George Mason University
College of Education and Human Development
Advanced Studies in Teaching and Learning

EDCI 660.B01 CRN 43469 Integrated STEM Teaching
3 Credits, Summer 2021
Online

Faculty

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For COVID-19 procedures in Summer 2021: Be aware of and follow all policies and procedures for Mason's Safe Return to Campus: https://www2.gmu.edu/Safe-Return-Campus

Prerequisites/Corequisites
None.

University Catalog Course Description
Provides an interdisciplinary approach to integrating science, technology, engineering, and mathematics (STEM) into teaching practice across all disciplines. Explores aspects of STEM education through literature, recent national reports, discussion, and practice. Involves participation in problem-based and project-based learning activities, inquiry learning, while using technology to gain and display information.

Course Delivery Method
This course will be delivered online (76% or more) using a mostly asynchronous format (3 or fewer synchronous Collaborate sessions will be scheduled) via the Blackboard Learning Management system (LMS) housed in the MyMason portal. You will log in to the Blackboard (Bb) course site using your Mason email name (everything before @masonlive.gmu.edu) and email password. The course site will be available by June 1, 2021].

Under no circumstances, may students participate in online class sessions (either by phone or Internet) while operating motor vehicles. Further, as expected in a face-to-face class meeting, such online participation requires undivided attention to course content and communication.

Technical Requirements
To participate in this course, students will need to satisfy the following technical requirements:

- High-speed Internet access with standard up-to-date browsers. To get a list of Blackboard's supported browsers see: https://help.blackboard.com/Learn/Student/Getting_Started/Browser_Support#supported-browsers

  To get a list of supported operation systems on different devices see: https://help.blackboard.com/Learn/Student/Getting_Started/Browser_Support#tested-devices-and-operating-systems

- Students must maintain consistent and reliable access to their GMU email and Blackboard, as these are the official methods of communication for this course.
- Students will need a headset microphone for use with Zoom and/or the Blackboard Collaborate web conferencing tool.
- Students may be asked to create logins and passwords on supplemental websites and/or to download trial software to their computer or tablet as part of course requirements.
- The following software plug-ins for PCs and Macs, respectively, are available for free download: [Add or delete options, as desire.]
    - Adobe Acrobat Reader: https://get.adobe.com/reader/
    - Windows Media Player: https://support.microsoft.com/en-us/help/14209/get-windows-media-player
    - Apple Quick Time Player: www.apple.com/quicktime/download/

Expectations

- Course Week: Because asynchronous courses do not have a "fixed" meeting day, our week will start on Tuesday and finish on Monday. Synchronous Collaborate sessions will be held on Wednesday afternoons, or at a time mutually agreed upon by students and faculty.
- Log-in Frequency:
  Students must actively check the course Blackboard site and their GMU email for communications from the instructor, class discussions, and/or access to course materials **at least three times per week.** In addition, students must log-in for all scheduled online synchronous meetings.
- Participation:
  Students are expected to actively engage in all course activities throughout the semester, which includes viewing all course materials, completing course activities and assignments, and participating in course discussions and group interactions.
- Technical Competence:
  Students are expected to demonstrate competence in the use of all course technology. Students who are struggling with technical components of the course are expected to seek assistance from the instructor and/or College or University technical services.
- Technical Issues:
  Students should anticipate some technical difficulties during the semester and should, therefore, budget their time accordingly. Late work will not be accepted based on individual technical issues.
- Workload:
  Please be aware that this course is **not** self-paced. Students are expected to meet *specific deadlines* and *due dates* listed in the **Class Schedule** section of this syllabus. It is the student's responsibility to keep track of the weekly course schedule of topics, readings, activities and assignments due.
- Instructor Support:
  Students may schedule a one-on-one meeting to discuss course requirements, content or other course-related issues. Students should email the instructor to schedule a one-on-one session, including their preferred meeting method and suggested dates/times.
- Netiquette:
  The course environment is a collaborative space. Experience shows that even an innocent remark typed in the online environment can be misconstrued. Students must always re-read their responses carefully before posting them, so as others do not consider them as personal offenses. *Be positive in your approach with others and diplomatic in selecting your words*. Remember that you are not competing with classmates, but sharing information and learning from others. All faculty are similarly expected to be respectful in all communications.

- Accommodations:
  Online learners who require effective accommodations to insure accessibility must be registered with George Mason University Disability Services.

