

ECED 5354
Early STEM Development and Curriculum
Spring 2024 Syllabus

University of Texas at El Paso
College of Education, Department of Teacher Education

Instructor	Dr. Song An	Email: saan@utep.edu
Class Location	402 Education Building	
Office Phone	915-747-7616	
Office Hours	College of Education (Education Building 808) Monday 12:00 pm– 2:15 pm Thursday 12:00 pm– 2:15 pm (Other time by appointment)	
Class Time	Online Learning throughout the semester	
This syllabus is subject to change as needed. Any changes to the syllabus will be announced in class.		

Course Description: This course focuses on the early STEM (Science, Technology, Engineering and Mathematics) learning of young children and the use of culturally sustaining teaching methods and materials to support STEM development. It covers how environmental interactions, socio-cultural relationships and STEM process skills/ practices form the basis of early problem solving, critical thinking and domain-relevant concept development. Students will synthesize differing views of STEM learning, inquiry-based learning pedagogy and current research to create curricula that supports diverse STEM learners in the Early Childhood classroom.

Course Format Information: This course will be conducted *fully online* [there are no in-person/campus-based class meetings]. This is a fast-paced, intense 7-week course that covers the content typically taught in a 15-week semester. It runs on a Monday to Sunday schedule; course work throughout the week is due at specific days/times, however, you are *not* required to be online at any specific time. The standard recommendation across the board by American universities is to plan for approximately three hours of study time for every one credit hour taken. Therefore, for this course, you can expect each week to spend 3 hours of class time + 9 hours of study and prep time, which equals approximately 12 hours per week devoted to this course. Please read the syllabus and information in the course site *very* carefully, understand what you need to do and when you need to do it, and then plan course study time in your week accordingly. If at any time you do not understand what to do or when to do it, you should contact Dr. Song An immediately (saan@utep.edu).

For Technical Assistance: For technical problems with our online course site or related computer/Internet applications, please contact the UTEP Helpdesk: M - F: 7AM - 8PM, Sat: 9AM - 1PM, Sundays 11-4 pm. On campus phone: 915.747.5257. Off campus: 915.747.4357. If you are on campus, you may also visit the ATLAS lab located within the Undergraduate Learning Center (UGLC building) or the Technology Support Center in Room 300, Library.

Required Reading:

This course does *not* require the purchase of a textbook. All the required readings and video/audio files for the course are provided in Blackboard via our course site, either as an attached PDF which can be downloaded or through a clickable Internet link. You are allowed access to *one* copy of any PDFs within the courses site-- per copyright law, they are not intended for further mass distribution. Readings/video/audio files that are assigned by linking to the Internet are also subject to copyright law, but these links may be shared as they are open to the public.

Our online course site is copyrighted and is the property of UTEP and ECED faculty. Content from the course site, in part or whole, may *not* be shared or distributed without direct written permission. For questions or issues related to this, please contact Lead ECED Faculty, Dr. Alyse C. Hachey at ahachey@utep.edu.

Additional Recommended Resources:

(These are *not* required but you may want to use them to further your knowledge and support the completion of your coursework).

Suggested Texts:

- Bang-Johnson, V. & Lubkowitz, M. (2017). Sharing books, talking science. Portsmouth, NH: Heinemann.
- Charpenter, T.P, et al. (2016). Young children's mathematics: Cognitively guided instruction in early childhood. Portsmouth, NH: Heinemann.
- Charlesworth, C. (2016). Math and science for young children, 8th edition. NY, NY: Carnegie.
- Clements, D.H. & Sarama, J. (2009). Learning and teaching early math: The learning trajectories approach. Ny, NY: Ruutledge.
- Erikson Institute (2013). Big ideas of early mathematics: what teachers of young children need to know. Washington, D.C.: NAEYC.
- Gopnik, A., Meltzoff, A.N. and Kuhl, P.K. (2000). Scientist in the crib: What early learning tells us about the mind. NY, NY:William Morrow and Company, Inc.
- Heroman, C. (2017). Making and tinkering with STEM. Washington, DC: NAEYC.

