UTTyler COLLEGE OF EDUCATION & PSYCHOLOGY

EDUT 4371
Perspectives in STEM Education

Section 060, Fall 2025

Time: Online with Weekly Synchronous ZOOM Sessions
Day: TBD
Final: Online

Instructor Information:

Pradeep M. Dass, Ph.D.

Office: BEP 226
Office Hours: By Appointment (meetings via Zoom or Phone)
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Course Overview:

This course explores science and mathematics as dynamic human endeavors shaped by societal needs, historical events, and innovation. Using a Science-Technology-Society (STS) framework, future STEM educators will examine key discoveries, policies, and their impact on education and society. Aligned with the Texas Essential Knowledge and Skills (TEKS), this course equips educators with the tools to integrate historical and philosophical perspectives into engaging, inquiry-driven STEM instruction.

Schedule (See the schedule of Modules in Canvas)

Student Learning Outcomes:

- Demonstrating the methods and nature of science and math through real-life examples of discovery in practice.
- Building cross-curricular connections within the STEM disciplines and beyond in the arts and humanities.
- Humanizing scientists and mathematicians and addressing issues of diversity in STEM
- Exploring the ethics, values, and social context of science and math.
- Explore Resources related to the History, Science, and Philosophy of STEM

Resources

Pedagogy: Resources on HPS in STEM education

Current education research makes a strong case for STEM teaching that is informed by the history and philosophy of science and math. *Read more*

Meeting the Standards

National and state standards for science and math teaching already include substantial requirements for teaching the history and nature of science and math. *Read more*

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A selection of books on the role of history in STEM education (not required reading but a list of useful resources)

- Allchin, D. Teaching the Nature of Science: Perspectives & Resources. SHiPS Education Press, 2013
- Bevilacqua, F., et al. Science Education and Culture: The Contribution of History and Philosophy of Science. Springer, 2001.
- Bruneau, O. et al. (eds.) Innovative Methods for Science Education, Frank & Timme, 2012
- Calinger, R. Vita Mathematica: Historical Research and Integration With Teaching. Cambridge University Press, 1996.
- Fauvel, J., and J. van Maanen. History in Mathematics Education: The ICMI Study. Kluwer Academic Publishers, 2000.
- Hagen, J. B., et al. Doing Biology. Harper Collins College Publishers, 1996.
- Heering, P., and D. Osewold (eds.) Constructing Scientific Understanding Through Contextual Teaching. Frank & Timme, 2007.
- Herreid, C. F. (ed.) Start with a story: The case study method of teaching college science. NSTA press, 2007.
- Jardine, D., & Amy Shell-Gellasch, eds. Mathematical time capsules: Historical modules for the mathematics classroom. MAA 2010.
- Katz, V., (ed.) Using History to Teach Mathematics: An International Perspective. Cambridge University Press, 2000.
- Kumar, D. D., and D.E. Chubin. Science, Technology, and Society: A Sourcebook on Research and Practice. Springer, 2000
- Matthews, M. R. (ed.) History, Philosophy and Science Teaching: New Perspectives. Springer, 2018.
- Matthews, M. R. Science Teaching. Revised & expanded ed., Routledge, 2015
- Matthews, M. R. (ed.) International Handbook of Research in History, Philosophy and Science Teaching. Springer, 2014.
- Matthews, M. R. Science Teaching: The Role of History and Philosophy of Science. Routledge, 1994.
- Swetz, Frank, John Fauvel, Bengt Johansson, Victor Katz, and Otto Bekken, eds. Learn from the masters. MAA, 1995.

Online reference resources related to history and philosophy in STEM education

- SHiPS Resource Center for science teachers using Sociology, History and Philosophy of Science
- Understanding Science

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Open Source Textbook (this is a very useful 'free download' book in pdf)

https://openlibrary-repo.ecampusontario.ca/jspui/bitstream/123456789/605/1/Introduction-to-History-and-Philosophy-of-Science-1559572706._print%20%281%29.pdf

Online Videos (weekly modules are based on these videos, one video per weekly module)

Day the Universe Changed:

https://archive.org/details/the-day-the-universe-changed-s01e01-the-way-we-are

https://archive.org/details/the-day-the-universe-changed-s01e02-the-way-we-are

https://archive.org/details/the-day-the-universe-changed-s01e03-the-way-we-are

https://archive.org/details/the-day-the-universe-changed-s01e04-the-way-we-are

https://archive.org/details/the-day-the-universe-changed-s01e05-the-way-we-are

https://archive.org/details/the-day-the-universe-changed-s01e06-the-way-we-are

https://archive.org/details/the-day-the-universe-changed-s01e07-the-way-we-are

https://archive.org/details/the-day-the-universe-changed-s01e08-the-way-we-are

https://archive.org/details/the-day-the-universe-changed-s01e09-the-way-we-are

https://archive.org/details/the-day-the-universe-changed-s01e10-the-way-we-are

https://archive.org/details/thedaytheuniversechanged10changingknowledgechangingreality

Course Activities and Assignments:

Activities	% Grade
Attendance & Participation	**10**
Assignments *(See the* **Assignments** *tab in Canvas for more details)*	
• **Reflections (on videos, readings, etc.)**	**20**
• **Lesson Plan (5E or PBL, etc.)**	**20**

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• **Video PowerPoint Summaries**	**20**
• **Video Project (Historical Perspective of Your STEM Area)**	**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 activities 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 may: 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 in advance.

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

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- Social Security and FERPA Statement
- Emergency Exits and Evacuation
- Student Standards of Academic Conduct

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/

COLLEGE OF EDUCATION AND PSYCHOLOGY (CEP) VISION AND MISSION

Core Purpose of College of Education and Psychology:

To prepare competent, caring, and qualified professionals in the fields of education, psychology and counseling, to foster discovery and to advance the knowledge base in our respective disciplines.

Vision

The CEP will be a global leader in responding to needs in the fields of education, psychology, and counseling, with a focus on the East Texas region, by creating innovative academic and scholarly pathways and partnerships.

Mission

The mission of the CEP is to prepare competent and passionate professionals in the fields of education, psychology, and counseling; to advance knowledge and expertise; and to impact these fields locally, regionally, nationally, and internationally.

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

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

TEKS for Science

Code of Ethics and Standard Practices for Texas Educators.