



DEPARTMENT OF
HIGHER EDUCATION &
WORKFORCE DEVELOPMENT

New Program Report

Date Submitted:

02/04/2021

Institution

Missouri University of Science & Technology

Site Information

Implementation Date:

4/1/2021 12:00:00 AM

Added Site(s):

Selected Site(s):

Missouri University of Science & Technology, 206 Parker Hall, Rolla, MO, 65409-0470

CIP Information

CIP Code:

130101

CIP Description:

A program that focuses on the general theory and practice of learning and teaching, the basic principles of educational psychology, the art of teaching, the planning and administration of educational activities, school safety and health issues, and the social foundations of education.

CIP Program Title:

Education, General

Institution Program Title:

Education

Degree Level/Type

Degree Level:

Bachelor's Degree

Degree Type:

Bachelor of Science

Options Added:

Elementary

Middle School Language Arts

Middle School Math

Middle School Science

Middle School Social Studies

Collaborative Program:

N

Mode of Delivery

Current Mode of Delivery

Classroom



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Hybrid

Student Preparation

Special Admissions Procedure or Student Qualifications required:

Students must meet general university requirements for admission. To student teach, students must pass the Missouri Content Assessment, complete all education and content coursework with a 3.0 GPA, and hold a 2.75 cumulative GPA. Students are not permitted to take any other courses their student teaching semester, and they may student teach at any Missouri public school that will accept them and has an available cooperating teacher meeting the DESE requirements.

Specific Population Characteristics to be served:

This program is targeted toward S&T students currently in other programs that may otherwise leave the university as well as students in the surrounding region interested in teaching math/science who want to attend close-to-home and teach in South/Central Missouri.

Faculty Characteristics

Special Requirements for Assignment of Teaching for this Degree/Certificate:

The faculty include the chair, three non-tenure track teaching professors, and a shared faculty with University of Missouri Extension. Cross-listed education/psychology courses are taught by a full time psychology NTT professor. Dr. Michelle Schwartze has expertise in middle school and mathematics. A new hire, Dr. Mary Gillis, will be responsible for student teaching seminar, EDUC 1174, and secondary methods. All faculty will supervise student teachers as needed. Adjuncts may have a masters.

Estimate Percentage of Credit Hours that will be assigned to full time faculty:

90-100%. In 2020-21, the department anticipates needing no adjunct professors because of the additional capacity from the new hires, with the possible exception of student teaching supervision in spring 2021.

Expectations for professional activities, special student contact, teaching/learning innovation:

All faculty will supervise student teachers as needed.

Student Enrollment Projections Year One-Five

Year 1	Full Time: 28	Part Time: 0	
Year 2	Full Time: 45	Part Time: 0	
Year 3	Full Time: 81	Part Time: 0	Number of Graduates: 15
Year 4	Full Time: 96	Part Time: 0	
Year 5	Full Time: 105	Part Time: 0	Number of Graduates: 38

Percentage Statement:

100.00

Program Accreditation



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Institutional Plans for Accreditation:

DESE has already approved the elementary and middle school program curricula, and S&T is listed as an approved provider on their website. Every teacher preparation program in the state receives an annual report card that serves as state accreditation approval. S&T does not currently have enough completers to generate a report (Fall 2019), but this will change in subsequent years as our population grows.

Program Structure

Total Credits:

125

Residency Requirements:

Students are required to complete at least 60 hours in residency at Missouri S&T; this is a requirement for all students, not just for this degree.

NOTE: This program involves multiple pathways with differential requirements. Please refer to the additional documentation provided in the curriculum section for information relating to specific courses as this will be more reliable than what can be provided in the portal.

General Education Total Credits:

57

Major Requirements Total Credits:

68

Course(s) Added

COURSE NUMBER	CREDITS	COURSE TITLE
	75	Middle School - Social Studies Track
	63	Middle School - Language Arts Track
	63	Elementary Education Track
	59	Middle School - Science Track

Free Elective Credits:

0

Internship or other Capstone Experience:

Again, please refer to the attached curriculum for more accurate and emphasis-specific information. Student teaching (EDUC 4299) is required of all students seeking teacher certification. Students must earn a grade of B or better to be recommended for certification.

Assurances

I certify that the program is clearly within the institution's CBHE-approved mission. The proposed new program must be consistent with the institutional mission, as well as the principal planning priorities of the public institution, as set forth in the public institution's approved plan or plan update.

I certify that the program will be offered within the proposing institution's main campus, CBHE-approved service region or CBHE-approved off-site location.

I certify that the program will not unnecessarily duplicate an existing program within the geographically applicable area.

I certify that the program will build upon existing programs and faculty expertise.



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I certify that the program can be launched with minimal expense and falls within the institution's current operating budget.

I certify that the institution has conducted research on the feasibility of the proposal and it is likely the program will be successful. Institutions' decision to implement a program shall be based upon demand and/or need for the program in terms of meeting present and future needs of the locale, state, and nation based upon societal needs, and/or student needs.

Contact Information

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CHAFFIN

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Phone: 573-884-3360

teaching standards can be cross-walked to the national standards. These standards are the basis for the first year teacher survey and employer survey issued by DESE annually; results are available to institutions in late summer. The appendix of this document displays S&T's results.

The teacher shortage is not unique to Missouri, and graduates of this program can apply for reciprocal licensure in another state. With the teacher shortage, licensure is usually a matter of taking that state's exam. A survey of alumni in spring revealed graduates in Utah, Texas, Washington, West Virginia, and Georgia, among others.

5.B. Program Design & Content

The B.S. in Education follows the basic structure and requirements for any B.S. degree on the Missouri S&T campus. The courses required for this degree align with the competencies mandated by DESE as well as the framework of the exams needed for certification. Whenever possible, we chose courses that aligned with existing programs in the content areas so that students had options for courses to meet requirements. Any course substitutions must be approved through the Department of Teacher Education and Certification to ensure adherence to DESE requirements. These requirements are publicly available on DESE's website and updated for any curriculum changes.

Students must apply for professional standing in the department when they have 60 credit hours. Professional standing requires a fingerprint background check as part of a substitute teacher application to a school district, an interview with the department chair, and successful completion of the first 12 hours of education coursework including one field experience course.

As with all teacher education programs, the final semester in the program is student teaching. Students must have all course requirements complete and have passed the appropriate Missouri Content Assessment to be eligible for student teaching. Students must have a 2.75 cumulative GPA or the potential to earn this by the end of student teaching. A 3.0 GPA in the content area is also required for student teaching.

The requirements for each emphasis area are listed in the following tables. All of the education emphasis areas, including those in other departments, include the following courses (prerequisites are noted in parentheses):

- EDUC 1040 Perspectives in Education, 2 (education emphasis declared)
- EDUC 1104 School Organization and Administration, 2 (EDUC 1040)
- EDUC 1164 Teacher Field Experience I, 2 (EDUC 1040)
- EDUC 1174 Teacher Field Experience II, 2 (EDUC 1040, 1104)
- EDUC 2102 Educational Psychology, 3 (PSYCH 1101)
- EDUC 3216 Teaching Reading in the Content Area, 3 (EDUC 1040)
- EDUC 4310 Psychology of the Exceptional Child, 3 (PSYCH 1101)

EDUC 4298 Student Teaching Seminar, 1 (Prerequisites: Meet all requirements for student teaching and concurrently be enrolled in student teaching)

EDUC 4299 Student Teaching, 12 (Prerequisites: Professional standing and arrangements made previous semester)

This allows us to streamline the course offerings, which also gives students the flexibility of taking their first 12 hours of coursework before deciding on a specific grade level. These courses are also required for secondary teacher certification.

5.C. Program Structure

The program is designed as a primarily face-to-face delivery model, with a few appropriate courses offered asynchronously online. If necessary, the department can pivot courses to synchronous online; this was done successfully in March 2020 with little differences in course evaluations or grade distributions. These online asynchronous courses include Children's Literature and Assessment for Student Learning. The program uses existing coursework in both education and other content departments, requiring only one new course for middle school programs. Two online asynchronous summer courses will be offered in 2021; funding to pay faculty is based on course enrollment, following the College of Arts, Science, and Business funding model. If students are not enrolled, the courses will be canceled because no funds will be available to pay instructors. These courses have already been developed because they were needed for DESE approval, as such no faculty stipends or additional resources are devoted to this in the budget.

The curriculum is designed with research-informed strategies for student retention. The first course, EDUC 1040 Perspectives in Education, has no prerequisites. Students can enroll in this course their first semester on campus. This and the first field experience course, EDUC 1104, which is taken the following semester, help students determine early if education is the best fit for their major. EDUC 1104 involves students observing in a school environment as well as other educational experiences such as the Applied Language institute on campus, after school activities, camps, robotics events, and other diverse experiences such as the parochial school next to campus. Students must have a cleared background check to enroll in any field experience course.

Each methods course involves a field experience in a local elementary or middle school where students teach a lesson after observing and working with teacher throughout the semester. This allows them to gain experience teaching each subject before entering student teaching. A more sustained field experience course, EDUC 1164, helps students participate in full school days prior to student teaching; ideally this course is taken the semester before student teaching if schedules allow.

The program is designed with the last semester as student teaching, with no additional courses taken at that time to help students be successful. The programs

articulate with area two year community colleges including State Fair, Ozark Technical College, and East Central. These transfer guides are listed on [S&T's website](#). The new degree proposal will require no new negotiated transfer agreements; we only need to change the name of the degree at the top.

