STEM Education Certificate of Proficiency
Annual Academic Assessment Report
2024-2025

Secondary STEM Education students have three program options:

1. Complete a Certificate of Proficiency in STEM Education — 9 credit hours
2. Complete a minor in STEM Education — 15 credit hours
3. Earn an Arkansas teaching license in Biology, Chemistry, Mathematics or Physics for grades 7-12 or Computer Science licensure in grades 4-12

Students who earn the Certificate in STEM Education can apply up to 9 hours toward the Minor in STEM Education. With the STEM Ed minor, students can apply up to 15 credit hours to the teacher licensure program for Math, Biology, Chemistry, Physics, or Computer Science if they decide to become teachers.

STEM Education Certificate of Proficiency

2024-25 Program Goals and Objectives

- To attract STEM majors to explore issues in STEM literacy and develop communication strategies from the field of education that will be beneficial to any STEM-related career.
- To increase the pool of potential teachers of STEM subjects to help address the critical shortage of teachers in math, science, and computer science at the secondary level.
- To increase enrollment in the STEM education courses to keep them viable and offered on a regular basis to ensure that the University of Arkansas will be able to continue to prepare math, science, and computer science teachers at the secondary level.

Learning Outcomes

- Students who earn this certificate in STEM Education will improve their ability to communicate STEM concepts from fields such as science, engineering, medical professions, mathematics
- Students who earn this certificate in STEM Education will be able to explain STEM topics in a way that engages a class or other audience, using research-based strategies.
- Students who earn this certificate in STEM Education will have a deeper understanding of how people learn math, science, and computer science.
- Students who earn this certificate in STEM Education will have an opportunity to explore their interests by choosing three elective courses relating to STEM education.

Results of Analysis of Assessment of Student Learning Outcomes

For the first 3 learning outcomes, student learning is primarily evidenced by grades on assignments and in the course. The vast majority of students earn A's in the key classes for the

STEM Ed CP (STEM 20003, STEM 12001, STEM 12102). They have multiple opportunities to create and give presentations on STEM Topics, including some that were taught as lessons in local schools. In these classes, students engage in many STEM-related group and individual activities that model research-based ways for learning science and math in a way that deepens learning conceptually and they engage in discussions about STEM education and STEM literacy issues.

The table near the end of this document addresses the 4th learning outcome, showing that students are taking more than one course in STEM Education and a variety of courses that show there are options for them to explore their interests by course selection.

Process for Assessing each Student Learning Outcome

1. Timeline for assessment and analysis
    - Every May
2. Means of assessment and desired level of student achievement
    a. STEM Ed Certificate: students will complete 9 credit hours (from the approved course list) in order to receive the STEM Education Certificate
    b. Examine students' course grades - Expect a minimum of 80% of students to receive A's in the key intro courses (which has been met, but if a time comes when it is not met, examine which assignments may be problematic or if new assignments would better prepare students to meet the learning outcomes)
3. Reporting of results
    - CIED Head and Dean of COEHP

Modifications and revisions to the current assessment process:

Going forward, we could report student evaluations and instructor survey data on the key gateway course to the STEM Ed program - STEM 20003, with student comments to demonstrate in what ways the course is valuable to students and suggestions for how it could be tweaked to be of more value or relevance to STEM majors.
Our recruitment goal has shifted to focus on getting students into any of the key STEM Ed intro courses, then advising them into certificate, minor, or teacher licensure options from there, and recommending next courses. We developed several iterations of tracking documents for the certificate or minor, and are improving on advising students to continue, but still it remains challenging to keep up with all the data. Students have completed google surveys to collect some of this information but revisions to the surveys are necessary so that data collection is more comprehensive and retrievable.

Results of Analysis of Assessment of Program Goals

The main program goals for the 2024-25 academic year are listed below, with commentary on the meeting of those goals:

1. To attract STEM majors to explore issues in STEM literacy and develop communication strategies from the field of education that will be beneficial to any STEM-related career.

We offered 7 sections of STEM 20003, with an increased enrollment cap of 30, with approximately 200 students enrolled.

We offered 4 sections of STEM 12001, with 75 students enrolled.

We offered 3 sections of STEM 12102 with 37 students enrolled. (this course includes a practicum to teach in a local school)

The new course STEM 34003 STEM Teaching Experience was approved beginning Fall 2024 to increase students options for earning the Certificate or Minor. This course was designed to increase support to students who have been hired by the College of Engineering to teach the summer engineering camps to middle school/junior high students and increase the likelihood that Engineering majors can complete the STEM Education Certificate of Proficiency. It is also having appeal to our teacher licensure students who are interested in more teaching experience. 2 students completed the course Summer 2023, 4 students completed the course for Summer 2024, and 8 students are currently enrolled for the Summer 2025 session.

2. To increase the pool of potential teachers of STEM subjects to help address the critical shortage of teachers in math, science, and computer science at the secondary level.

Thirteen students graduated in 2024-25 having met requirements for teacher licensure (and earning the STEM Ed minor), compared to six STEM Education students in May 2024, and three in May 2023.