Suggested Online Texts (available for free download):

- How students learn: History, mathematics & science in the classroom (2005). Available from: <https://www.nap.edu/catalog/10126/how-students-learn-history-mathematics-and-science-in-the-classroom>
- Mathematics learning in early childhood: Pathways towards equity and excellence (2009). Available from: <https://www.nap.edu/catalog/12519/mathematics-learning-in-early-childhood-paths-toward-excellence-and-equity>
- Successful K-12 STEM education (2011). Available from: <https://www.nap.edu/catalog/13158/successful-k-12-stem-education-identifying-effective-approaches-in-science>
- STEM Integration in K-12 Education (2014). Available from: <https://www.nap.edu/catalog/18612/stem-integration-in-k-12-education-status-prospects-and-an>

Suggested Websites

- NAEYC Developmentally Appropriate Practice [DAP]. Available at: <https://www.naeyc.org/resources/topics/dap>
- Next Generation Science Standards [NGSS]. Available at: <https://www.nextgenscience.org>
- Common Sense Media Non-profit. (for Technology) Available at: <https://www.commonsensemedia.org/about-us/our-mission>
- American Society for Engineering Education [ASEE]. Available at: <https://www.asee.org/>
- National Council of Teachers of Mathematics [NCTM]. Available at: <http://www.nctm.org/>
- Texas Early Learning Guidelines (2015). Available at: <https://tea.texas.gov/pkg.aspx>
- Texas Essential Knowledge and Skills [TEKS]. Available by grade level and content focus at: <https://tea.texas.gov/curriculum/teks/>

UTEP Learning Resources:

(UTEP provides a variety of student services and support, including the resources below.)

UTEP Library: You can access to a wide range of resources, including online, full-text access to thousands of journals and eBooks plus reference service and librarian assistance for enrolled students.

The University Writing Center (UWC): Virtually everyone needs help with writing academic English. There's no shame in it. The UWC [Library Building, Rm.227; phone: 915.747.5112] provides online consultations to all UTEP students at no cost. They also have walk-in services, if you are local. It is a terrific resource. If I suggest you attend the Writing Center, it's because I think you will benefit from it. It's not a punishment – it's intended to help you. Check the website for more information: <http://uwc.utep.edu>

Standards of academic integrity: Students are expected to uphold the highest standards of academic integrity. Any form of scholastic dishonesty is an affront to the pursuit of knowledge and jeopardizes the quality of the degree awarded to all graduates of UTEP. Any student who commits an act of scholastic dishonesty is subject to discipline. Scholastic dishonesty includes, but is not limited to: cheating, plagiarism, collusion [making plans to cheat with another], the submission for credit of any work or materials that are not attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts. Proven violations of the detailed regulations, as printed in the Handbook of Operating Procedures (HoOP) and available in the Office of the Dean of Students, may result in sanctions ranging from disciplinary probation, to failing grades on the work in question, to failing grades in the course, to suspension or dismissal among others.

Students with Disabilities statement: If you have or believe you have a disability, you may wish to self-identify. You can do so by providing documentation to the Center for

Accommodations and Support Services (CASS) located in Union E Room 106. Students who have been designated as having a disability must reactivate their standing with CASS 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 CASS. You may call 919-747-5148 for general information about the Americans with Disabilities Act (ADA).

Student Conduct and Discipline: All students are expected and required to obey the law and to comply with Regent, Rules, and Regulations (<http://www.utsystem.edu/bor/rules>) with system and University rules, with directives issued by an administrative official in the course of his or her authorized duties and to observe the standards of conduct appropriate for the university.

Equal Opportunity: All students regardless of gender, age, class, race, religion, physical disability, sexual orientation, etc., shall have equal opportunity without harassment in this course. Any problems with or questions related to this can be discussed confidentially with Dr. Hachey [email ahachey@utep.edu to set up a phone meeting].

Guide to Online Etiquette:

As a member of the learning community of this class, the following is a list of specific expectations (Note that this list is not exhaustive and that it may be added to as needed throughout the semester):

1. *You are expected to actively engage in the learning community of this class.*

This includes completing the coursework tasks as outlined in each week's session, actively contributing to discussions, seeking guidance if you have questions (note that if you have a question, it is likely that everyone will benefit if ask your question) and exhibiting professional courtesy during interactions with classmates/ your instructor. Class participation includes but is not limited to engaging in in-class activities and writing, volunteering inputs in class discussions, answering questions, defending personal viewpoints, and presenting completed assignments to your classmates.

2. *You are expected to exhibit appropriate behavior for a higher learning environment.*

Even though we will not meet face-to-face, logging on to our online course site is the equivalent of walking on to the UTEP campus. Therefore, the rules of conduct that apply on campus also apply in our course site. Our course site is a place to engage in social learning; it is meant to be a safe space for all. Our ideas and beliefs shape who we are and will differ from our peers; sharing these within class allows us to learn different perspectives and points of view, but this can only happen successfully if everyone in our learning community is respectful of individual ideas. You are encouraged to participate in all activities to the fullest extent possible, with an open mind to new experiences. In particular, the following are general guidelines for online interactions:

- All the information discussed between peers and/or with your instructor should be kept confidential, thus providing a safe atmosphere for creative expression, free of judgment.