5.C.1. Program Structure Form

The advising forms for each emphasis area appear in the following tables. The program course requirements will be re-examined regularly based on assessment data and offerings by content departments. Note that because of S&T's STEM focus and smaller size, content STEM courses are often taken by both majors and nonmajors. Although a nonmajor course may be listed in the catalog for transfer student equivalencies, these courses are not offered on the campus. For the elementary emphasis, students are required to take computer science, three science courses, and two math courses, at a minimum. This content is in addition to two math methods courses, a science methods course, and a unique STEM methods course with embedded Project Lead the Way Training. This means S&T elementary students take at least 10 more credit hours in combined STEM and STEM education coursework than other elementary programs.

The middle school programs were designed to use existing courses in various departments. These courses were chosen based on the assessment framework for the content exam in the appropriate area and consultation with content area faculty. Many of these courses overlap with requirements for the secondary teacher certification. General education courses may be substituted as determined by the department chair, as described in existing S&T policy. Specific curricular overviews are provided on the following pages.

Table 8: Elementary Requirements (121-126 hrs.)

	HRS		HRS
GENERAL EDUCATION:		PROFESSIONAL REQUIREMENTS:	14
COMM SKILLS	9	EDUC 1040*	2
ENG 1120	3	EDUC 1174*	2
ENG 1160	3	PSYCH 2300*/ED 2102*	3
SPEECH 1185	3	PSYCH 3310*	3
		PSYCH 4310*/ED 4310*	3
HUMANITIES	12	EDUC 4298*	1
Literature	3	CLINICAL EXP	16
Art 1180 or Music 1150	3	EDUC 1104*	2
Philosophy 1105	3	EDUC 1164*	2
Humanity Elective	3	EDUC 4299*	12
SOCIAL SCI	18	DEGREE	33
PSYCH 1101	3	EDUC 3530 SS*	3
ECON 1100 or 1200	3	EDUC 3430 C Lit*	3
History 2110	3	EDUC 3220 Sci*	3
Hist 1100 or 1200 or 1300 or 1310	3,3	EDUC 3215*	3
Pol Sci 1200	3	EDUC 3216*	3
MATH/SCIENCE	19-24	EDUC 3217*	3
Biology 1113	3	EDUC 3218*	3
Lab	1,2	EDUC 3203*	3
PHYSICS 1145 or 1505	3	EDUC 3221*	3
Comp Sci 1570, IS&T 1551 or 1971/1981 or 1970/1980 or 1972/1982*	3 or 2, 1	EDUC 3222*	3
		EDUC 3340*	3
Math 1103*	3		
Math 1120 or 1140*	5,3		
Geology 1110 or Chem 1310 & 1319	3 or 4.1		

Table 9: Middle School English Emphasis Requirements (122-125 hrs.)

The middle school language arts emphasis uses existing courses in the English and Technical Communications department. Students will be able to earn not only a B.A. in Education but also minor in Creative Writing and Literature.

	HRS		HRS
GENERAL EDUCATION:		PROFESSIONAL REQUIREMENTS:	35
COMM SKILLS	9	EDUC 1040*	2
ENG 1120*	3	EDUC 1174*	2
ENG 1160*	3	EDUC 3216*	3
SPEECH 1185	3	English 3170*	3
HUMANITIES	12	EDUC 3280*	6
ART 1180, MUSIC 1150, THEATER 1190	3	EDUC 4298*	1
ENG-LITERATURE	3	PSYCH 2300*/EDUC 2102*	3
Philosophy 1105 or 1115	3	PSYCH 3310*	3
Humanity Elective	3	PSYCH 4310*/EDUC 4310*	3
SOCIAL SCI	12	EDUC 3335*	3
HIST 1100 or 1200 or 1300 or 1310	3	EDUC 3215	3
POL SCI 1200	3	EDUC 3340*	3
PSYCH 1101	3	CLINICAL EXP:	16
ECON 1100 OR 1200	3	EDUC 1104*	2
Math & Science	14-17	EDUC 1164*	2
		EDUC 4299*	12
	3 or 5	English (Literature Minor)	12
Math 1103 or 1120 or 1140		Literature Elective*	3
BIOLOGY 1113 & 1219	3,2	Literature Elective (2000 or 3000 level)*	3
Geo 1110 or 1120 or Physics 1505 or 1605 or Chem 1310	3 or 4	Literature Elective (2000 or 3000 level)*	3
		Literature Elective (2000 or 3000 level)*	3
IS&T 1551 or Comp Sci 1500 or 1570 or 1971/1981 or 1970/1980 or 1972/1982	3	English (Creative Writing Minor)	12
		English 1170*	3
		English 2171 or 2172*	3
	3,3		
Eng 3301 or 3302 or 3303*			

Table 10: Middle School Science Course Requirements (121-123 hrs.)

The middle school science emphasis uses courses from a variety of STEM disciplines and includes at least six hours of math and statistics. For middle school general science emphasis, DESE would not accept a computer science course as a science content course. This may be a revision pursued at a later date. The education STEM methods course, which emphasizes integrated rather than isolated content skills and includes PLTW certification, is also required, in addition to two science methods courses, EDUC 3280 (6 credit hours) and EDUC 3220 (3 credit hours). This is above and beyond the three-hour science methods course required by DESE.

	HRS		HRS
GENERAL EDUCATION:		PROFESSIONAL REQUIREMENTS:	35
COMM SKILLS	9	EDUC 1040*	2
ENG 1120	3	EDUC 1174*	2
ENG 1160	3	EDUC 3216*	3
SPEECH 1185	3	English 3170*	3
HUMANITIES	12	EDUC 3280*	6
ART 1180, MUSIC 1150, THEATER 1190	3	EDUC 4298*	1
		PSYCH 2300*/EDUC 2102*	3
ENG-LITERATURE	3	PSYCH 3310*	3
Philosophy 1105 or 1115	3	PSYCH 4310*/EDUC 4310*	3
Humanity Elective	3	EDUC 3335*	3
SOCIAL SCI	12	EDUC 3203	3
HIST 1100 or 1200 or 1300 or 1310	3	EDUC 3340*	3
POL SCI 1200	3	CLINICAL EXP:	16
PSYCH 1101	3	EDUC 1104*	2
ECON 1100 OR 1200	3	EDUC 1164*	2
Science	31	EDUC 4299*	12
BIOLOGY 1113 or 1213*	3	Math	6 or 8
Biology 1219*	2	Math 1103, 1120 or 1140	3,5
Biology 1173*	3	Stats 1115, 3113 or 3115	3
Geology 1110	3		
Geology 1120	3		
Physics 1505 or 1145*	3		
History 3530*	3		
Chemistry 1310*	4		
Chemistry 1319*	1		
EDUC 3203	3		
EDUC 3220	3		

Table 11: Middle School Social Studies Emphasis Course Requirements (122-125 hrs.)

For the middle school social studies emphasis, students will earn not only the B.S. in Education but also a minor in psychology and a minor in history. The listed content courses are in addition to the economics and political science general education requirements of the degree.

	HRS		HRS
GENERAL EDUCATION:		PROFESSIONAL REQUIREMENTS:	35
COMM SKILLS	9	EDUC 1040*	2
ENG 1120	3	EDUC 1174*	2
ENG 1160	3	EDUC 3216*	3
SPEECH 1185	3	English 3170*	3
HUMANITIES	12	EDUC 3280*	6
ART 1180, MUSIC 1150, THEATER 1190	3	EDUC 4298*	1
		PSYCH 2300*/EDUC 2102*	3
ENG-LITERATURE	3	PSYCH 3310*	3
Philosophy 1105 or 1115	3	PSYCH 4310*/EDUC 4310*	3
Humanity Elective	3	EDUC 3335*	3
SOCIAL SCI	12	EDUC 3530	3
History 2110*	3	EDUC 3340*	3
POL SCI 1200*	3	CLINICAL EXP:	16
PSYCH 1101	3	EDUC 1104*	2
ECON 1100 OR 1200*	3	EDUC 1164*	2
Science	14-17	EDUC 4299*	12
BIOLOGY 1113 & 1219	3,2	History Minor/Psych Minor	24
Geo 1110 or 1120 or Physics 1505 or 1145 or Chem 1310	3 or 4	History 1100 or 1200*	3
		History 1300 or 1310*	3
Math 1103, 1120 or 1140	3 or 5	American Hist Elective*	3
IS&T 1551 or Comp Sci 1500 or 1570 or 1971/1981 or 1970/1980 or 1972/1982*	3 or 2,1	World Hist Elective*	3
		World Hist Elective*	3
		EDUC 3530	3
		History Elective	3
		Psych 4600	3

Table 12: Middle School Math Emphasis Course Requirements (120-125 hrs.)

For middle school mathematics emphasis, computer science is included as a content course, in part because Missouri includes this subject as a math course in graduation requirements. The highest math taught in middle school is algebra, but students in S&T's program take courses including Calculus II. Both the Calculus for Engineers and the Calculus with Analytic Geometry courses are included to provide options for students wanting to switch into teaching from engineering. Providing these options will aid in student retention and time-to-graduation so they do not have to retake another calculus course to teach in middle school.