Learner Outcomes

This course is designed to enable students to do the following:

1. Design and modify instruction based on STEM teaching and assessment theory, philosophy, educational research, and best practice.
2. Incorporate findings from STEM education research literature into instructional strategies to improve student learning.
3. Engage in STEM learning within Problem-based learning, Model Eliciting Activities, and Project-based learning activities and identify how these activities might be implemented in K-12 classrooms for STEM Integration.
4. Examine the STEM Integrated School Models and identify key elements that might be adapted into K-12 STEM classrooms.
5. Review and become fluent in recent research findings that are widely accepted to advise colleagues in STEM classroom practice.
6. Design and modify STEM instruction that is responsive to differences among learners.
7. Identify equity issues within STEM Education and how STEM focused classrooms can help address these issues.

Professional Standards

Upon completion of this course, students will have met the following sets of professional standards:

National Board for Professional Teaching Standards Alignment:

EDCI 660 is designed as a course for practicing teachers, particularly those in the Advanced Studies in Teaching and Learning (ASTL) Program. This course is thus aligned with the NBPTS Propositions, also the first five ASTL learning outcomes, specifically:

- Proposition 1: Teachers are committed to students and their learning; *(ASTL Learning Outcome 1)*
- Proposition 2: Teachers know the subjects they teach and how to teach those subjects to students; *(ASTL Learning Outcome #2)*
- Proposition 3: Teachers are responsible for managing and monitoring student learning; *(ASTL Learning Outcome #3)*
- Proposition 4: Teachers think systematically about their practice and learn from experience; *(ASTL Learning Outcome 4)*
- Proposition 5: Teachers collaborate with other professionals to improve school effectiveness. *(ASTL Learning Outcome 5).*

EDCI 660 is aligned with four of the additional outcomes that guide the ASTL program:

- Principle 1: Teachers are committed to students and their learning.
- Principle 2: Teachers know the subjects they teach and how to teach those subjects to students.
- Principle 6: Teachers account for the needs of culturally, linguistically, and cognitively diverse learners *(ASTL Learning Outcome 6);* and
- Principle 7: Teachers are change agents, teacher leaders, and partners with colleagues *(ASTL Learning Outcome 7)*

Required Texts

- Reagan, M. T. (2016). *STEM-infusing the Elementary Classroom*. Corwin Press.
- Jolly, A. (2016). *STEM by design: Strategies and activities for grades 4-8*. Routledge.

Optional texts (you do not need to purchase, chapters will be provided for readings):

- Hoffer, W. W., & Sampson, S. (2016). *Cultivating STEM identities: Strengthening student and teacher mindsets in math and science*. Heinemann.
- Hunter, J. (2020). *High Possibility STEM Classrooms: Integrated STEM Learning in Research and Practice*. Routledge.
- Weld, J. (2017). *Creating a STEM culture for teaching and learning*. National Science Teachers Association.

Course Performance Evaluation

Students are expected to submit all assignments on time via the Blackboard Assignments page.

	Points
Participation and Professionalism - **includes dialectical journal & digital interactive notebook*	30
Student-centered Learning & Teaching in STEM: **PBL/MEA/Maker Reflection**	10
Integrated STEM Lesson Plan and Video	20
Classroom Practices for STEM Equity: Research and Policy Presentation & Reflection • **Journal in week XX - identify topic - 5** • **Literature Review chart in week XX - 10** • **Final Presentation - 15** • **Final Reflection - 10**	40
Total Points	**100**

Assignments

1. Participation and Professionalism (30%)

This course operates under the assumption that knowledge is socially constructed and the most meaningful learning opportunities include those where learners have the opportunity to offer and explore diverse perspectives with peers. To do this, it is expected that you will regularly contribute to and engage in class discussion (which will occur in multiple formats), as well as to genuinely listen to peers as they do the same. While agreement is not mandatory, consideration and respect for others are.

Thus, you must be "present" throughout all discussions and activities, including both synchronous and asynchronous class meetings. You will actively build upon your prior knowledge to connect, question, and extend the discussions by citing readings, class content, and module materials in relation to your personal and educational experiences. In addition to contributing to synchronous and asynchronous discussions, you will complete individual and collaborative tasks that are related to each week's content. Please refer to the student expectations and student participation portion of the course rubric in this syllabus for grading criteria.

Each online module will begin on a Tuesday and run through the following Monday. We will use a variety of formats for online discussions. If you are engaged in asynchronous discussion, initial posts to

the online asynchronous discussion should be completed by ***12 noon on Saturday (EST)*** so that class members will have until Monday to interact with the posted material and engage in "conversation."

