STEM 6304 Instructional Trends in STEM Education

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Cathy Davidson - Now You See It

Term: Fall 2021
CRN: 19068
Format: Hybrid → 50% Face-to-Face (F2F), 50% Online
Meetings: Wednesdays from 5:30-8:20 PM in College of Education, Room 402 (F2F only)
Instructor: Dr. William H. Robertson, Professor, Teacher Education, College of Education, Room 807, robertson@utep.edu, 747-6426
Office Hrs: Tuesdays, 4:00–5:00 PM online

Readings

Kuhn, Thomas S. (1962). *The Structure of Scientific Revolutions*, University of Chicago Press, Chicago, IL. ISBN # 978-0226458120

Additional Articles will be shared as links and/or as handouts for students to read prior and will be assigned regularly.

Course Description and Goals

This course examines the science, technology, engineering and mathematics (STEM) education in both national and state standards taught in schools, pedagogical practices in science classrooms and various aspects of student learning in STEM education. The emphasis of this class is on enhancing and broadening STEM education and knowledge in relation to instructional design practices in the STEM area.

This is a hybrid class that meets 50% face-to-face (F2F) and 50% online (ONL) in alternating class sessions. The framework for the classroom is a constructivist-based approach that is designed to maximize experiential learning within a classroom environment and to best leverage interactive problem-solving and critical thinking skills, the constructivist flipped classroom looks to leverage student-to-student and student-to-teacher interactions primarily within a F2F environment, while maximizing student-to-content learning opportunities online.

In other words, the F2F class sessions are for active practice within the STEM disciplines, which will include discussions, experiments, hands-on activities, projects and cooperative group work. Then, within the asynchronous online portion to follow for the subsequent class meeting, students will interact with primary content in order to develop explanations for the experiences from class and to integrate the required subject matter content into future assignments. The course meets during the fall 2021 semester on Wednesday nights from 5:30-8:20 PM in Room

402 in the Education Building. The first meeting will be on August 25, 2021, the course will be delivered in a hybrid format, and meeting face to face every other week.

Grading Criteria

The course will be assessed based on the following criteria:

Activity	Percentage of Grade
Quizzes/Discussion/Assignments	60%
Final Project & Video Presentation	30%
Participation	10%
Total	**100%**

The overall grade for the class for each student will be calculated with the following weights: 60% of points from quizzes, discussions and assignments, 30% Final Project and Video Presentation and 10% on Participation. The Participation Score includes the Syllabus Quiz, Online Class Evaluation and all online interactions within the class.

A standard scale will be used in order to determine final grades. The scale is as follows: 90% or above – A, 80% to 89.9% - B, 70% to 79.9% - C, 60% to 69.9% - D, below 60% - F.

Course Procedures

This class is a graduate class in STEM education, and it is expected that students manage their time and complete all the required classroom material. The class will be fully online in Blackboard through the University of Texas at El Paso. The course can be accessed through the My UTEP Web Site (http://my.utep.edu) and will be conducted as an online class. All class assignments for the semester will be delivered and received in Blackboard. Be sure to read all the assigned class materials thoroughly and to continually consult the course schedule in order to keep up on all information associated with this online class.

Primarily, you will use discussions, quizzes and assignments for turning in material to be graded. An overview of these tools is provided in the class syllabus. Additionally, I would also suggest that you begin to understand the differences between Synchronous and Asynchronous technology tools. Synchronous tools are those that you use in real time, such as chat, instant messaging, telephone conversations or talking to someone face to face. Asynchronous tools are those that have a delay in the delivery of some content and the reception of that content by another person. Tools that fit this are email, discussion boards, quizzes, and assignments in Blackboard Learn, as well as phone messages left on an answering machine.

You will need to examine and understand the environment of your class in Blackboard and the location of all class material. It is recommended that you log in with great regularity in Blackboard to look for email announcement, new content of changes that may come throughout the semester. It is recommended that you try and log into the course at least once a day to make sure you do not miss any important announcements, which will be posted regularly.

Class Format / Miscellaneous Information

- A 3-credit class is required to have 45 contact hours, and we will have both F2F classes and online sessions. Additionally, you may expect to have approximately 1-3 hours of homework for every class session for class readings and the preparation of materials
- 250 words is approximately 1 page, 12-point font, double spaced
- This syllabus is subject to change by the Instructor.

STEM 6304 Online Activities – Due Dates Fall 2021

Online Activity	**Date Open**	**Date Due - Closed**
Discussion1	August 25 at 7:00 AM	September 1 at 11:59 PM
Quiz 1	August 25 at 7:00 AM	September 1 at 11:59 PM
Discussion 2	September 1 at 7:00 AM	September 8 at 11:59 PM
Assignment 1	September 8 at 7:00 AM	September 15 at 11:59 PM
Quiz 2	September 15 at 7:00 AM	September 22 at 11:59 PM
Assignment 2	September 22 at 7:00 AM	September 29 at 11:59 PM
Assignment 3	September 29 at 7:00 AM	October 6 at 11:59 PM
Discussion 3	October 6 at 7:00 AM	October 13 at 11:59 PM
Assignment 4	October 13 at 7:00 AM	October 20 at 11:59 PM
Discussion 4	October 20 at 7:00 AM	October 27 at 11:59 PM
Assignment 5	October 27 at 7:00 AM	November 3 at 11:59 PM
Quiz 3	November 3 at 7:00 AM	November 10 at 11:59 PM
Assignment 6	November 10 at 7:00 AM	November 17 at 11:59 PM
Final Video Presentation	November 17 at 7:00 AM	December 1 at 11:59 PM
Final Project	November 17 at 7:00 AM	December 1 at 11:59 PM