	HRS		HRS
GENERAL EDUCATION:		PROFESSIONAL REQUIREMENTS:	35
COMM SKILLS	9	EDUC 1040*	2
ENG 1120	3	EDUC 1174*	2
ENG 1160	3	EDUC 3216*	3
SPEECH 1185	3	English 3170*	3
HUMANITIES	12	EDUC 3280*	6
ART 1180, MUSIC 1150, THEATER 1190	3	EDUC 4298*	1
		PSYCH 2300*/EDUC 2102*	3
ENG-LITERATURE	3	PSYCH 3310*	3
Philosophy 1105 or 1115	3	PSYCH 4310*/EDUC 4310*	3
Humanity Elective	3	EDUC 3335*	3
SOCIAL SCI	12	EDUC 3203	3
HIST 1100 or 1200 or 1300 or 1310	3	EDUC 3340*	3
POL SCI 1200	3	CLINICAL EXP:	16
PSYCH 1101	3	EDUC 1104*	2
ECON 1100 OR 1200	3	EDUC 1164*	2
Science	11 or 12	EDUC 4299*	12
BIOLOGY 1113 & 1219	3,2	Math Emphasis	25-29
Geo 1110 or 1120	3	EDUC 3222/Math 3922*	3
Physics 1505 or 1145 or Chem 1310	3,4	Math 1103*	3
		Math 1120 or 1140*	3 or 5
		Math 1160*	2
		Math 1208 or Math 1214*	4 or 5
		Math 1215 or Math 1221 or Math 1212*	4 or 5
		IS&T 1551 or Comp Sci 1500 or 1570 or 1971/1981 or 1970/1980 or 1972/1982*	3 or 2,1
		Stats 1115, 3113 or 3115*	3

Residency Requirements, if any: students are required to complete at least 60 hours in residency at Missouri S&T; this is a requirement for all students, not just for this degree.

Requirements for thesis, internship, or other capstone experience

Student teaching (EDUC 4299) is required of all students seeking teacher certification. Students must earn a grade of B or better to be recommended for certification.

Any unique features such as interdepartmental cooperation:

Multiple courses are taught in other departments such as Psychological Sciences and English.

5.D. Program Goals and Assessment

This degree proposal is for middle school and elementary certification programs. While Missouri S&T has healthy enrollments in many secondary teaching STEM areas, those students are not included in these goal projections because they will not have a degree in education. Annually, DESE sends placement data with the courses taught by each S&T alumnus; out of state and private school teachers are more difficult to track beyond self-reported employment.

The B.S. in Education program goals are as follows:

- 80% of students who take the first three education courses as a declared B.S. in Education (EDUC 1040, 1174, and 1104) complete the degree.
- 80% of students will pass the Missouri Content Assessment on the first attempt.
- 95% of graduates are employed in schools or attending graduate school one year after completion.
- 50% of graduates are employed as Missouri public school STEM teachers (middle school science or math).
- 25% of graduates with teaching jobs in Missouri public schools are teaching Project Lead the Way courses.

The program outcomes align with the Missouri Teaching Standards. These are the standards by which practicing teachers in the state are assessed by their principals.

Missouri S&T education program graduates will . . .

1. create learning experiences that make the central concepts, structures, and tools of inquiry of the discipline(s) of subject matter, particularly STEM, meaningful and engaging for all students.
2. provide learning opportunities that are adapted to diverse learners and support the intellectual, social, and personal development of all students.

Executive Summary

B.S. in Education

The teacher shortage in our state was critical even before the COVID-19 pandemic; research indicates teacher quality is an essential variable in student success and preparation for college. As an institution with a heavy STEM emphasis, an education program at Missouri S&T provides needed teachers to schools in the state. Evidence of employer demand can be found in the Missouri Department of Elementary and Secondary Education 2020 Teacher Shortage Report. The certification areas with the worse shortages include elementary (#2 on the list), middle school science (#7), middle school math (#8), and middle school language arts (#9), and middle school social studies (#16), all of which are emphasis areas in this proposal.

Teachers have been graduating from Missouri S&T since 2009; about 90 students are currently taking education courses or pursuing teacher certification at the university. This program has been successful for over ten years without a degree and even a department; we hope this degree will expand the program to produce more teachers for the south-central region of Missouri. A named degree program will help with recruitment externally and retention of internal students who do not match with another STEM field such as engineering.

A Bachelor of Science in Education is needed for recruitment of new students. A named degree will formalize the curriculum and allow the new Department of Teacher Education and Certification to manage the degree. Currently, students pursuing elementary or middle school certifications are in the Bachelor of Arts in Multidisciplinary Studies program; current students have concern that this generic degree makes them less marketable than others with an education degree. The proposed curriculum for this degree is streamlined, 121 credit hours in most cases, and designed to easily articulate with nearby community colleges. The Missouri Department of Elementary and Secondary Education has already approved the list of courses for the emphasis areas.

Education coursework has been offered at the institution for many years, even before students could complete on the S&T campus. The department offers at least ten courses every semester with enrollment ranging from 9 (for student teaching) to 28. This program has been viable even before establishing a named degree; a degree can only help with recruitment of new students. Recruitment of teacher education students will be focused on the south-central region of the state, where the need for teachers is great. The department has already had a sizable donation to the newly established Rural Teacher Scholarship Fund and hopes to create more partnerships with local school districts. Missouri S&T has invested in the department with the hiring of a chair in 2019 and two teaching professors for Fall 2020, as well as a shared hire with University of Missouri Extension. These new hires necessitated expanded office space, indicating the university's investment in the department and program.

No. 4

Recommended Action – B.S. in Education – Missouri S&T

It was recommended by Sr. Associate Vice President Steve Graham, endorsed by President of the University of Missouri Mun Choi, recommended by the Academic, Student Affairs and Research & Economic Development Committee, moved by Curator _____, seconded by Curator _____ that the following action be approved:

that the Missouri University of Science & Technology be authorized to submit the attached proposal for a Bachelor of Science in Education to the Coordinating Board for Higher Education for approval.

Roll call vote of the Committee:	YES	NO
Curator Wenneker		
Curator Hoberock		
Curator Layman		
Curator Snowden		
The motion _____.		

Roll call vote of Board:	YES	NO
Curator Brncic		
Curator Chatman		
Curator Graham		
Curator Hoberock		
Curator Layman		
Curator Snowden		
Curator Steelman		
Curator Wenneker		
Curator Williams		

The motion _____.

New Degree Program Proposal:
**Bachelor of Science in
Education**

Missouri University of Science & Technology

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(Some appendices are excluded from these materials for length and clarity and are available upon request.)

Executive Summary B.S. in Education

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Education coursework has been offered at the institution for many years, even before students could complete on the S&T campus. The department offers at least ten courses every semester with enrollment ranging from 9 (for student teaching) to 28. This program has been viable even before establishing a named degree; a degree can only help with recruitment of new students. Recruitment of teacher education students will be focused on the south-central region of the state, where the need for teachers is great. The department has already had a sizable donation to the newly established Rural Teacher Scholarship Fund and hopes to create more partnerships with local school districts. Missouri S&T has invested in the department with the hiring of a chair in 2019 and two teaching professors for Fall 2020, as well as a shared hire with University of Missouri Extension. These new hires necessitated expanded office space, indicating the university's investment in the department and program.

1. Introduction

For decades, students at Missouri S&T have enrolled in education courses to become certified secondary teachers. These graduates typically obtained jobs in rural school districts outside of Rolla and along the I-44 corridor to St. Louis. In 2013, the institution began offering elementary certification as a pathway in the Bachelor of Arts in Multidisciplinary Studies. This program required more STEM coursework, including computer science, than most other elementary programs in the state. In addition, the STEM emphasis of the campus means that the lower level science courses are taken by both majors and nonmajors. For example, there is only one General Chemistry (CHEM 13010) course offered at the 100 level, so students majoring in chemical engineering and chemistry take the same course as students majoring in English or history. This gives Missouri S&T teachers a strong STEM background, even if they are teaching elementary school. S&T's unique elementary education program also includes a Teaching STEM methods course with embedded Project Lead the Way Launch (PLTW) training, one of only two Missouri institutions to use this model. Multiple S&T alumni are currently teaching PLTW courses in elementary and high schools after their successful training at S&T. Since the original DESE approval of the program seven years ago, enrollment in the elementary pathway has grown to 42 students. For Spring 2021, nine students will graduate with elementary teacher certification.

Some of these students began as engineering majors and switched to teacher certification, allowing them to be retained at S&T and in the University of Missouri system. These students usually want to return to their hometown, which is a nationwide trend. These students want to be close to home on a small campus, and S&T fills that need. Without a teacher education program on campus, these students may have transferred or never attempted a career in education. The Missouri State Board of Education regularly hears reports on teacher recruitment and retention data, including surveys of students, parents, and teachers. A January 2020 survey indicated that 58% of students said that teaching was not presented as a career option. The outreach programs already conducted by the Department of Teacher Education and Certification help contribute to awareness of teaching as a profession in the rural schools of south-central Missouri.

Official statistics on teacher shortages actually understate the teacher shortage. In Missouri, teachers who receive their certification may teach in subject areas for which they have taken little-to-no coursework by simply passing an exam. While these "out-of-field" teachers help address the problem, it also means they are less qualified to provide the kind of high-quality, rigorous education desirable for student learning. At Missouri S&T, our teachers often graduate and work in rural areas where they need to teach multiple subjects. The rigorous STEM coursework makes them more prepared. While some reports indicate that teacher shortages may be cyclical, COVID-19 has the potential to decimate the teacher workforce. An annual survey by *EdWeek* indicated that one third of teachers were considering leaving their jobs in 2020, compared with a typical response of eight percent. Despite the circumstances, the

student teachers at Missouri S&T have been thriving in the current uncertain environment.

In 2018, S&T created a new Department of Teacher Education and Certification as a commitment of resources to fill the need for teachers in the region. The number of students seeking elementary certification with almost no advertising or recruitment demonstrates the demand that this program will meet. A named education degree program will help recruitment of new undergraduate students; currently, there is a lack of awareness that S&T even offers teacher certification. Despite this, about 90 students are pursuing teacher certification. For secondary teachers, the degree in the content area helps them be more competitive. However, current students with a Multidisciplinary Studies degree have concerns about the lack of a named degree and their ability to compete with students earning an education degree from another institution.