We will use Blackboard, Google, and other online educational technology to communicate regularly in this class. You will be asked to post assignments and responses, read classmates' postings, and actively participate in discussions. Our online resources serve as important vehicles for discussing ongoing work on your major project with group members. Please refer to the Participation Rubric in this syllabus for evaluation criteria.

Dialectical Journal
A dialectical journal captures the academic dialogue between each student and the texts read in the class. The dialectical journal provides the instructor a view into each student's interaction with the course content as represented in the readings. Each student will create and maintain a google doc that captures class Specific directions will be provided to students in class.

Digital Interactive Notebook
In order to teach STEM in K-12 classrooms, teachers need opportunities to create and innovate in authentic STEM activities. We learn not only from our individual approaches and instructor feedback; we also learn by synthesizing the ideas of our peers. It is especially valuable to study others' problem-solving strategies and to anticipate how our students might think about STEM.

2. **Student-centered Learning and Teaching in STEM: PBL/MEA/Maker Reflection (10%)**

Throughout the semester you will learn about student-centered teaching for STEM, with some focus on PBL, MEAs, and maker activities. Each student will identify an MEA, STEM PBL resource, maker activity, or other new STEM activity from online resources linked in class and create a solution. Effective teaching requires that you experience a STEM activity as a learner to anticipate implementation challenges and design instruction, and then create a written reflection of this problem-solving experience as both a learner and as a teacher by responding to the following questions:

1. What was your rationale for selecting this activity?
2. What opportunities do you (the learner) have for creative or innovative thinking?
3. What challenges did you face as you solved the problem?
4. How would you facilitate this activity with your students?

APA Style headings, references, and in-text citations must be used throughout this document.

3. **Integrated STEM Lesson Plan with Video Introduction (20%)**

A major goal of this course is to enable students to incorporate integrated STEM instruction into their classes in an explicit and reflective way. To reach this goal, students will create a new or modify an existing lesson with explicit, reflective integrated STEM. Students will then prepare a short video (approximately 5 minutes) in which they introduce the lesson or activity, present the performance-based objectives and assessment of the lesson, and discuss the ways they incorporate STEM and STEM design principles in their classes. The video can be an edited video of the teacher actually teaching in a K-12 classroom, or it can be recorded by the teacher outside of a classroom.

The video and link to the lesson plan should be submitted by the designated due date in the class schedule. These will be incorporated into the class modules for instructor and peer feedback. Students should be sure to view the "Accomplished" column of the rubric to identify how the video and lesson plan will be assessed.

4. **Classroom Practices for STEM Equity: Research and Policy Presentation and Reflection (40%)**

Issues of equity and access are persistent problems in STEM education and many STEM career fields. Drawing on course readings and supplementing with additional research and policy literature, students will work throughout the semester to prepare a presentation on a STEM education equity issue of their choice. Although the problem should be situated within the global or national context, the main focus of this assignment should be on addressing the problem at a local level, with recommendations for STEM teaching practices that can be implemented in teacher's own school(s) and grade level(s). The Classroom Practices for STEM Equity assignment has several components.

a. **Journal due in week 2 in which you identify your topic. (5 points)**
b. **Literature Review chart in week 3 (10 points)**
c. **Poster Presentation during a combined synchronous session in week 8 (15 points)**
d. **Final Reflection and STEM Advocacy Orientation due in week 8. (10 points)**
   APA Style headings, references, and in-text citations must be used as applicable.

4a. Journal - Topic Identification (5 points): You will use an instructor-provided template to briefly describe your chosen STEM education issue and your rationale for choosing this issue for your research.

4b. Literature Review Chart (10 points): You will use an instructor-provided template to record a minimum of 5 peer-reviewed journal articles that advance your thinking about your chosen topic. Your chart should include the following components for each article:

- APA Citation of Article
- Short summary of article – in your own words (1-2 sentences)
- What does this article say about the specific equity in STEM issue you have identified?
- What does this article recommend be done to address the problem?

