due Apr 4)
  • IRB Application

Module 7. Preparing Presentations (April 4 – Apr 17)
  • Presentation strategies
  • Creating effective PowerPoint presentations
Assignments (Due Apr 18)
  • Draft of Short and Long Proposal

Module 8. Finishing Touches (Apr 18 – May 2)
  • Present proposals
  • Submit all final materials by May 2.