- **Dates Due – Open** means that a discussion, quiz or written and uploaded assignment is now available.
- **Dates Due – Closed** means that a discussion, quiz or written and uploaded assignment is closed and no longer available.
- **It is important to pay attention to all due dates and to manage your time and meet the requirements of this graduate class as outlined in the course syllabus.**

Class Schedule

Classes will be HYBRID with 50% class meetings face-to-face (F2F) and 50% asynchronous online (ONL) during the fall 2021 semester. The class will be a combination of lecture, guided instruction, classroom activities, discussions, content exercises, and project development. Every F2F and online class module is vital to your development in the area of STEM curriculum development and pedagogy within your content area. It is the students' responsibility to meet all deadlines for each weekly session and to complete all assignments and readings as well.

Date	Topics	Online Assignments	Readings
Week 1 (F2F) August 25th	Introductions/Icebreakers Syllabus Review Blackboard Overview Active Learning Activity	Use of Blackboard at UTEP for Class materials Discussion 1 – Introductions Quiz 1 - Syllabus and Class Procedures	Read Chapters 1-3 in *The Structure of Scientific Revolutions*
Week 2 (ONL) September 1st	STEM Education Overview Teaching Philosophies for STEM Education	Discussion 2 – Paradigm Shifts	Read Chapters 4-6 in *The Structure of Scientific Revolutions*
Week 3 (F2F) September 8th	Liberating Structures Activities Pecha Kucha Demonstration	Assignment 1 – The Structure of Scientific Revolutions	Read Chapters 7-9 in *The Structure of Scientific Revolutions*
Week 4 (ONL) September 15th	Classroom Strategies for STEM Education – Flipped Classroom, Learning Environments	Quiz 2 – The Structure of Scientific Revolutions	Read Chapters 10-13 in *The Structure of Scientific Revolutions*

Date	Topics	Online Assignments	Readings
Week 5 (F2F) September 22nd	Video Instruction Action Science Guest Speaker 1	Assignment 2 – STEM as an Integrated Approach	Assigned Articles in Blackboard
Week 6 (ONL) September 29th	Student Perspectives Authentic Education	Assignment 3 – Literature Review of STEM Education Articles	Assigned Articles in Blackboard
Week 7 (F2F) October 6th	Constructivism Problem-based Learning	Discussion 3 – The Value of STEM Education	Assigned Articles in Blackboard
Week 8 (ONL) October 13th	Constructivist-Flipped Invention, Innovation and Creativity	Assignment 4 – Teaching STEM concepts through PBL	Assigned Articles in Blackboard
Week 9 (F2F) October 20th	Modern Methods Pedagogy STEM Education Funding Guest Speaker 2	Discussion 4 – How do you best define STEM (or STEAM)?	Assigned Articles in Blackboard
Week 10 (ONL) October 27th	STEM Professional Development STEM vs. STEAM	Assignment 5 – The valuation of STEM-based instruction and learning	Assigned Articles in Blackboard

Date	Topics	Online Assignments	Readings
Week 11 (F2F) November 3rd	English Language Learners Guest Speaker 3	Quiz 3 – STEM Education Articles (weeks 5-10)	Assigned Articles in Blackboard
Week 12 (ONL) November 10th	Formative and Summative Assessment Qualitative and Quantitative Evaluation	Assignment 6 – Developing an inclusive and diverse STEM Education curriculum and classroom	Assigned Articles in Blackboard
Week 13 (F2F) November 17th	Go over Final Project & Final Presentation Criteria and Rubric Final Project & Final Presentation Discussion	Final Project & Final Presentation Preparation	Assigned Articles in Blackboard
Week 14 (ONL) November 24th	Final Project & Final Presentation Preparation	Final Project & Final Presentation Preparation	Assigned Articles in Blackboard
Week 15 (F2F) December 1st	**Final Project & Final Video Presentations**	**Final Project & Final Video Presentations**	

**** You must submit all your course assignments in Blackboard by the assigned dates and times. ****
**** Work will only be accepted through this method and Blackboard should be utilized effectively in order to receive full credit for all class assignments. ****

Assignments

All online assignments are due by the posted time on the deadline date. Late assignments will not be accepted. Please carefully read all instructions for each assignment. Reading instructions is your responsibility and you should meet all due dates and times. Individual assignments will be done in the Assignments area and will need to be posted as .docx, .doc or .rtf files. Occasionally, a PowerPoint will be required as well and will need to be submitted in .ppt or .pptx format.