3. To increase enrollment in the STEM education courses to keep them viable and offered on a regular basis to ensure that the University of Arkansas will be able to continue to prepare math, science, and computer science teachers at the secondary level.

As of April 24, 2025, we have 65 students declared with the STEM Ed Minor (about 36 of them are pursuing teacher licensure), and 17 students with the STEM Ed Certificate. So it should be clear that the “minor/CP-only students” are helping to keep our courses viable to support the teacher licensure program. We expect 19 students to finish with teacher licensure in 2025-26, and 13 in 2026-27. One or two of our STEM Ed students each year decide to finish their licensure by doing the SEED M.A.T. but they still earn the STEM Ed minor or certificate.

We continue to engage in recruitment methods of emails, Arkansas News announcements, flyers, advising, website improvement, and are in the process of making a promotional video for the website.
In summer, fall, and spring semesters, we meet or are in contact with Fulbright support personnel Suzanne Wyatt and Michelle Pribbernow to coordinate ways to increase enrollment among Fulbright STEM majors. These efforts focus on course enrollment as well as declaring certificate, minor, and teacher licensure. Michelle Pribbernow assisted in getting Fulbright to print and mail a STEM Ed promotional postcard (that we designed) to incoming freshmen prior to New Student Orientation, May 2025.

In December 2024, we submitted an Enrollment Growth Plan to Matt Ganio (copied at the end of this document, with added comments about our progress

Student Progress in the STEM Ed Certificate 2024-25 (See tables below)

We have made headway in keeping more accurate records on tracking students who have declared the STEM Ed CP noting which courses they have taken and at registration time, recommending which courses they could take next. For instance, in the intro courses, students were given a list of the next semester's STEM Ed courses with course description and when the courses are offered.

Note that with the switch from UAconnect to Workday, we have gotten conflicting reports of numbers, but each line of the table below represents a student associated with a name that we have information about. Also, some of the students listed below are enrolled in a fall course but that info is on Workday, not UAconnect, and not sure how to access it at this time.

Below are 15 or the 17 students, listed by major, who are enrolled as of May 20, 2025 (we were unable to get the names of the two students who declared in the past month). Worthy of noting:

- Average Cumulative GPA is 3.56
- For the 7 students who have completed the STEM Ed certificate in this academic year, the average GPA for the courses they completed toward the certificate is 3.6.
- This table specifies the order in which students took the STEM Ed intro courses. The percentages below (rounded to the nearest whole percent) indicate which courses were the first course taken for this list of students.
    - STEM 20003 The Art of STEM Communication: 47% of students began with this course
    - STEM 12001 Introduction to Teaching STEM Subjects 27% of students began with this course
    - STEM 12102 Inquiry Approach to Teaching STEM Subjects 27% of students began with this course
- The table also is a convenient record for us to know which course to recommend next

Major- (Fulbright)	**Cum. GPA**	**Major GPA**	**Classes taken for Certificate (Chronological Order) Semester/Year Course #/Course grade** *Note which STEM Ed intro course students take first and what they continue in (STEM 12001, 12102, 20002). STEM 40303 belongs to CHED and is not an intro course into the program, rather an elective*				**Cert. GPA**	**Grad. Date**
Math, B.S.	3.95	3.9	Sp'24 STEM 12102/A Approved for 20003	F'24 STEM 12001/A Approved for 20003	F'24 STEM 31003/A	Sp'25 STEM 32003/A	4.0	May '26
Biochem B.S Biology	3.69	3.57	Sp'24 STEM 20003/A	Fa'24 STEM 31003/A				May '26
Biology B.S. Chem. B.A.	3.97	4.0	Sp;24 STEM 12102	F'24 STEM 12001	Sp'25 STEM 2003			May '27
Biology B.S.	3.6	3.24	F'23 STEM 12001/A	Sp'24 STEM 20003/A	Sp'25 STEM 12102/A			May '26
Biology B.A.	3.14	3.03	F'22 STEM 20003/A (and 31003/A)	Sp'23 STEM 12001/A, 12102/A, and 32003/A			4.0	**May '25**
Chemistry BA	3.1	2.44	F'24 STEM 20003/A					May '26?
Physics B.S.	3.44	3.46	Sp'23 STEM 12001/A	F'24 STEM 12102/A	Sp/25 STEM 20003/A			Dec '25 or May '26?
Biochem	2.54		Sp/23	Sp'23	F'24			*Didn't return*