The Bachelor of Science in Education simply names what the institution is already offering. This allows the Department to make curricular decisions based on data and stakeholder feedback. The proposed degree formalizes the curriculum that is already approved with the Missouri Department of Elementary and Secondary Education. Offering these degrees would incur no additional cost and would streamline existing processes such as exempting requirements for the BA in Multidisciplinary Studies. The degrees can be completed in four years and articulate with surrounding two year colleges. The courses in this degree draw from existing classes offered on a regular rotation at S&T. The middle school emphasis areas draw upon not only education courses but also classes in other departments in CASB (College of Arts, Science, and Business) at S&T. A B.S. in Education will provide more visibility for the department's offerings and be more aligned with the degree other universities offer for teacher certification.

Even without the degree, the teacher education program at S&T is strong; 89% of principals reported that graduates' preparation was good or very good, according to the DESE First Year Teacher Survey. Graduates are highly sought after by principals in the area; their only request is that S&T send them more. Students have a high pass rate for the required, Missouri Content exam (MoCA); for example, in July 2020, when test centers reopened after Covid, 10 students took the MoCA and 9 passed on their first attempt.

Last year, 68 applicants were admitted for teacher education, an increase of 54.55% over the previous year, even with the pandemic. The two most popular programs were mathematics and elementary education, the BA in Multidisciplinary Studies currently in use. As of November 30, 2020, 47 students had already applied for Fall 2021, and 32 applicants have already been admitted, with elementary education using the BA in Multidisciplinary Studies being the most popular. These numbers demonstrate the interest in the program. Students who attend campus visits report applying to Missouri State, Southeast Missouri State, or Lindenwood in addition to S&T.

While the program does help retain students at the institution, education also attracts new applicants; for degrees with secondary education programs like applied mathematics, biology, and others, the teacher certification attracts students to campus. A new Global Engineering program, will populate the B.A. in Multidisciplinary Studies, so numbers in this degree should not suffer with the addition of the B.S. in Education.

The contact person for this proposal is Dr. Beth Kania-Gosche. Dr. Kania-Gosche is chair and professor of the department of teacher education and certification. She began in July 2019 and came to S&T with five years of experience as an associate dean at a large School of Education at a private institution. She is familiar with Missouri certification regulations and has already facilitated the approval of the middle school certification offerings by DESE. She has been a site visitor for both national accrediting agencies in education (CAEP and AAQEP), has worked on numerous DESE committees, and is current president of the Missouri Association of Colleges for Teacher Education.

Expenses for this position and two teaching professors were already budgeted when the new department was created. Very few new resources are needed to launch this degree program; the department has sufficient staffing and office space because courses are already running with healthy enrollments.

2. Fit with University Mission and Other Academic Programs

2.A. Alignment with Mission and Goals

The B.S. in Education degree program fits within the university mission and strategic plan. The mission statement specifically references serving our state, and Missouri, like almost all states, is in the midst of a teacher shortage crisis in rural areas. An investment in teacher education is an investment in the institution. Graduates of the program work in area schools to prepare students to then attend the university. High quality STEM high school and middle school teachers inspire students to pursue those career paths and attend S&T or other higher education institutions.

The S&T strategic plan recognizes this in the compact titled "Excellence in Engagement and Outreach." The first objective is "inspire students to pursue careers in STEM disciplines," and the first strategy specifies "inspire Missouri S&T students to become certified K-12 teachers particularly in underserved areas and in STEM disciplines." The metric for this strategy is to grow enrollment, and the addition of the middle school programs and the named degree are designed to do just that.

In addition, this proposed degree fits with the strategic plan in other ways. For example, Strategy E in the Compact for Student Success is about shortening time-to-degree. The middle school programs offer another option for students pursuing secondary certification, which requires an entire degree in their content area while still maintaining a 3.0. The middle school programs require fewer content courses

because those graduates will teach at a lower grade level. This provides an option for completion for secondary students struggling to meet the 3.0 content GPA requirement for teacher certification. Previously, these students would be ineligible for student teaching if their content GPA fell below the benchmark or if they were unable to successfully complete a complex upper level course. These students could be effective teachers but may not be suited for the curriculum designed to propel undergraduates to graduate school. The middle school program is also a good option for transfer students who want to become teachers but still graduate in four years.

Collaboration with community colleges helps recruit students who used A+ money and helps keep the cost of a degree affordable, another element of the strategic plan. This degree program aligns with Strategy C in the Inclusive Excellence compact: "Encourage the development of new and existing curricular and co-curricular programs that promote academic and personal growth of traditionally underserved students." Community colleges are a source of more diverse student populations, and those students with an associate degree have already demonstrated their abilities. The department chair has already successfully consulted with colleagues at East Central, State Fair, Metro, and Jefferson, and communication is ongoing with other potential community college partners.

2.B. Duplication and Collaboration Within Campus and Across System

Missouri S&T's student population is ideal for attracting high quality STEM teachers. All other UM system institutions offer an education degree of some type; however, Rolla is near many rural school districts struggling to find teachers. The department chair has already communicated with administrators and faculty in Columbia and St. Louis about sharing online courses for students who need courses off the scheduled rotation. S&T will also offer a small number of asynchronous online courses beginning Spring 2020 which would be available for course sharing to other system students. In spring 2021, the department will pilot offer elementary reading methods courses as two, deliberately paired eight-week courses instead of two full semester courses. The department will also offer online asynchronous summer courses for the first time in Summer 2021.

A challenge for any course sharing in the UM System for education is that each institution has its own approved curriculum with DESE. Although the culminating credential is the same, each institution submitted a separate list of courses to the state for approval. While some courses are similar, others vary dramatically, making course sharing difficult. These course lists are available in a searchable directory on DESE's website: <https://dese.mo.gov/educator-quality/educator-preparation/programs>. In addition, each university has different content courses across many departments, i.e. psychology; this makes sharing programs almost impossible without all parties rewriting curriculum to align.

In addition, field experiences, including student teaching, typically require faculty to observe students teaching in the classroom. Faculty housed at Rolla can travel to area

school districts with less mileage and time. While urban and suburban districts have the broadband to support virtual observations if needed, most rural school districts do not, requiring in person visits or recordings. In addition, these faculty make connections with the local schools when visiting, and the Department of Teacher Education and Certification is very active with many community outreach programs. With many schools moving to virtual or hybrid schedules, supervisors have to creatively work with student teachers given the current circumstances.

Articulation agreements for elementary certification already exist with some surrounding two-year colleges such as East Central and State Fair. S&T graduates are already working as elementary teachers in Missouri public schools along the I-44 corridor. Most students return to teach near their hometown (McCardle, 2019), and most students seeking teacher certification at S&T are from regional rural school districts; therefore, there is no overlap with other UM system campuses or other public colleges and universities. They like the small campus and would not be comfortable transferring to an urban campus like UMKC or UMSL or the large campus in Columbia. These students may not have pursued teaching at all if it was not offered at S&T. Offering teacher education at S&T is a commitment to the quality of the education and workforce of the south-central region of the state, where the need is great.

No existing programs will be deleted or placed on inactive status. The Bachelor of Arts in Multidisciplinary Studies will remain, and future plans include using that degree to develop a global engineering program. Some of the courses in this program are used by biology, chemistry, applied mathematics, physics, history, business, economics, and psychology for teacher certification.

3. Business-Related Criteria and Justification

3.A. Market Analysis

3.A.1. Need for Program

Elementary education is the highest teacher shortage certification area with 386 jobs across the state left vacant or filled by an unqualified applicant, according to DESE's 2019 report, and rural school districts are having the most difficulty. According to the *Talent for Tomorrow* report issued by the Missouri, the demand for central region elementary teachers will be 2,159 jobs in the next five years. Last year, 1,717 elementary candidates graduated in the entire state, with many of these graduates concentrated in St. Louis and Kansas City. These data were reported prior to COVID-19; the pandemic will only exacerbate the teacher shortage.

The middle school emphasis areas are new to S&T, although no new courses are needed. The shortages in these areas are listed in the table below, all are from DESE's 2018-19 report and the federal Title II data on completion from 2017-18. As the number of graduates from teacher education programs falls nationally, recruitment of qualified candidates, particularly in STEM fields, becomes more pressing.

Table 3.A.1.1 indicates the annual shortage of teachers in 2018-19 compared to the statewide enrollment in programs. Note that this is enrollment over an entire program, not completers. This indicates the need for middle school teachers across the state; in a single year there are more vacant positions than enrolled students in STEM fields.

Table 1: Missouri Teacher Shortage Data

Certification	Annual Statewide Shortage (FTE)	Statewide Enrollment*
Middle School Science	132	117 (24 from ABCTE, 14 from DESE Temporary Authorization)
Middle School Math	127	140 (36 from ABCTE)
Middle School Language Arts	110	151 (44 from ABCTE)
Middle School Social Studies	84	119 (37 from ABCTE)

*As reported on Missouri Title II data from approved educator preparation programs

**ABCTE is a legislated alternative certification program in which students pass a test and take online modules. No student teaching or coursework is required.

DESE's Equity Plan Data Chart reports on the differences in schools in varying categories, including rural, high minority, and high poverty. Rural schools had the highest percent of less than qualified teachers at 16.7% and the highest percent of educators teaching "out of field" at 14.9%. Thus, the teacher shortages in Missouri often vary by the type of school, and Missouri S&T's small size is attractive to rural high school students.