4c. Poster Presentation: (15 points): All students will create and share a poster presentation on their STEM education equity issue using one of the poster presentation templates provided by your instructor. You will have approximately ten minutes to present your poster to your peers during a combined synchronous session near the end of the semester. You should include the following components:

i. **Introduction:** Identify the problem and situate it within the global or national context. Provide a (brief) historical perspective on the issue.
ii. **Goal-oriented Problem Statement:** Explicitly state the problem with a goal in mind—this may be broad or very specific (e.g. How to increase access to creative computing in an elementary classroom; how to increase access to STEM innovation for students in under-represented groups; how to increase enrollment of girls in A.P. Physics at XX High School). Discuss why this is a problem and a realistic goal, using references to literature. Most persistent problems are complex--try to avoid oversimplifying the issue.
iii. **Identification of Potential Solutions:** Draw on research and policy literature to identify strategies that have been used to address the issue. These are likely to include research on the impact of school district and school policies, as well as research on formal and informal STEM instructional practices. Recommendations should highlight solutions that are innovative and/or creative.
iv. **Specific Recommendations & Expected Outcomes:** This section should focus on specific recommendations for the student's specific teaching context. Recommendations should be made for policies and practices at multiple levels (e.g. classroom, school, district). Expected outcomes for each recommendation should be clearly stated.

4d. Final Reflection & STEM Advocacy Orientation (10 points): The final component of your Classroom Practices for STEM Equity is a 2-3 page (double-spaced, APA 7th ed. style) reflection in which you reflect on the following:

- **Reflect on Course & Feedback:** How did the course content, as well as ideas and feedback from your peers and your instructor(s) influence your thinking on creativity and innovation within an equitable STEM classroom? This should include peer and instructor feedback from throughout the semester and may include ideas and feedback from during the collaborative presentation.
- **Reflect on Future Classroom Practices and STEM Advocacy Orientation:** How has reviewing STEM education policy literature this semester (especially for this assignment) influenced your thinking about STEM education? How will the literature impact your practices in the classroom and/or as a teacher leader? How will you advocate for STEM education and equity in STEM in your current and future roles? *[Note: You should be realistic and honest in your discussion of STEM Advocacy, but do not underestimate the power that a teacher has to serve as an advocate within their own classroom – and beyond.]*

General Requirements

A. Please note that this online course is **NOT self-paced;** it consists of *weekly modules* that progress sequentially through the semester. You will be expected to complete one learning module each week. It is critical that each student complete all readings and activities on a weekly basis so that learning is adequately scaffolded and that students develop rapport with the content and their colleagues. Class 'attendance' is both important and **required**. *If, due to an emergency, you will not be participating in course activities on time, please contact your instructor prior to due dates or time. Please note that learners with more than two 'absences' risk a letter grade drop or can lose course credit.*

B. All assignments are due no later than **11:59 PM EST** of the date indicated in each week's assignments published in the **COURSE SCHEDULE AND TOPICS** section of this Syllabus. Due dates are also posted on our Bb course site.
    a. **Grades for assignments date-stamped in Blackboard after the due date will be reduced by 10%, unless prior approval from instructor has been granted. Late submissions are not acceptable after the course end date without prior arrangements.**
    b. Assignments earning less than a passing grade may be rewritten and resubmitted so that the assignment is satisfactorily completed. In fact, because mastery learning is our program's goal, we may ask (or *require)* you to redo an assignment that is far below expectations. Our goal for all learners is mastery, so we thank you, in advance, for making *genuine learning* your goal.

C. Please adhere to the assignment submission instructions listed in this Syllabus**.** Only assignments submitted as indicated will be graded; incorrect submissions may result in a grade of zero for those assignments.
    a. All assignments should be submitted in Word and should have the filename format as follows: Last name-Assignment Title. *Please do not upload written assignments in PDF format*. Other editable formats are acceptable (i.e., .doc, .docx, .rtf, .ppt, .pptx, .xlsx, .xlsx). If there are supporting documents for assignments, they may be submitted in PDF format.

D. *Please Note: All written work* should be carefully edited for standard grammar and punctuation, as well as clarity of thought. All submitted work should be prepared through word processing and reflect APA style (6th edition), as well as be double- spaced, with 1" margins, and 12-point font (Times New Roman, Calibri, or Arial).

Instructor Role

- Your professor will review your dialectical journal and online discussion updates regularly; however, their active role as faculty is to support the discussion development and not so much to "enter into each one" so that the dialogue is authentic among participants engaging in this community of practice. Please note that during this time, your professor will be noting the quality and extent of your participation.