			STEM 12001/A	STEM 12102/A	STEM 20003/A			*for 24-25*

Major-Engineering ang COEHP	**Cum. GPA**	**Major GPA**	**Classes taken for Certificate (Chronological Order) Semester/Year Course #/Course grade** *Note which STEM Ed intro course students take first and what they continue into (STEM 12001, 12102, 20003). STEM 40303 belongs to CHED and is not an intro/recruiting course into the program, rather an elective*				**Cert. GPA-**	**Grad. Date**
Chemical Engineer.,B.S	2.43	2.57	F'21 STEM 12001/A	F'21 STEM 12102/A	F'21 STEM 31003	Sp'23 STEM 40303/D	2.44	**Summer '25**
Computer Science B.S.	3.96		F'22 STEM 20003	F'24 STEM 31003/				May '26
Elem.Ed	3.8	3.95	Sp'22 (STEM 40303)/A	F'22 STEM 12102/A	Sp'23 STEM 12001/A	F'23 STEM 20003/A	4.0	**May '25**
Elem.Ed	3.9	3.9	F'22 STEM 20003/A	Sp'24 STEM 12001/A	Sp'24 STEM 12102/A	F'24 STEM 40303/A	4.0	May '26
Elem.Ed	3.9		Sp'25 STEM 12102/A	Sp'25 STEM 40303/A	Summer'25 STEM 34003			May '27?
Elem.Ed	3.66		F'23 (STEM 40303)/A	Sp'24 STEM 20003/A	F'24 STEM 43303/B		3.7	**May '25**
Ed Studies	3.31		Sp'22 STEM 20003/B	Fa'22 STEM 31003/B	Fa'22 43303/B2		3.0	**Summer '25**

We have increased enrollment in the required course for the STEM Ed CP (STEM 20003) and other 'feeder' courses (such as STEM 12001and STEM 12102)

STEM Education Certificate Enrollment Goals - Goals were met for 2024-25			
Academic Year	**# of Students With STEM Ed Certificate declared**	**# of Students Graduating With STEM Ed Certificate**	**Goals Met?**
2024-25	10	4	Yes, goal was met: 17 students declared 5 students graduated
2025-26	10	4	
2026-27	10	4	

Enrollment Growth Plan (submitted to Matt Ganio December 2024)

Rationale for the STEM Education certificate:

- Provides an abbreviated course of study for STEM majors to explore communication strategies used in education. Businesses value a STEM employee who can communicate complex ideas well.

- Provides a worthwhile 'end goal' for students who take a STEM Education intro course but do not want to become teachers, rather than leaving after taking one course

- The 'carrot' of the certificate encourages students to take more courses. The more classes they take, the more they may consider becoming a math, science, or computer science teacher. (Courses in the certificate can be applied to the STEM Education teacher licensure program.)

Below, we provide comments on progress on previously-stated goals:

1) In key classes (STEM 12001, 12102, 20003, 31003 and BIOL 32773/ CHEM/PHYS 32703), show students during class time how to declare the certificate and have them do it in class.

- Fulbright students: Guide them to Program Update Form on Fulbright Advising website (2024-25 Update: Fulbright students are no longer allowed to declare certificate/minor on their own. They must have their Fulbright advisor do it. We have added that information to our messaging and our website.)

- College of Engineering students - students can not enroll directly. Contact Denise Rogers to find out the best way to streamline this (e.g., generate a list of students) Update: Denise Rogers has become familiar with the STEM Ed certificate and contacts Denise Bignar when needed.

- Find out the certificate declaring process for COEHP, and others Update: COEHP advisors have become more familiar with the STEM Ed certificate and minor and there are currently 4 ELED majors and 1 Ed Studies majors in the certificate program

2) Add to STEM.uark.edu website: directions for declaring certificate and applying at graduation. Update: as mentioned above, students can no longer declare themselves, so the website has been changed to guide them to contact advisors

3) Continue to inform college advisors on certificate options and get their support in encouraging students to declare and to continue taking courses toward the certificate. Update: This is ongoing. STEM Ed faculty (Childress, McComas, Ward) met with Fulbright advisor Suzanne Wyatt on May 14, 2025 to go over the program options again, ahead of freshmen orientation advising.

4) Track the course progress of students who have declared the certificate (name, email, phone, I.D. #, major, expected graduation date, courses recommended and taken). Divide up the certificate students among 3 STEM Ed faculty serving as mentors/advisors to support their progress through the program. Email suggestion of 'next course' at registration time. Email reminders to apply for the certificate of proficiency when applying for graduation. Update: We have a shared google folder and documents where STEM Ed faculty can add info about a student as they progress. Starting in April 2025, Michelle Childress will be in charge of monitoring the certificate and minor only students (who are not going on to licensure), although this will continue to be a shared effort as Peggy Ward and Kim McComas see these students in their classes, they will add info to the tracking documents and encourage students to declare and take more courses. Childress will contact students who have met the requirements but have not yet declared the certificate to make sure they declare it in time for graduation.

5) Continue to advertise the STEM Education program options through emails to STEM major listserv, articles in Arkansas News. Improve messaging on website. Update: Ongoing. Emails about STEM Ed program options are sent to STEM majors prior to registration times, and to incoming freshmen prior to fall semester. Ward has worked with Ben Pollack to improve messaging on the STEM.uark.edu website.

6) Ask students what barriers they have encountered in declaring and completing the certificate. Update: generally, they say they don't get around to it. In our surveys to the students, we get more students who say they are interested in the certificate than we have actually declared the certificate. We will work on better follow up with students to take another course and declare.

New Goal - we need to become familiar with student Workday to be able to look up students' course enrollment, degree audit, etc.