

EDUC 4360

Special Topics: Research Methods in STEM and STEM Education

Spring 2024

Time: Online with Synchronous meetings

Day: TBD



Instructor Information:

Michael Odell, Ph.D.

Office: HPR 263A

Office Hours: Office Hours: Zoom or Phone by appointment.

Telephone: office (903) 566-7132

Email address: modell@uttyler.edu (best way to contact)

Course Description:

An overview of using tools to solve scientific problems. This course offers students a broad understanding of the scientific method as a means of obtaining knowledge and provides an introduction to the research enterprise. This course is intended for students seeking teacher certification through the UTeach program.

Hybrid Schedule (See Schedule in Canvas)

Student Learning Outcomes:

By the conclusion of the course, students should be able to:

1. Understand the Scientific Method and its application to research. (Critical Thinking Skills)
2. Recognize the importance of our personal Power of Observation at its value in research and in our life. (Critical Thinking Skills)
3. Possess qualitative, quantitative, and conceptual problem-solving skills. (Critical Thinking Skills, Empirical and Quantitative Skills)
4. Think creatively. (Critical Thinking Skills)
5. Work independently as well as with a team. (Critical Thinking Skills, Teamwork Skills)
6. Present scientific results effectively and enjoyably. (Critical Thinking Skills, Communication Skills)

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| Session 1: Course introduction and Safety in Research |
| Session 2: Research Overview and the Scientific Method |
| Session 3: The Power of Observation and Types of Research |
| Session 4: Data Analysis with <i>Excel</i> and other Software |
| Session 5: Library research (how to find information efficiently) |
| Session 6: Improvement of Hypothesis and Experimental Design |
| Session 7: Midterm Examination |
| Session 8: Scientific Communication |
| Session 9: Ethics and Morals in Research |
| Session 10: Preparation of Effective Scientific Figures |
| Session 11: How to Review the Scientific Literature |
| Session 12: How to Present Effective Scientific Talks and Posters |
| Session 13: Student presentations |

Summative Assessment:

Student Presentation of Research

Course Objectives and Expectations:

| Activities | % Grade |
|--|-----------|
| Attendance | 10 |
| Assignments (See Canvas) | |
| <ul style="list-style-type: none"> • Safety Contracts and RCR | 10 |
| <ul style="list-style-type: none"> • GLOBE Program Research Project | 40 |

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| • Research Article Analyses | 10 |
| • Scientific Communication (Posters and Presentations) | 30 |
| TOTAL | 100 |

Grading Scale: A=90-100; B=80-89; C= 70-79; D=60-69; F <60

Related Clinical Experiences: Clinical Hours will be completed in EDUT 2170.

Course Policies:

1. Attendance and Participation

A large portion of your grade is based on attendance and active participation in all class sessions and assignments. Credit for attendance requires arriving to each class session on time, participating in all class activities, and staying until the session ends. Attendance is a crucial component of this class because during class time you will: 1) plan and practice your lessons with your partner; 2) get feedback from the Instructors and other members of the class; and 3) observe and learn from demonstration lessons. Because the course meets only once per week and there are no texts, missing class means you will miss essential information and experiences. Furthermore, Step 1 students will be working with a partner, and this collaboration is vital to your success. The workload for each lesson should be shared equally. If you are not in class, you inconvenience your partner by forcing him or her to work with you outside of class. If you miss a class, it is your responsibility to communicate with your partner about how to coordinate the next lesson. Don't leave your partner guessing about why you are not in class, or how and when you will get together.

2. Late Work

There will be a deduction of 10% per day (capped at 50%) for any assignment turned in late unless arrangements have been made with the Instructor.

UNIVERSITY POLICIES

UT Tyler Honor Code

Every member of the UT Tyler community joins together to embrace: Honor and integrity that will not allow me to lie, cheat, or steal, nor to accept the actions of those who do.

For a full list of university policies including information related to the topics listed below, click [here](#).

- Students Rights and Responsibilities
- Campus Carry
- Tobacco-Free University
- Grade Replacement/Forgiveness and Census Date Policies
- State-Mandated Course Drop Policy
- Disability Services
- Student Absence due to Religious Observance
- Student Absence for University-Sponsored Events and Activities
- Social Security and FERPA Statement
- Emergency Exits and Evacuation
- Student Standards of Academic Conduct

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UT Tyler Resources for Students:

- UT Tyler Writing Center (903.565.5995), writingcenter@uttyler.edu, <http://www.uttyler.edu/writingcenter/>
- UT Tyler Tutoring Center (903.565.5964), tutoring@uttyler.edu, <https://www.uttyler.edu/tutoring/>
- The Mathematics Learning Center, RBN 4021, This is the open access computer lab for math students, with tutors on duty to assist students who are enrolled in early-career courses.
- UT Tyler Counseling Center (903.566.7254) <https://www.uttyler.edu/counseling/>

[University Guidelines, Links and Policies](#)

COLLEGE OF EDUCATION AND PSYCHOLOGY (CEP) VISION AND MISSION

Vision: The College of Education and Psychology is nationally recognized and respected for its academic programs and opportunities. It is a center of academic excellence, scholarly inquiry, and public service. The College prepares leaders to meet the critical challenges of the 21st Century through productive contributions to local and global communities and toward individual and cultural equity.

Mission: The mission of the College of Education and Psychology is to provide a positive environment that fosters the acquisition of knowledge and skills. The mission is individually and collectively realized through a community of scholars that contributes to knowledge through scholarly inquiry; organizes knowledge for application, understanding and communication; and provides leadership and service. We affirm and promote global perspectives that value individual and cultural diversity to enhance learning, service, and scholarship.

UT TYLER'S SCHOOL OF EDUCATION STANDARDS FOR EDUCATOR PREPARATION PROGRAMS

Texas Education Standards: The School of Education are committed to teaching and implementing the Texas Educator Standards at the highest level. The School of Education faculty use the Texas Education Standards, along with the Interstate New Teacher Assessment and Support Consortium (InTASC) standards used by educator preparation programs throughout the United States.

The list of [Texas Education Standards](#) can be accessed [here](#). \

Access the [Code of Ethics and Standard Practices for Texas Educators](#).