Quizzes

All online quizzes are due by the posted time on the deadline date. Late quizzes will not be accepted. Please carefully read all instructions for each assignment. Reading instructions is your responsibility and you should meet all due dates and times.

Discussions

For class discussions, you will be communicating in a written format on an individually assigned topic on a given discussion board. The discussion boards are located within this course. You will need to do the readings and go over the lecture notes to be effective in your responses. Obvious use of acquired content knowledge must be incorporated into discussions. Therefore, participation in discussions will reflect not only in your participation grade, but also in the thoroughness of your assignments.

For each discussion topic, each member should have a minimum of 1 individual response (300 words) to the overarching question and 2 individual postings for feedback (50 words) to other group members' comments. The deadlines for discussion postings and replies will be posted online and in the course syllabus. If there are no responses submitted there will be no credit given for the posting.

You will be graded your postings according to the following criteria:

- Did you discuss the topic in a thoughtful way?
- Is the argument discussed relevant to class discussion/readings?
- Do you provide relevant evidence that supports your argument?

Grades will be given on an INDIVIDUAL basis for participation in the group discussion. If, however, it is determined that you did not participate at all in the group discussion, or if your participation is graded as unsatisfactory, you will get a grade of "0" for the group assignment portion of the discussion board. Do not post your responses to the discussion board as attachments! Please type directly or copy and paste the text into the discussion boards.

Netiquette

When communicating electronically, many of the feelings or impressions transmitted via body language in face-to-face communications are lost. Consequently, interpreting emotions and innuendos is much more difficult. Often, for example, excitement can be misinterpreted as anger or insult. It is important that we all keep this in mind as we communicate. Words in print may seem harmless, but they could emotionally injure us when working at a distance. Hence, it is vitally important that we are conscious of how we communicate while working at a distance.

For example, avoid the use of caps in your electronic messages, as wording in caps comes across as shouting. The standard practice for participation in networked discussion requires that all participation be focused on the topic at hand, not become personalized, and be substantive in nature. (Translation: you may certainly disagree with others, but you must do so respectfully; you may express strong beliefs or emotions, but you may not get so carried away that you lose all perspective on the course itself.) Please observe the following:

- Check the Blackboard course shell and UTEP email daily for messages, updates, and/or assignments.
- Respect and courtesy must be provided to fellow classmates and the instructor at all times, in all contexts. No harassment or inappropriate postings will be tolerated.
- Be professional and careful in what you say about others.
- When reacting to someone else's message, address and focus on the ideas, not the person who posted them.
- Be careful when using sarcasm and humor. Without face-to-face communications, your joke may be viewed as criticism.

Instructions for Accessing Your Course Online with Blackboard

You must have an UTEP e-mail ID and password before you can access Blackboard. UTEP automatically generates an e-mail ID for you when you are entered into the system. If you do not have your ID or do not remember the ID or password call the helpdesk first at (915) 747-5257.

All the course content will be delivered via Blackboard. You can access Blackboard by following the steps outlined below:

- Go to **http://my.utep.edu**
- **Your login is your e-mail ID and your password is your e-mail password**.
- Once you are in the **my.utep.edu** portal, you can find the link to Blackboard near the top of the webpage

In case the above URL does not work, you can do the following:

- Go to http://blackboard.utep.edu
- **Your login is your e-mail ID but your password is your goldmine password**, which is generally a 6-digit number. You need to have an UTEP e-mail ID to be able to access Blackboard.

Once you are logged into Blackboard, you will find all the courses you are registered for, under the appropriate semester. Click on your course title to access the course.

If you have any questions concerning this process, you must contact the UTEP Help Desk at (915) 747-5257 or helpdesk@utep.edu. This is your best and most reliable resource concerning issues related to both the UTEP Web portal and tools including Blackboard.

All course correspondence with the instructor must be done using the tools in Blackboard.

UTEP Policies

Academic Dishonesty

Academic dishonesty is prohibited and is considered a violation of the UTEP Handbook of Operating Procedures. It includes, but is not limited to, cheating, plagiarism, and collusion. Cheating may involve copying from or providing information to another student, possessing unauthorized materials during a test, or falsifying research data on laboratory reports. Plagiarism occurs when someone intentionally or knowingly represents the words or ideas of another person's as ones' own. And, collusion involves collaboration with another person to commit any academically dishonest act. Any act of academic dishonesty attempted by a UTEP student is unacceptable and will not be tolerated. Violations will be taken seriously and will be referred to the Dean of Students Office for possible disciplinary action. Students may be suspended or expelled from UTEP for such actions.

Students with Disabilities

If you have or believe you have a disability, you may wish to self-identify. You can do so by providing documentation to the Office of disabled Student Services located in Union E Room 203. Students who have been designated as disabled must reactivate their standing with the Office of Disabled Student Services on a yearly basis. Failure to report to this office will place a student on the inactive list and nullify benefits received. If you have a condition which may affect your ability to exit safely from the premises in an emergency or which may cause an emergency during class, you are encouraged to discuss this in confidence with the instructor and/or the director of Disabled Student Services. You may call 747-5148 for general information about the Americans with Disabilities Act (ADA).

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