Student Expectations

- Students are also requested to adhere, to the extent possible, to a 24-hour turn-around time for emails.
- Students are expected to visit our Blackboard site *at least three* times during the week: thus, once at the beginning of each week, once in the middle of the week, and then again at the end to read any new posts and replies. Please note that you can subscribe to forums/threads to be notified when new posts are added; access the posted directions in Blackboard for doing this.
- Students are expected to read all posted/emailed Course Announcements. These contain important information from your instructor. In addition to being sent by email, these will be available in the Course Announcements link in Blackboard.
- It is also expected that you will monitor your participation so that you remain timely and responsive and are able to complete all tasks on-time, without reminder. Successful students in an online learning environment are proactive, self-regulated, and manage their time well. You should expect to spend 12-15 hours a week on this 3-credit course, including reading, engagement in other content, reflection, and posting. This commitment is commensurate with the commitment expected for F2F classes, which also includes preparation, class time, and assignments.
- Questions are welcome, and your professor is available to respond to individual class members as needs might arise.

Grading

At George Mason University course work is measured in terms of quantity and quality. A credit normally represents one hour per week of lecture or recitation or not fewer than two hours per week of laboratory work throughout a semester. The number of credits is a measure of quantity. The grade is a measure of quality. The university-wide system for grading graduate courses is as follows:

Grade	Grading	Grade Points	Interpretation
A	94-100	4.0	Represents mastery of the subject through effort beyond basic requirements
A-	90-93	3.67	
B+	88-89	3.33	Reflects an understanding of and the ability to apply theories and principles at a basic level
B	80-87	3.0	
C	70-79	2.0	Denotes an unacceptable level of understanding and application of the basic elements of the course
F	< 69	0	

See the University Catalog for details: http://catalog.gmu.edu/policies/academic/grading/

Professional Dispositions

See https://cehd.gmu.edu/students/polices-procedures/

Honor Code & Integrity of Work

Students must adhere to the guidelines of the Mason Honor Code (seehttps://catalog.gmu.edu/policies/honor-code-system/). The principle of academic integrity is taken very seriously, and violations are treated as such.

Violations of the Honor Code include:

1. Copying a paper or part of a paper from another student (current or past);
2. Reusing work that you have already submitted for another class (unless express permission has been granted by your current professor **before** you submit the work);
3. Copying the words of an author from a textbook or any printed source (including the Internet) or closely paraphrasing without providing a citation to credit the author. For examples of what should be cited, please refer to: https://owl.english.purdue.edu/owl/resource/589/02/

Late Work Policy

At the graduate level all work is expected to be of high quality and submitted on the dates due. *Work submitted late will be reduced one letter grade for every day of delay, unless prior arrangements have been explicitly made.* Because we live in uncertain times, if you have any extraordinary circumstances that prevent you from submitting your work in a timely manner, it is your responsibility to contact the instructor as soon as possible after the circumstances occur and make arrangements to complete your work. *It is up to the discretion of the instructor to approve the late/makeup work.*

Course Withdrawal with Dean Approval

Graduate and non-degree students may request a withdrawal from classes after the drop deadline for non-academic reasons. Such requests are only considered under exceptional circumstances. Students must provide verifiable, third-party documentation with the request. For questions about documentation, contact the CEHD Office of Student and Academic Affairs at **cehdsaa@gmu.edu**. *Students should contact an academic advisor* in APTDIE to withdraw after the deadline, and there is no guarantee that such withdrawals will be permitted.

Online Participation/Attendance Policy

Students are expected to participate in **all** online discussions. Not participating in an online discussion module will be reflected with a zero for the week and considered a class absence. Students are expected to attend all of the required synchronous class meetings via Zoom and/or Blackboard Collaborate (see Class Schedule). The instructor will work with students to identify a time that works for students, and students are expected to attend these sessions. Students' Participation and Professionalism grade is related to student participation in online work, including online discussions and synchronous class meetings.

Incomplete (IN)

This grade may be given to students who are in good standing, but who may be unable to complete scheduled course work for a cause beyond reasonable control. The student must then complete all the requirements by the end of the ninth week of the next semester, not including summer term, and the instructor must turn in the final grade by the end of the 9th week. Unless an explicit written extension is filed with the Registrar's Office by the faculty deadline, the grade of IN is changed by the registrar to an F (Mason catalog). Faculty may grant an incomplete with a contract developed by the student with a reasonable time to complete the course at the discretion of the faculty member. The faculty member does not need to allow up to the following semester for the student to complete the course. A copy of the contract will be kept on file in the APTDIE office.

Tentative Class Schedule

Note: Faculty reserves the right to alter the schedule as necessary, with notification to students.