The American Physical Sciences Society for Physics (Marder, Brown, & Plisch, 2019) reported that half of STEM majors considered teaching, and that those students tended to underestimate teacher salaries. In a student population where more than 80% of degrees conferred are in the STEM fields, S&T could significantly contribute to eliminating the statewide STEM teacher shortage with focused recruitment and partnerships with rural high schools. The Rural Teacher Scholarship, established in summer 2020, will begin to attract students with this focus, and the department hopes to partner with S&T content areas for submissions of grants such as the NSF Noyce Teacher Scholarship program.

3.A.2. Student Demand for Program

Students in the existing pathways of elementary and secondary have often requested a middle school option for certification. This option is more flexible in regard to the DESE requirements for content courses. This also meets the need of students who love a specific content area but also want to teach younger students than high school. Only one course is exclusive to the middle school emphasis area; all other education and content courses are used by multiple degree programs. This efficiency allows the middle school emphasis areas to be academically and financially viable even with low enrollment in individual emphasis areas.

S&T's program allows students to return home for their student teaching semester. This allows them to save money and possibly teach in a school with a job opening the next year. The statewide student teaching evaluation instrument allows us to hire a university supervisor in the area if needed. The flexible choice for student teaching placement is appealing to current students.

The access to higher education that S&T provides to the south central region is essential. The Missouri Department of Higher Education noted in their review of academic programs in 2011 that they "identified high priority but low-producing programs in foreign languages, teacher education and STEM fields that should be strengthened for the state to fulfill projected work force needs, grow economically and compete globally" (p. 16). This degree proposal is following that recommendation.

Enrollment Projections Table

The degree uses existing courses, so students could switch degrees immediately once the degree is approved.

Table 2: Student Enrollment Projections (anticipated total number of students enrolled in program during the fall semester of a given year).

	2021	2022	2023	2024	2025	2026	2027
Full-time	28	48	81	96	105	112	112

We do not anticipate any part-time students seeking an undergraduate degree; this status is rare in our current student population. However, secondary students do take education coursework although they are not a part of the proposed degree. We are also in the process of submitting an undergraduate certificate program in Teaching and Learning. These additional programs will supplement the course enrollment in EDUC classes, although they do not count as completers because they earn a content degree.

Table 3: New Student Enrollment Projections (anticipated number of students enrolled in the program during the fall semester of a given year that are new to campus).

	2021	2022	2023	2024	2025	2026	2027
Full-time	8	23	41	63	79	89	89

Tables 2-3 provide enrollment projections across all of the degree program's emphasis areas. Table 4, below, provides estimated degree conferrals across the different emphasis areas included in the degree program.

Table 4: Projected Number of Degrees Awarded

	2021	2022	2023	2024	2025	2026	2027	2028	2029
Middle School Science	0	0	0	0	2	4	6	9	10
Middle School Math	0	0	0	0	2	5	6	10	11
Middle School Language Arts	0	0	0	0	0	1	2	4	5
Middle School Social Studies	0	0	0	0	0	2	5	7	9
Elementary	3	5	7	9	10	12	12	15	18
Total Degree	3	5	7	9	14	24	31	45	53

This degree program is designed to be transfer-friendly, so it is anticipated accepted elementary students may not take four years to complete because they have completed hours at a community college.

3.B. Financial Projections

3.B.1. Additional Resources Needed

Very few new resources are needed to offer this degree. The courses will continue to be on the schedule, and students are already in the pipeline to become teachers. The department already had resources including a set of Chromebooks, iPads, Vex robots, and other educational materials. The department recently obtained more office space in Centennial Hall 215 for Fall 2020.

Financially, the B.S. degree in Education will bring in net income to the University because there are no new expenditures, and every enrolled student would pay tuition and fees. The Department and staff have already been established and would be in existence if the degree was not proposed. The Department has already been deemed financially viable with current enrollments, and the proposed degree can only increase visibility of the program.

Currently, a staff member functions as the advisor for secondary students and faculty advise elementary certification students. There are no teaching assistants, and students have direct access to faculty. Class enrollment generally is between 13-19 students, so there is room for higher enrollments without adding new sections. An example of the program growth and new, more efficient scheduling model is the enrollment of 28 students in EDUC 3216, Reading in the Content Area, taught by the chair for Spring 2021. This course is taken by all teacher education students, including secondary.

The new course described for the middle school program has already been developed; Dr. Michelle Schwartze received a CAFÉ grant for this work. A syllabus submission was required for DESE approval of the middle school certification program, so there is no need for resources to develop the course.

3.B.2. Revenue

The program will be run on the current budget model from the department's general revenue allocation. Departments do not receive funds based on student credit hour at the undergraduate level. These general revenue funds are distributed to the colleges.

The department also supports secondary students pursuing certification. These students take 33 credit hours of education coursework, although their degree is in the content area. Those students were not included in the enrollment projections above, except as noted. The consistent secondary student enrollments in the EDUC courses are why this proposed degree requires so few resources.

Potential sources of revenue include the National Science Foundation Noyce Scholarship program. This grant program is designed to recruit STEM majors into teaching using scholarships and stipends once they enter the teaching force. The department also submitted a proposal to the state grants titled MoExcels, which was focused on workforce development. Although the funds for these grants were eliminated with the current pandemic, if reinstated, these funds or similar workforce development grants may have revenue potential. As of December 1, 2020, the department was requested to resubmit the MoExcels proposal with any revisions for possible funding. The department has also been working with the College of Engineering and Computer Science on multiple NSF grants to involve teachers and preservice teachers in professional development focused on manufacturing and artificial intelligence.

3.B.3. Net Revenue

Table 5, below, provides estimates of net revenue. This program is projected to generate net revenue beginning in its initial year, with net revenue reaching \$300,567 per year by Year 5 following implementation.

Table 5: Expenses and Revenue

	Year 1	Year 2	Year 3	Year 4	Year 5
1. Expenses per year					
A. One-time					
<i>New/Renovated Space</i>	0	0	0	0	0
<i>Equipment</i>	0	0	0	0	0
<i>Library</i>	0	0	0	0	0
<i>Consultants</i>	0	0	0	0	0
<i>Other</i>	\$5,000	\$5,000	0	0	0
Total one-time	\$5,000	\$5,000			
B. Recurring					
<i>Faculty</i>	0	5,000	10,000	10,000	15,000
<i>Staff</i>	0	0	0	0	0
<i>Benefits</i>	0	0	0	0	0
<i>Equipment</i>	0	0	1,000	2,000	3,000
<i>Library</i>	0	0	0	0	0
<i>Other</i>	10,800	12,800	13,300	13,300	13,300
Total recurring	10,800	17,800	24,300	25,300	31,300
Total expenses (A+B)	\$15,800	\$22,800	\$24,300	\$25,300	\$31,300
2. Revenue per year					
<i>Tuition/Fees</i>	94,565	165,354	284,615	344,068	383,851
<i>Institutional Resources</i>					
<i>State Aid -- CBHE</i>					
<i>State Aid -- Other</i>					
Total revenue	94,565	165,354	284,615	344,068	383,851
3. Net revenue (loss)*	\$72,931	\$142,672	\$262,926	\$318,400	\$359,615
4. Cumulative revenue (loss)*	\$72,931	\$215,603	\$478,529	\$796,930	\$1,156,545

*Based on new enrollments in B.S. in Education only; internal transfers not included.

3.B.4. Financial and Academic Viability

The elementary certification is already being offered as a Bachelor of Arts in Multidisciplinary Studies and has been since 2014. The courses are currently offered on a rotation because of the small student population. Currently, the schedule has room for additional students in the existing courses.

The department already has a chair and two staff to support students in the existing programs. The department supports the education emphasis in the business, biological sciences, chemistry, economics, English, history, mathematics, psychological sciences, and physics departments. These students were not included in enrollment numbers above because they are in the degree area of their content; however, they take 33 credit hours of education coursework.

Expenses and equipment are listed to cover purchase and maintenance of technology and hot spots for virtual observations, travel to student teaching and field experience sites, as well as mentor teacher training and stipends. As the number of completers rises, there is a small cost to supervising those students in their student teaching placements.

No state aid or faculty salaries are included in this table because current state funding covers all department salaries; no new faculty or staff are being requested. The amount listed for faculty in Table 5 is for adjunct professors to supervise student teachers and teach courses, as needed. While full time faculty current teach all courses, as enrollments rise, adjunct professors may be needed, particularly for student teaching supervision.

Table 6. Enrollment at the End of Year 5 for the Program to Be Financially and Academically Viable.

Enrollment Status	Full-Time	Part-Time*	Total
Number of Students	30	50	80

*Calculation includes students in secondary certification pathways that contribute revenue to the program.

Courses in this program also support education emphasis areas in other departments. Typically, about 60 students are enrolled in the secondary certification pathways. These students are counted as part time students in the calculation above, but these students were not included in previous tables of new students. The teacher education program attracts students who want to be secondary teachers; without this program, those students would not choose to attend Missouri S&T.

3.C. Business and Marketing Plan

3.C.1. Marketing Plan

The department had set aside \$5,000 for marketing and promotion of the new degree programs, including recruitment travel, but the availability of these funds and ability to travel may be impacted by COVID-19. The department chair has already worked with the marketing department to create a new flyer and video. These are easily edited to include the new degree programs. The department chair has partnered with admissions to visit regional college fairs at rural schools to increase awareness of the program. The department chair is also coordinating with two year community colleges including East Central, State Fair, and Ozark Technical College to arrange virtual classroom visits and attend transfer fairs. The department S&T faculty and students attend the state conference for Future Teachers of America, and the department has reached out to area high school FTA chapters to offer students and faculty as potential speakers for local events. The department advisory board has organized two virtual recruitment events for December 2020, and marketing was sent to all community colleges in the area.