- You are encouraged to participate to the depth that you feel comfortable sharing with the class (Note: An electronic record will remain, so be thoughtful in how much personal information you share. The general rule is: share only that which you would be comfortable seeing printed in a newspaper/ public Internet page.).
- Do not use inappropriate language, all capital letters, or language short cuts (i.e., texting shorthand). Online entries should reflect academic writing standards, with edited spelling, grammar, and punctuation.
- When reacting to someone else's message, whether in agreement or disagreement, please address the ideas, not the person. (Note: Harassing, flaming and/or inappropriate postings will not be tolerated.)
- Be sure to read everyone's responses before posting. Avoid repetition of what someone else has already said. Add something new to the discussion!
- Please refrain from posting yes/no or I agree/disagree answers (this will not earn you participation points). The point of our online interactions is to create a rich and meaningful sharing of ideas; therefore, posts should: justify positions, provide specific examples, and demonstrate that you have read the required readings and your classmates' comments carefully and thoughtfully.

3. *You are expected to exhibit high level time management skills and turn your work in on time.*

As previously mentioned, this is a fast-paced, intensive course that requires you to devote significant time to complete the required readings, discussions and various additional assignments that are due each week. Although there is no mandatory time that you must be online, the research shows that those with the best success in online courses create a set schedule for coursework and stick to it (whether you do your work at 3am or 10am on whatever day does not matter, what matters is just that you allow a sufficient, set time each week of the semester to focus on coursework). Timely completion of all coursework is essential for this class to run smoothly (i.e., your classmates rely on you to do your readings early in the week and contribute to the discussion on time in order for them to be able to post feedback later in the week). Therefore, late work will not be accepted. All online assignments are due by the due date and time listed in the task directions (see each weekly session in our course site for specific details). Please ensure that you carefully read all instructions for each assignment, particularly the due dates and times, and then schedule the time you devote to this class accordingly.

Missing two weeks of discussion and/or failure to turn in three assignments will result in your automatically failing this course, regardless of any points earned.

Note: Exceptions may be made in the case of *extreme emergency* with supporting documentation. I will not accept any late coursework after one week from the originally scheduled due date during the semester or after the last scheduled coursework due date at the end of the semester. If you anticipate your assignment will be late due to unusual circumstances, please contact me and explain your situation prior to the due date of the assignment. Without prior notice, late assignments will not receive any credit.

If Blackboard is down and you cannot get into our course site to post work by the required due date:

ALL coursework should be posted in our online course site. If you find that you are unable to log into Blackboard to access our course site at the time that you are trying to post your work by the due date, you must email me (through regular e-mail at saan@utep.edu) immediately with an attachment of your work. When you do this, I will know that you have completed the work in a timely manner and it will be accepted, even though it was not posted in our course site as is generally required. I will then check with the Technology staff at UTEP to determine when Blackboard was out. If you email me indicating that you did not post your coursework because Blackboard is down, but you do not send me your work as an attachment in the message, you will not receive credit for your work.

4. *You work is expected to be your own.*

Everything you turn in for this course must be your own work. The purpose of coursework is to know what *you* think, not how clever you are at getting around the rules.... so use your brilliance in a productive way. Any student caught engaging in instances of cheating, plagiarism or any other form of academic misconduct *will* be referred to the Dean of Students Office for disciplinary action. Students may be suspended or expelled from UTEP for such actions. It's serious! Don't do it.

5. *You are expected to contact me for help if needed throughout the semester.*

My office hours for this spring are by appointment. Please email me to set up a day/time for a phone conversation or Zoom meeting.

If at any time, you have difficulty understanding my expectations or the course material or completing course work for any reason—be proactive!!! I am here for you (email, phone, Zoom). I *strongly* encourage you to reach out to me as soon as possible (do not wait until the day before something is due or the end of the semester) and we will work together to make this class a success for you!