Wk	Weekly topic	Readings/assignments

Week 0	What is this course about?	Complete Getting Started activities posted in Week 0 module
Wk 1 June 1-7	How does your building, district, & community define STEM? Who is STEM for?	**READ:** • Reagan chapter 1: pp 1-9 • Vasquez Ed Leadership (2015) - STEM Beyond the Acronym (posted to Bb) • Mensah - Cult Rel/Cult Res - Science article (posted to Bb)
Wk 2 June 8-14	What does STEM mean to students & educators in the culture of the school? Collaborative Zoom Meeting on June 9	**READ:** • Jolly chapter 3 AND • EITHER Reagan ch 2 OR Jolly ch 2 DUE THIS WEEK: • STEM Equity Journal: Identify topic DUE 6/14
Wk 3 June 15-21	What can a STEM classroom look like?	**READ:** • Reagan ch 3: pp 19-28 • Jolly ch 4 • Maker/Making article in Blackboard
Wk 4 June 22-28	What does a STEM infused lesson/unit look like? Collaborative Zoom Meeting on June 30	**READ:** • Jolly 5-8 (pp 54-92) **DUE THIS WEEK:** • Student-centered Teaching & Learning in STEM: PBL/MEA/Maker Try-it Reflection DUE 6/28
Wk 5 June 29-July 5	What can STEM assessment look like?	**READ:** • Reagan chapter 7: pp 53-62 • Jolly chapter 9: pp 110-127 **DUE THIS WEEK:** • STEM Equity - Literature Review chart DUE 7/5
Wk 6 July 6-12	What qualities can we foster in STEM students?	**READ:** • Reagan ch. 8 & 9 (pp 63-76) • Hoffer text - ch.1 (posted to Bb) **DUE THIS WEEK:** • Integrated STEM Lesson Plan and Video due 7/12
Wk 7 July 13-19	What do we need to do differently to integrate STEM into our curriculum?	**READ:** • Reagan ch. 10 (pp 77-84) • Hunter ch 7 (posted to Bb)
Wk 8 July 20-24 (short week)	What do teachers need to do to sustain STEM integration? Collaborative Zoom Meeting on July 21	**READ:** • Weld chapter 9: pp 147-167 (posted to Bb) **DUE THIS WEEK:** • STEM Equity Online Presentation: Wed 7/21 • STEM Equity reflection due 7/23

Core Values Commitment
The College of Education and Human Development is committed to collaboration, ethical leadership, innovation, research-based practice, and social justice. Students are expected to adhere to these principles: http://cehd.gmu.edu/values/.

GMU Policies and Resources for Students
Policies

- Students must adhere to the guidelines of the Mason Honor Code (see https://catalog.gmu.edu/policies/honor-code-system/).

- Students must follow the university policy for Responsible Use of Computing (see http://universitypolicy.gmu.edu/policies/responsible-use-of-computing/).

- Students are responsible for the content of university communications sent to their Mason email account and are required to activate their account and check it regularly. All communication from the university, college, school, and program will be sent to students **solely** through their Mason email account.

- Students with disabilities who seek accommodations in a course must be registered with George Mason University Disability Services. Approved accommodations will begin at the time the written letter from Disability Services is received by the instructor (see https://ds.gmu.edu/).

- Students must silence all sound emitting devices during synchronous (virtual or face-to-face) class unless otherwise authorized by the instructor.

Campus Resources

- Questions or concerns regarding use of Blackboard should be directed to https://its.gmu.edu/knowledge-base/blackboard-instructional-technology-support-for-students/.

- For information on student support resources on campus, see https://ctfe.gmu.edu/teaching/student-support-resources-on-campus

For additional information on the College of Education and Human Development, please visit our website https://cehd.gmu.edu/students/ .