The department will capitalize on existing S&T initiatives such as the Expanding Your Horizons conference for middle school girls and the Teaching with Technology conference offered to K-12 educators and higher education faculty in March. The department chair is developing partnerships with area school districts to begin "Grow Your Own Teacher" programs, following the recommendations of DESE and the national organization AACTE. The department works closely with the South Central Regional Center for Professional Development for distribution of advertisement of course offerings, workshops, and speakers.

An active social media presence and updated website will assist with awareness of the new department, and news releases such as the recent one announcing the approval of middle school programs will continue. The department participated in research with the Dean for Impact organization, along with UMSL, and is now a member of the American Association of Colleges for Teacher Education (AACTE). These steps, along with state, regional, and national presentations by department faculty, help build awareness that teacher education is an option at S&T, which is often known for STEM, specifically engineering. The department and its student group frequently participate in campus fairs and other activities to bring awareness to the campus community.

The department chair has presented to the S&T professional advisors on staff for Freshmen Engineering students. Admissions has made a point to include a teacher education alum on a panel for potential new students, and the chair met with all admissions counselors and coaches in the athletic department to describe the program offerings of the department. These internal awareness opportunities have already resulted in visits from potential student athletes and questions from applicants answered quickly by the department chair because they were forwarded from admissions. These small steps have resulted in 95 applications and 65

admissions for Teacher Education and Certification for Fall 2020, a 40% increase over the past three years despite the COVID-19 crisis. The department is on a similar pace for Fall 2021, despite the uncertainties of the pandemic.

Institutional advancement recently partnered with the department to create a "Rural Teacher Scholarship" fund. This fund has already had a donation of \$25,000. This fund complements two other scholarships established specifically for students seeking teacher certification.

With the STEM emphasis at Missouri S&T, the newly established department of Teacher Education and Certification, in partnership with other content departments, would have the capability to apply for grants such as the NSF Noyce Teacher Scholarship. The department chair has already worked with engineering faculty on an ERC grant with an outreach component for high school and middle school teachers.

3.C.2. Student Success Plan

Students in certification programs can access all campus support services including the writing center, tutoring, etc. Students in certification programs have high pass rates on state required exams. The department has purchased study guides for each Missouri content exam. A donor recently funded the testing and background check fees for students in the program.

Since the program is small and the courses offered on a rotation, students form a natural cohort. The current students communicate through informal channels using GroupMe and other technology. The department also has a Canvas community for all students in the program. This allows for announcements, advising files, teaching resources, professional development opportunities, and other resources to be shared with students in the program. Since students use Canvas for courses, this lets them access the resources when needed rather than searching through emails. This reserves the department website for recruitment rather than information for current students.

The staff advisor monitors midterm grades and lists of dropped courses. She contacts students who have not enrolled every semester, and she has a four year plan on file for each student in the program. The staff advisor meets with every student for advising each semester, and she has an individual orientation meeting with each new student to review the program requirements. She also works closely with content area faculty to advise secondary students. If students are approaching the GPA threshold for either content or cumulative, she will offer alternatives such as grade replacement. Because the courses in teacher education are on a rotation for more efficient scheduling, she may offer course sharing options for students who are off rotation.

3.C.3. Transition Plan

Dr. Kania-Gosche is primarily responsible for the program. She has created a curriculum map for the programs, in collaboration with other faculty and content faculty. All documents created or modified by her, including handbooks, syllabi, MOUs with school districts, etc. are accessible to other members of the department, including staff. The data from first year teacher surveys and any other assessments are also shared with faculty during regular meetings for program improvement. All documents, including a curriculum map and all recruitment materials, are kept in an institutional, shared Google drive that all full-time faculty and staff can access. Decisions are made collaboratively with faculty as much as possible, and minutes are kept at meetings to document decisions and discussions. Prior to Dr. Kania-Gosche's arrival, an interim chair ran the department for the first two years. While not ideal, the department still functioned.

3.C.4. Exit Strategy

Elementary teacher certification has been offered on campus for the past six years and has been determined to be viable. Teacher certification in secondary areas is typically over 60 students and has remained steady for the past ten years. However, if needed, course sharing with other UM System schools could be used if courses were not offered. All UM system campuses have student teaching supervisors that could potentially supervise student teachers remotely if capacity allowed.

4. Institutional Capacity

The department currently consists of five faculty and two staff, and three courses in the program are taught by a full-time psychology faculty member. If needed, the department could employ adjunct instructors; adjunct professors are typically educators who work during the day and bring current practices from the field into the classroom. With a small student population, education courses are offered on a rotation, but students have the option of taking online courses from other UM system campuses if necessary. For courses with a field experience component, enrollment caps may be necessary because the professor must visit schools and observe students teaching.

The department already purchased a library of curriculum materials and technology tools for use in the classroom. The department also has access to resources at the South Central Regional Center for Professional Development including technology equipment, professional development. S&T students and faculty can attend workshops at no cost.

Education courses are typically offered in Centennial Hall because of furniture purchased from a CAFÉ grant for a research study by Dr. Michelle Schwartz. This also avoids professors having to carry robots, STEM materials, chromebooks/iPads,

or other materials needed for class across the campus, particularly in the winter months. Prior to Fall 2020, these classrooms provided the necessary space, although other classrooms on campus are available if needed.

The faculty capacity is described in that section of this document. Two new NTT faculty were hired for Fall 2020, demonstrating the university commitment to the department. This allows the department to teach all courses with full time faculty members. The department faculty do not burden the existing resources on campus, and, in fact, they supplement the educational expertise in CAFÉ. For example, Dr. Kania-Gosche has presented at the Graduate Teaching Assistant workshops on formative assessment for student engagement, and she has also assisted in training for the peer tutors on S&T's campus.

All faculty in the department are skilled in using technology to deliver instruction. Dr. Kania-Gosche has previous experience teaching online with Canvas and assisting faculty with transitioning to Canvas from a previous course management system. Four faculty members in the department have enrolled in the ACUE cohort to enhance their skills in online teaching, which they can then translate to the K-12 environment and include in their courses. As experienced teachers, all faculty have knowledge and awareness of best practices in online education. Dr. Kania-Gosche and Dr. Schwartz have presented at various conferences about technology integration; two recent conference sessions included Breakout EDU and Flipgrid which they have both used successfully in their courses.

5. Program Characteristics

5.A. Program Outcomes

The following outcomes mirror the Missouri Teacher Standards that are used in K-12 schools across the state for evaluation of practicing educators. Several of these standards, including standards 1 and 4, have been modified to reflect the STEM emphasis of S&T.

Missouri S&T education program graduates will . . .

1. create learning experiences that make the central concepts, structures, and tools of inquiry of the discipline(s) of subject matter, particularly STEM fields, meaningful and engaging for all students.
2. provide learning opportunities that are adapted to diverse learners and support the intellectual, social, and personal development of all students.
3. develop, implement, and evaluate curriculum based upon student, district and state standards
4. use a variety of instructional strategies and resources to encourage students' critical thinking, problem solving, and performance skills with emphasis in STEM

5. create a learning environment that encourages active engagement in learning, positive social interaction, and self-motivation.
6. model effective verbal, nonverbal, and media communication techniques with students, colleagues and families to foster active inquiry, collaboration, and supportive interaction in the classroom.
7. monitor the performance of each student through formative and summative assessment strategies, and devises instruction to enable students to grow and develop, making adequate academic progress.
8. continually assess the effects of choices and actions on others and seek out opportunities to grow professionally.
9. have effective working relationships with students, parents, school colleagues, and community members

Students in this program will graduate meeting all the requirements for Missouri teacher certification including passing the Missouri Content exam. Historically, students in this program have high pass rates on these assessments. DESE provides all educator preparation programs with job placement data for public Missouri schools. Fifty-four teachers who graduated from S&T since 2010 were employed in public Missouri schools in 2019-20. This also demonstrates the gender diversity this department offers the S&T campus, which is heavily skewed toward men. However, these data indicate high percentages of women in biology and math.

Table 7 Program Completer Missouri Teaching Job Placement 2010-2019

Certification Area	Female	Male	Grand Total
BIOLOGY 9-12	9	0	9
CHEMISTRY 9-12	1	0	1
ELEMENTARY ED 1-6	7	2	9
ENGLISH 9-12	10	0	10
MATHEMATICS 9-12	10	4	14
SOCIAL SCIENCE 9-12	3	8	11
Grand Total	40	14	54

The elementary program has a unique component in the STEM Methods course. Elementary students will also earn Project Lead the Way (PLTW) Launch teacher training. This training would cost a school district \$800, but Dr. Michelle Schwartze is a certified trainer. The content from the PLTW training is embedded within the STEM Methods course, and students do not pay any fees.

Learning outcomes for the program are based on the Missouri teaching standards which are used by principals to evaluate practicing teachers in the state. The Missouri

teaching standards can be cross-walked to the national standards. These standards are the basis for the first year teacher survey and employer survey issued by DESE annually; results are available to institutions in late summer. The appendix of this document displays S&T's results.

The teacher shortage is not unique to Missouri, and graduates of this program can apply for reciprocal licensure in another state. With the teacher shortage, licensure is usually a matter of taking that state's exam. A survey of alumni in spring revealed graduates in Utah, Texas, Washington, West Virginia, and Georgia, among others.