Student Learning Outcomes:

General Criteria for Grading Assignments:

Does not meet expectations (Loss of many points)	Meets expectations (Loss of few points)	Exceeds expectations (Loss of no points)
The information provided is not organized and detailed or conclusions drawn from the information is not supported or accurate. The assignment is incomplete/does not include all required sections according to the directions. All written portions include	The information provided is somewhat organized and detailed and conclusions drawn from the information is somewhat supported and accurate. The assignment is mostly complete/ includes most required sections according to the directions.	The information provided is organized and detailed and conclusions drawn from the information are supported and accurate. The assignment is complete/includes all required sections according to the directions. All written portions include no

repeated grammatical and spelling errors; no or improper citations.	All written portions include few or no grammatical and spelling errors; proper citations with few errors.	grammatical and spelling errors; proper citations with no errors.
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Individual grading rubrics are found in the directions for each coursework task, which are located in our online course site.

COURSE SPECIFIC STANDARDS ECE5354 students will be able to:	Measurements (means of assessment for student learning outcomes listed in first column)
Compare and contrast empirical research and related theoretical perspectives of child development as they related to Inquiry-based pedagogy and early learning in the STEM domains	Taking a Deeper Look
Analyze the critical impact of both the physical environment and socio-cultural interactions/relationships on young children’s early STEM conceptual development	Class Participation; Discussions; Taking a Deeper Look
Outline STEM process skills/practices and the impact they have on early problem solving and critical thinking across academic subjects	Discussions; Taking a Deeper Look
Critically examine various instructional techniques and materials aimed at addressing differentiated student needs, strengths and interests in the STEM domains	Class Participation; Discussions; Taking a Deeper Look
Apply Inquiry-based learning experiences to enhance STEM domain competencies in young children	EC STEM Teaching Portfolio
Design developmentally appropriate STEM curricula for culturally and linguistically diverse learners	EC STEM Teaching Portfolio

Evaluation & Coursework Requirements of Students:

Coursework Requirements

Participation	150
Points _____	
Weekly Discussion	300 Points _____
Taking a Deeper Look Reflections	300 Points _____
EC STEM Teaching Portfolio	250
Points _____	

Total	1000 Points _____

How Grades are Determined

Grade	Earned Points
A	900 -1000
B	800- 890
C	700- 790
D	600- 690
F	Below 600



This course runs on a weekly schedule, Monday through Sunday. Detailed instructions for all of the coursework tasks to be completed each week of the semester are arranged by class session (i.e. each class session covers one week of the semester). The class sessions for each week are labeled by week number and start date in the main left-hand navigation in our course site. In each of the weekly class sessions, you will find: the topic(s) and objectives for the week, the required reading (with embedded links to download/access articles), a summary of what tasks are due (and when) that week and detailed directions and related links for completing and posting your coursework that is due for that class session (i.e., during that week).

All weekly tasks must be submitted by the given deadline; course work is on the time and the day indicated in the task directions.

The following is a summary overview of the required coursework for the entire semester and related points possible. For *detailed instructions*, you should access the weekly class sessions in our online course site in Blackboard.

Participation (150 points total)

Since we do not actually meet in person, participation in this course occurs through online postings and interactions in our course site. Your active participation in this course will be measured three ways, by your: (1) one-time self-introduction; (2) multiple feedback to various classmate postings throughout the semester, and (3) one-time feedback to classmates' self-introduction and EC STEM Teaching Portfolios.

One-time Self-Introduction (20 points): At the beginning of the course, you will post a Self-introduction to introduce yourself to all of us (this introduction should be at least **300 words**; detailed instructions for this assignment are found in our courses site, Week #1).

Multiple Feedback to Classmates' postings (100 points total through two types of response tasks, repeated throughout the semester)

For the weeks that required "Feedback to Classmates' Postings" are assigned (see detailed directions outlined in the individual weekly class sessions in our online course site), you will offer:

- Feedback to two classmates' Discussion Postings: (5 points for EACH feedback x 2 responses = 10 points per class session x 5 class sessions= 50 points total)
- Feedback to two classmates' Taking a Deeper Look Reflections: (5 points for EACH feedback x 2 responses = 10 points per class session x 5 class sessions= 50 points total)

To receive full credit, you will need to post all feedback to classmates' (two for Discussion postings and two for Taking a Deeper Look reflections) by 11:45pm MT on Sunday for each class session week they are assigned. Please write at least **50 words** for each feedback posting (regardless of type). Note: you do not have to give feedback to the same student for each type of response (Discussion and Taking a Deeper Look reflection) in any given class session. Please do not provide feedback to the same classmate every week. Instead, you should always try to

respond to a classmate who does not already have feedback and/or who you have not provided feedback before.