Participation and Professionalism Rubric

	Evolving	Competent	Accomplished
Overall Participation & Professionalism	Very few tasks are completed on time AND/OR completed tasks do not demonstrate thoughtful consideration of the content. Synchronous class sessions, if scheduled, may not have been attended. Communication with peers and instruction may be disrespectful or inappropriate. Additional weekly work (e.g. Dialectical notebook and/or Digital Interactive Notebook) is incomplete or does not follow directions.	Most tasks for all weeks are completed on time and demonstrate thoughtfulness. Synchronous class sessions, if scheduled, are attended and student is somewhat engaged with peers and instructor. Communication with peers and instruction is usually respectful and appropriate. Additional weekly work (e.g. Dialectical notebook and/or Digital Interactive Notebook) is usually consistently completed as directed.	All tasks for all weeks are completed on time and demonstrate thoughtfulness. Synchronous class sessions, if scheduled, are attended and student is actively engaged with peers and instructor. Communication with peers and instructor is always respectful and appropriate. Additional weekly work (e.g. Dialectical notebook and/or Digital Interactive Notebook) is completed as directed.
Discussion Quality	Small group engagement with peers is inconsistent and rarely active; Readings and weekly content may sometimes be drawn on, but it might not be explicit or consistent; If assigned, weekly dialogue reflections may not demonstrate learners' prior and new knowledge and may not demonstrate engagement in dialogue that goes beyond superficial consideration of ideas and perspectives; Questioning might be absent or not well communicated.	Small group engagement with peers is mostly consistently active and thoughtful; Readings and weekly content are usually integrated to support thoughtful dialogue engagement; Student sometimes critically considers class content and poses questions to push their own thinking and that of their peers. If assigned, weekly dialogue reflections usually demonstrate learners' prior *and* new knowledge and understandings and demonstrate engagement in dialogue that goes beyond superficial consideration of ideas and perspectives; Questions are sometimes posed for further thought and discussion;	Small group engagement with peers is consistently active and thoughtful; Readings and weekly content are integrated to support thoughtful dialogue engagement; Student consistently critically considers class content and poses questions to push their own thinking and that of their peers. If assigned, weekly dialogue reflections demonstrate learners' prior *and* new knowledge and understandings; Weekly dialogue reflections demonstrate engagement in dialogue that goes beyond superficial consideration of ideas and perspectives; As appropriate, questions are posed for further thought and discussion;

EDCI 660

Student-centered Teaching & Learning in STEM: PBL/MEA/Maker Reflection

RUBRIC

	Evolving	Competent	Accomplished
Rationale Why did you select this activity?	Vague description of activity with no connections to course readings/content OR limited opportunities for student-centered STEM thinking *0-1 points*	Description of activity with connections to course readings/content AND substantial opportunities for student-centered STEM thinking *1.1-2 points*	Strong description of activity with explicit connections to course readings/content AND extensive opportunities for student-centered STEM thinking *2.1-3 points*
Implementation from a Learning Perspective What opportunities did you have for creative or innovative STEM thinking? What challenges did you face as you solved the problem?	Activity may not have been implemented OR no evidence of problem solving is provided; vague discussion of STEM opportunities and challenges from the learner perspective *0-1 points*	Activity was implemented AND evidence of problem solving is provided; discussion of STEM opportunities and challenges from the learner perspective *1.1-3 points*	Activity was implemented AND multiple representations of problem solving strategies are provided; detailed discussion of STEM opportunities and challenges from the learner perspective *3-4 points*
Implementation from a Teaching Perspective How would you facilitate this activity with your students?	Instructional ideas are not identified nor explained; it is unclear what this activity would look like in the classroom *0-1 points*	Instructional ideas are identified but may not be explained; ideas are not clearly connected to the description of problem-solving experiences. *1.1-2 points*	Instructional ideas are identified and clearly explained; ideas are tightly connected to the description of problem-solving experiences *2.1-3 points*

Integrated STEM Lesson Plan and Video Rubric

	Evolving	Competent	Accomplished
Lesson Plan: Objectives & STEM Integration	Performance-based objectives may not be stated and/or may not align with content standards. STEM integration is lacking; lesson plan may focus on only one area of STEM. *0-4 points*	Performance-based objectives are stated and are aligned with content standards. Integration of multiple STEM content areas is evident, but is not meaningfully synthesized. *4.1-6 points*	Performance-based objectives are clearly stated; includes alignment to state math and/or science standards (or Common Core/NGSS). Integration of STEM is clearly evident and provides meaningful use of multiple STEM content areas in a synthesized manner. *6.1-8 points*
Lesson Plan: STEM Instruction & Assessment	Instructional methods may not be relevant or may be teacher-centered. Opportunities for student-centered STEM problem solving are not described, and assessment practices may not be clearly connected to the lesson objectives. *0-4 points*	Instructional methods are described, but may not be appropriately used, or not clearly connected to stated student STEM skills. Lesson plan provides adequate opportunities for student-centered STEM problem solving. Assessment practices are evident but do not clearly connect to the lesson objectives. *4.1-6 points*	Relevant STEM instructional methods are clearly described and appropriately used in the lesson, with a focus on student-centered practices to encourage meaningful STEM problem solving. Collaboration is a component of the lesson. Assessment practices are evident and clearly connect to the lesson objectives. *6.1-8 points*
Video	Video does not sufficiently explain or introduce the lesson, and materials or activities may not be evident. STEM integration may be missing from the video. Video may be too long or too short. *0-2 points*	Video is close to the appropriate length (3-7 minutes) and introduces the lesson so that peers and the instructor understand the purpose of the lesson. Objectives may not be stated clearly, or materials may not be presented or explained. STEM integration is evident within the video, but the purpose may not be made clear. Presenter may not be engaging. *2.1 -3 points*	Video is appropriate length (4-6 minutes) and provides peers and the instructor an overview of the lesson, materials, and intended outcomes. Lesson objectives are clearly stated and intended outcomes are stated and/or evident from the lesson activities. How and why the lesson integrates STEM is made clear. Presenter is dynamic and engaging in the video. *3.1-4 points*