5.B. Program Design & Content

The B.S. in Education follows the basic structure and requirements for any B.S. degree on the Missouri S&T campus. The courses required for this degree align with the competencies mandated by DESE as well as the framework of the exams needed for certification. Whenever possible, we chose courses that aligned with existing programs in the content areas so that students had options for courses to meet requirements. Any course substitutions must be approved through the Department of Teacher Education and Certification to ensure adherence to DESE requirements. These requirements are publicly available on DESE's website and updated for any curriculum changes.

Students must apply for professional standing in the department when they have 60 credit hours. Professional standing requires a fingerprint background check as part of a substitute teacher application to a school district, an interview with the department chair, and successful completion of the first 12 hours of education coursework including one field experience course.

As with all teacher education programs, the final semester in the program is student teaching. Students must have all course requirements complete and have passed the appropriate Missouri Content Assessment to be eligible for student teaching. Students must have a 2.75 cumulative GPA or the potential to earn this by the end of student teaching. A 3.0 GPA in the content area is also required for student teaching.

The requirements for each emphasis area are listed in the following tables. All of the education emphasis areas, including those in other departments, include the following courses (prerequisites are noted in parentheses):

- EDUC 1040 Perspectives in Education, 2 (education emphasis declared)
- EDUC 1104 School Organization and Administration, 2 (EDUC 1040)
- EDUC 1164 Teacher Field Experience I, 2 (EDUC 1040)
- EDUC 1174 Teacher Field Experience II, 2 (EDUC 1040, 1104)
- EDUC 2102 Educational Psychology, 3 (PSYCH 1101)
- EDUC 3216 Teaching Reading in the Content Area, 3 (EDUC 1040)
- EDUC 4310 Psychology of the Exceptional Child, 3 (PSYCH 1101)

EDUC 4298 Student Teaching Seminar, 1 (Prerequisites: Meet all requirements for student teaching and concurrently be enrolled in student teaching)

EDUC 4299 Student Teaching, 12 (Prerequisites: Professional standing and arrangements made previous semester)

This allows us to streamline the course offerings, which also gives students the flexibility of taking their first 12 hours of coursework before deciding on a specific grade level. These courses are also required for secondary teacher certification.

5.C. Program Structure

The program is designed as a primarily face-to-face delivery model, with a few appropriate courses offered asynchronously online. If necessary, the department can pivot courses to synchronous online; this was done successfully in March 2020 with little differences in course evaluations or grade distributions. These online asynchronous courses include Children's Literature and Assessment for Student Learning. The program uses existing coursework in both education and other content departments, requiring only one new course for middle school programs. Two online asynchronous summer courses will be offered in 2021; funding to pay faculty is based on course enrollment, following the College of Arts, Science, and Business funding model. If students are not enrolled, the courses will be canceled because no funds will be available to pay instructors. These courses have already been developed because they were needed for DESE approval, as such no faculty stipends or additional resources are devoted to this in the budget.

The curriculum is designed with research-informed strategies for student retention. The first course, EDUC 1040 Perspectives in Education, has no prerequisites. Students can enroll in this course their first semester on campus. This and the first field experience course, EDUC 1104, which is taken the following semester, help students determine early if education is the best fit for their major. EDUC 1104 involves students observing in a school environment as well as other educational experiences such as the Applied Language institute on campus, after school activities, camps, robotics events, and other diverse experiences such as the parochial school next to campus. Students must have a cleared background check to enroll in any field experience course.

Each methods course involves a field experience in a local elementary or middle school where students teach a lesson after observing and working with teacher throughout the semester. This allows them to gain experience teaching each subject before entering student teaching. A more sustained field experience course, EDUC 1164, helps students participate in full school days prior to student teaching; ideally this course is taken the semester before student teaching if schedules allow.

The program is designed with the last semester as student teaching, with no additional courses taken at that time to help students be successful. The programs

articulate with area two year community colleges including State Fair, Ozark Technical College, and East Central. These transfer guides are listed on [S&T's website](#). The new degree proposal will require no new negotiated transfer agreements; we only need to change the name of the degree at the top.

5.C.1. Program Structure Form

The advising forms for each emphasis area appear in the following tables. The program course requirements will be re-examined regularly based on assessment data and offerings by content departments. Note that because of S&T's STEM focus and smaller size, content STEM courses are often taken by both majors and nonmajors. Although a nonmajor course may be listed in the catalog for transfer student equivalencies, these courses are not offered on the campus. For the elementary emphasis, students are required to take computer science, three science courses, and two math courses, at a minimum. This content is in addition to two math methods courses, a science methods course, and a unique STEM methods course with embedded Project Lead the Way Training. This means S&T elementary students take at least 10 more credit hours in combined STEM and STEM education coursework than other elementary programs.

The middle school programs were designed to use existing courses in various departments. These courses were chosen based on the assessment framework for the content exam in the appropriate area and consultation with content area faculty. Many of these courses overlap with requirements for the secondary teacher certification. General education courses may be substituted as determined by the department chair, as described in existing S&T policy. Specific curricular overviews are provided on the following pages.

Table 8: Elementary Requirements (121-126 hrs.)

	HRS		HRS
GENERAL EDUCATION:		PROFESSIONAL REQUIREMENTS:	14
COMM SKILLS	9	EDUC 1040*	2
ENG 1120	3	EDUC 1174*	2
ENG 1160	3	PSYCH 2300*/ED 2102*	3
SPEECH 1185	3	PSYCH 3310*	3
		PSYCH 4310*/ED 4310*	3
HUMANITIES	12	EDUC 4298*	1
Literature	3	CLINICAL EXP	16
Art 1180 or Music 1150	3	EDUC 1104*	2
Philosophy 1105	3	EDUC 1164*	2
Humanity Elective	3	EDUC 4299*	12
SOCIAL SCI	18	DEGREE	33
PSYCH 1101	3	EDUC 3530 SS*	3
ECON 1100 or 1200	3	EDUC 3430 C Lit*	3
History 2110	3	EDUC 3220 Sci*	3
Hist 1100 or 1200 or 1300 or 1310	3,3	EDUC 3215*	3
Pol Sci 1200	3	EDUC 3216*	3
MATH/SCIENCE	19-24	EDUC 3217*	3
Biology 1113	3	EDUC 3218*	3
Lab	1,2	EDUC 3203*	3
PHYSICS 1145 or 1505	3	EDUC 3221*	3
Comp Sci 1570, IS&T 1551 or 1971/1981 or 1970/1980 or 1972/1982*	3 or 2, 1	EDUC 3222*	3
		EDUC 3340*	3
Math 1103*	3		
Math 1120 or 1140*	5,3		
Geology 1110 or Chem 1310 & 1319	3 or 4.1		

Table 9: Middle School English Emphasis Requirements (122-125 hrs.)

The middle school language arts emphasis uses existing courses in the English and Technical Communications department. Students will be able to earn not only a B.A. in Education but also minor in Creative Writing and Literature.

	HRS		HRS
GENERAL EDUCATION:		PROFESSIONAL REQUIREMENTS:	35
COMM SKILLS	9	EDUC 1040*	2
ENG 1120*	3	EDUC 1174*	2
ENG 1160*	3	EDUC 3216*	3
SPEECH 1185	3	English 3170*	3
HUMANITIES	12	EDUC 3280*	6
ART 1180, MUSIC 1150, THEATER 1190	3	EDUC 4298*	1
		PSYCH 2300*/EDUC 2102*	3
ENG-LITERATURE	3	PSYCH 3310*	3
Philosophy 1105 or 1115	3	PSYCH 4310*/EDUC 4310*	3
Humanity Elective	3	EDUC 3335*	3
SOCIAL SCI	12	EDUC 3215	3
HIST 1100 or 1200 or 1300 or 1310	3	EDUC 3340*	3
POL SCI 1200	3	CLINICAL EXP:	16
PSYCH 1101	3	EDUC 1104*	2
ECON 1100 OR 1200	3	EDUC 1164*	2
Math & Science	14-17	EDUC 4299*	12
		English (Literature Minor)	12
Math 1103 or 1120 or 1140	3 or 5	Literature Elective*	3
BIOLOGY 1113 & 1219	3,2	Literature Elective (2000 or 3000 level)*	3
Geo 1110 or 1120 or Physics 1505 or 1605 or Chem 1310	3 or 4	Literature Elective (2000 or 3000 level)*	3
		Literature Elective (2000 or 3000 level)*	3
IS&T 1551 or Comp Sci 1500 or 1570 or 1971/1981 or 1970/1980 or 1972/1982	3	English (Creative Writing Minor)	12
		English 1170*	3
		English 2171 or 2172*	3
	3,3		
Eng 3301 or 3302 or 3303*			

Table 10: Middle School Science Course Requirements (121-123 hrs.)

The middle school science emphasis uses courses from a variety of STEM disciplines and includes at least six hours of math and statistics. For middle school general science emphasis, DESE would not accept a computer science course as a science content course. This may be a revision pursued at a later date. The education STEM methods course, which emphasizes integrated rather than isolated content skills and includes PLTW certification, is also required, in addition to two science methods courses, EDUC 3280 (6 credit hours) and EDUC 3220 (3 credit hours). This is above and beyond the three-hour science methods course required by DESE.