One-time feedback to classmates' Self-Introduction/EC STEM Teaching Portfolio (30 points total)

- Feedback to a classmate's Self-introduction: you will respond to one classmate [minimum of **50 words**] by 11:45pm MT on Sunday of the week they are assigned. (10 points)
- Feedback to classmates' EC STEM Portfolio: You will respond to two classmates [minimum of **75 words each**] by 11:45pm MT on Sunday of the week they are due. (10 points for each feedback x 2 responses= 20 points total)

Weekly Discussion (300 Points total)

Each week, there will be assigned readings/videos to watch related to our EC STEM discussion topic, along with four related questions for you to think about and share your thoughts. You should respond to all questions in your discussion posting. The total length of your responses should be at least **500 words** (you will include the total word count at the end; the number of words for each answer does not have to be equal). Your responses to Weekly Discussion Questions are due by **11:45 pm on Thursday** of the weeks they are assigned. It is important to keep your answers/comments relevant to the topic of the discussion that week. (12.5 points x 4 questions = 50 points per discussion x 6 weekly discussions = 300 points total)

Taking a Deeper Look Reflections (300 points total)

Throughout the course, we will be taking a deeper look at specific aspects of EC STEM and related application to teaching practice. Each week, you will have assigned readings and sometimes a hands-on activity to complete related to the deeper look topic. You will then compose a reflection that shares your thoughts and insights related to your deeper look exploration. Taking a Deeper Look Reflections should be at least **400 words** total (you will include the word count at the end). For all Taking a Deeper Look tasks that include hands-on activities, you are additionally required to include pictures of your hands-on work in your reflection posting. Taking a Deeper Look Reflections are due by **12pm (noon) MT on Sunday** of the weeks that they are assigned. [50 points x 6 reflections = 300 points total]

EC STEM Teaching Portfolio (250 Points total)

Your final project is the creation of an EC STEM Teaching portfolio. It is meant to both showcase the knowledge you have gained over the semester and to serve as a future resource. Your portfolio will consist of the five sections:

Section A: Introduction

Section B: Teacher Resources

Section C: Infants STEM

Section D: Toddlers STEM

Section E: 1st-3rd graders STEM

General Calendar

Changes may be made in this syllabus when judged appropriate by the instructor

WEEK	DATES	TOPICS	COURSEWORK DUE
Week 1	January 16 thru January 21	Introduction to, and issues in, EC STEM	Self-introduction -(due @ 11:45pm MT, Thurs) Discussion #1 -(due @ 11:45pm MT, Thurs) Taking a Deeper Look Reflection #1 - (due @ 12pm (noon) MT, SUN) All feedback to classmate postings for week #1 - (due @ 11:45pm MT, Sun)
Week 2	January 22 thru January 28	Grounding EC STEM in Developmental Theory and Practice	Discussion #2 -(due @ 11:45pm MT, Thurs) Taking a Deeper Look Reflection #2 - (due @ 12pm (noon) MT, SUN) All feedback to classmate postings for week #2 - (due @ 11:45pm MT, Sun)
Week 3	January 29 thru February 4	EC Science & EC STEM for Infants/Toddlers	Discussion #3 -(due @ 11:45pm MT, Sun) Taking a Deeper Look Reflection #3 - (due @ 11:45pm MT, Sun) [There is no feedback to classmates due this week.]
Week 4	February 5 thru February 11	EC Technology and EC Engineering & EC STEM for Preschoolers	Discussion #4 -(due @ 11:45pm MT, Thurs) Taking a Deeper Look Reflection #4 - (due @ 12pm (noon) MT, SUN) All feedback to classmate postings for week #4 - (due @ 11:45pm MT, Sun)
Week 5	February 12 thru February 18	EC Mathematics & EC STEM for 1 st -3 rd graders	Discussion #5 -(due @ 11:45pm MT, Thurs) Taking a Deeper Look Reflection #5 - (due @ 12pm (noon) MT, SUN) All feedback to classmate postings for week #5 - (due @ 11:45pm MT, Sun)
Week 6	February 19 thru February 25	Integrated Curriculum and expanding conceptions of EC STEM	Discussion #6 -(due @ 11:45pm MT, Thurs) Taking a Deeper Look Reflection #6 -(due @ 12pm (noon) MT, SUN) All feedback to classmate postings for week #6 - (due @ 11:45pm MT, Sun)
Week 7	February 26 thru March 4	Final Project	EC STEM Teaching Portfolio - (due@ 11:45pm, Fri) All feedback to classmate portfolios (due @ 11:45pm MT, Sun)