Classroom Practices for STEM Equity Poster Presentation Rubric (15 pts)

	Beginning (Limited evidence)	**Developing** (Clear evidence)	**Accomplished** (Clear, convincing and substantial evidence)
Introduction *2 points*	STEM issue is not situated within global or national context. Historical perspective is not provided.	STEM issue is adequately situated within global or national context, an adequate historical perspective on issue is provided.	STEM issue is thoroughly situated within global or national context. Provide a brief but useful historical perspective on the issue.
Problem Statement *2 points*	Problem statement may not include a goal or is not a STEM equity problem.	STEM equity problem is stated with a goal in mind. Literature is used to adequately discuss the problem and goal.	Explicitly states the STEM equity problem with a goal in mind—which may be broad or very specific. Provides reference to literature and/or data that demonstrates why this is a problem and a realistic goal.
Potential Solutions *6 points*	Presents research and policy literature in "book report" fashion without organization around themes or synthesis of ideas.	Adequately discusses research and policy literature related to potential solutions to the STEM equity issue. Some attempt to synthesize literature is made.	Thoroughly discusses research and policy literature related to potential solutions to the STEM equity issue. Literature is synthesized rather than summarized; presentation is organized around the themes and ideas identified from the literature. A minimum of 5 references are included, at least 3 of which were not assigned readings.
Recommendations & Expected Outcomes *3 points*	Recommendations are not relevant or not literature based. Recommendations may not be broken down into different levels of practice. Expected outcomes may be vague or not clearly connected to the problem/goal stated in the problem statement.	Recommendations are clearly made for multiple levels of practice, but may lack clear connection to literature (e.g. no citations). Expected outcomes are stated, but may not be clearly connected to the problem/goal stated in the Problem Statement.	Specific recommendations are made for the student's specific teaching context. Relevant recommendations are provided for different levels of practice (e.g. classroom, school, district), and expected outcomes are clearly stated for each recommendation. Literature is cited for each recommendation. Recommendations and outcomes are relevant for the problem/goal stated in the problem statement.
Style & Mechanics *2 points*	Stylistically lacking or contains many errors. References may	Stylistically well presented but contains some	Poster presentation is stylistically well presented and with few errors. An APA style reference list is

	not be included.	errors. References may not be in APA style.	provided at the end of presentation.

Final Reflection & STEM Advocacy Orientation

Reflection on Course & Feedback *4 points*	Reflection does not address how the course nor feedback throughout the semester influenced the teacher's thinking about creativity and innovation within an equitable STEM classroom	Reflection addresses how the course readings, activities, and/or feedback throughout the semester influenced the teacher's thinking about creativity and innovation within an equitable STEM classroom.	Reflection addresses how course readings, activities, and assignment feedback throughout the semester influenced teacher thinking about creativity and innovation within an equitable STEM classroom. Reflection includes thoughtful responses to peer and instructor feedback from collaborative presentations.
Reflection on Future Classroom Practices & STEM Advocacy Orientation *6 points*	Reflection does not describe the teacher's personal priorities for future classroom action. Literature may not be referenced. Advocacy orientation is unrealistic for stated current and future roles in education.	Reflection identifies personal priorities for future classroom action related to the STEM equity issue. References literature with relevant citations. Discussion of advocacy orientation is not meaningful for stated current and future roles in education.	Reflection clearly identifies specific personal priorities for future classroom action related to the STEM equity issue. Makes clear and thoughtful connections to how literature has influenced their thinking, with relevant citations. Discusses advocacy orientation with realistic and meaningful perspectives on the student's stated current and future roles in education.