	HRS		HRS
GENERAL EDUCATION:		PROFESSIONAL REQUIREMENTS:	35
COMM SKILLS	9	EDUC 1040*	2
ENG 1120	3	EDUC 1174*	2
ENG 1160	3	EDUC 3216*	3
SPEECH 1185	3	English 3170*	3
HUMANITIES	12	EDUC 3280*	6
ART 1180, MUSIC 1150, THEATER 1190	3	EDUC 4298*	1
		PSYCH 2300*/EDUC 2102*	3
ENG-LITERATURE	3	PSYCH 3310*	3
Philosophy 1105 or 1115	3	PSYCH 4310*/EDUC 4310*	3
Humanity Elective	3	EDUC 3335*	3
SOCIAL SCI	12	EDUC 3203	3
HIST 1100 or 1200 or 1300 or 1310	3	EDUC 3340*	3
POL SCI 1200	3	CLINICAL EXP:	16
PSYCH 1101	3	EDUC 1104*	2
ECON 1100 OR 1200	3	EDUC 1164*	2
Science	31	EDUC 4299*	12
BIOLOGY 1113 or 1213*	3	Math	6 or 8
Biology 1219*	2	Math 1103, 1120 or 1140	3,5
Biology 1173*	3	Stats 1115, 3113 or 3115	3
Geology 1110	3		
Geology 1120	3		
Physics 1505 or 1145*	3		
History 3530*	3		
Chemistry 1310*	4		
Chemistry 1319*	1		
EDUC 3203	3		
EDUC 3220	3		

Table 11: Middle School Social Studies Emphasis Course Requirements (122-125 hrs.)

For the middle school social studies emphasis, students will earn not only the B.S. in Education but also a minor in psychology and a minor in history. The listed content courses are in addition to the economics and political science general education requirements of the degree.

	HRS		HRS
GENERAL EDUCATION:		PROFESSIONAL REQUIREMENTS:	
		35	
COMM SKILLS	9	EDUC 1040*	2
ENG 1120	3	EDUC 1174*	2
ENG 1160	3	EDUC 3216*	3
SPEECH 1185	3	English 3170*	3
HUMANITIES	12	EDUC 3280*	6
ART 1180, MUSIC 1150, THEATER 1190	3	EDUC 4298*	1
		PSYCH 2300*/EDUC 2102*	3
ENG-LITERATURE	3	PSYCH 3310*	3
Philosophy 1105 or 1115	3	PSYCH 4310*/EDUC 4310*	3
Humanity Elective	3	EDUC 3335*	3
SOCIAL SCI	12	EDUC 3530	3
History 2110*	3	EDUC 3340*	3
POL SCI 1200*	3	CLINICAL EXP:	16
PSYCH 1101	3	EDUC 1104*	2
ECON 1100 OR 1200*	3	EDUC 1164*	2
Science	14-17	EDUC 4299*	12
BIOLOGY 1113 & 1219	3,2	History Minor/Psych Minor	24
Geo 1110 or 1120 or Physics 1505 or 1145 or Chem 1310	3 or 4	History 1100 or 1200*	3
		History 1300 or 1310*	3
Math 1103, 1120 or 1140	3 or 5	American Hist Elective*	3
IS&T 1551 or Comp Sci 1500 or 1570 or 1971/1981 or 1970/1980 or 1972/1982*	3 or 2,1	World Hist Elective*	3
		World Hist Elective*	3
		EDUC 3530	3
		History Elective	3
		Psych 4600	3

Table 12: Middle School Math Emphasis Course Requirements (120-125 hrs.)

For middle school mathematics emphasis, computer science is included as a content course, in part because Missouri includes this subject as a math course in graduation requirements. The highest math taught in middle school is algebra, but students in S&T's program take courses including Calculus II. Both the Calculus for Engineers and the Calculus with Analytic Geometry courses are included to provide options for students wanting to switch into teaching from engineering. Providing these options will aid in student retention and time-to-graduation so they do not have to retake another calculus course to teach in middle school.

	HRS		HRS
GENERAL EDUCATION:		PROFESSIONAL REQUIREMENTS:	35
COMM SKILLS	9	EDUC 1040*	2
ENG 1120	3	EDUC 1174*	2
ENG 1160	3	EDUC 3216*	3
SPEECH 1185	3	English 3170*	3
HUMANITIES	12	EDUC 3280*	6
ART 1180, MUSIC 1150, THEATER 1190	3	EDUC 4298*	1
		PSYCH 2300*/EDUC 2102*	3
ENG-LITERATURE	3	PSYCH 3310*	3
Philosophy 1105 or 1115	3	PSYCH 4310*/EDUC 4310*	3
Humanity Elective	3	EDUC 3335*	3
SOCIAL SCI	12	EDUC 3203	3
HIST 1100 or 1200 or 1300 or 1310	3	EDUC 3340*	3
POL SCI 1200	3	CLINICAL EXP:	16
PSYCH 1101	3	EDUC 1104*	2
ECON 1100 OR 1200	3	EDUC 1164*	2
Science	11 or 12	EDUC 4299*	12
BIOLOGY 1113 & 1219	3,2	Math Emphasis	25-29
Geo 1110 or 1120	3	EDUC 3222/Math 3922*	3
Physics 1505 or 1145 or Chem 1310	3,4	Math 1103*	3
		Math 1120 or 1140*	3 or 5
		Math 1160*	2
		Math 1208 or Math 1214*	4 or 5
		Math 1215 or Math 1221 or Math 1212*	4 or 5
		IS&T 1551 or Comp Sci 1500 or 1570 or 1971/1981 or 1970/1980 or 1972/1982*	3 or 2,1
		Stats 1115, 3113 or 3115*	3

Residency Requirements, if any: students are required to complete at least 60 hours in residency at Missouri S&T; this is a requirement for all students, not just for this degree.

Requirements for thesis, internship, or other capstone experience

Student teaching (EDUC 4299) is required of all students seeking teacher certification. Students must earn a grade of B or better to be recommended for certification.

Any unique features such as interdepartmental cooperation:

Multiple courses are taught in other departments such as Psychological Sciences and English.

5.D. Program Goals and Assessment

This degree proposal is for middle school and elementary certification programs. While Missouri S&T has healthy enrollments in many secondary teaching STEM areas, those students are not included in these goal projections because they will not have a degree in education. Annually, DESE sends placement data with the courses taught by each S&T alumnus; out of state and private school teachers are more difficult to track beyond self-reported employment.

The B.S. in Education program goals are as follows:

- 80% of students who take the first three education courses as a declared B.S. in Education (EDUC 1040, 1174, and 1104) complete the degree.
- 80% of students will pass the Missouri Content Assessment on the first attempt.
- 95% of graduates are employed in schools or attending graduate school one year after completion.
- 50% of graduates are employed as Missouri public school STEM teachers (middle school science or math).
- 25% of graduates with teaching jobs in Missouri public schools are teaching Project Lead the Way courses.

The program outcomes align with the Missouri Teaching Standards. These are the standards by which practicing teachers in the state are assessed by their principals.

Missouri S&T education program graduates will . . .

1. create learning experiences that make the central concepts, structures, and tools of inquiry of the discipline(s) of subject matter, particularly STEM, meaningful and engaging for all students.
2. provide learning opportunities that are adapted to diverse learners and support the intellectual, social, and personal development of all students.

3. develop, implement, and evaluate curriculum based upon student, district and state standards
4. use a variety of instructional strategies and resources, emphasizing STEM activities, to encourage students' critical thinking, problem solving, and performance skills
5. create a learning environment that encourages active engagement in learning, positive social interaction, and self-motivation.
6. model effective verbal, nonverbal, and media communication techniques with students, colleagues and families to foster active inquiry, collaboration, and supportive interaction in the classroom.
7. monitor the performance of each student through formative and summative assessment strategies, and devises instruction to enable students to grow and develop, making adequate academic progress.
8. continually assess the effects of choices and actions on others and seek out opportunities to grow professionally.
9. have effective working relationships with students, parents, school colleagues, and community members

All Missouri educator preparation programs are assessed annually by DESE through the Annual Performance Report. The data points include the GPA, Missouri Content Assessment, student teaching evaluation rubric scores, first year teacher surveys, and first year principal surveys. The last three data sets are aligned with the Missouri Teacher Standards. Department faculty examine survey data and student teaching evaluation scores annually for trends. Survey data can also be compared to the state mean. The appendix includes data from the alumni and employer survey for the past several years.

The department chair also interviews student teachers each semester to gather qualitative data for program improvement. The chair also has as an advisory council for the department; students were chosen to create a diverse group with varying backgrounds including transfer students, first semester students, and different content areas.

Every syllabus in Teacher Education and Certification offers alignment to the Teacher Standards, and a curriculum map is being developed by the faculty to determine where each goal is taught and how it is assessed. These data will be collected in Foliotek, the online portfolio management system used by the Department.

5.E. Student Preparation

Students must meet general university requirements for admission. To be admitted into the program (called professional standing), students should obtain a substitute teaching certificate from DESE which includes an FBI fingerprint background check. Students must interview with faculty to be accepted into professional standing. This interview focuses on their previous experience with adolescents and children in teaching-related roles.

Students need a cleared background check from the Family Care Safety Registry to enter a school for field experiences. To student teach, students must pass the Missouri Content Assessment, complete all education and content coursework with a 3.0 GPA, and hold a 2.75 cumulative GPA. Students are not permitted to take any other courses their student teaching semester, and they may student teach at any Missouri public school that will accept them and has an available cooperating teacher meeting the DESE requirements.

5.F. Faculty and Administration

No additional faculty are required at this time for the degree because of hires made for 2020-21. The faculty include the chair, three non-tenure track teaching professors, and a shared faculty with University of Missouri Extension. Cross-listed education/psychology courses are taught by a full time psychology NTT professor. Dr. Michelle Schwartze has expertise in middle school and mathematics. A new hire, Dr. Mary Gillis, will be responsible for student teaching seminar, EDUC 1174, and secondary methods. All faculty will supervise student teachers as needed.

A faculty member with expertise in literacy at the elementary level was hired for 2020-21. This position was especially needed with the recent emphasis on dyslexia and high number of literacy courses required for elementary certification. Currently these courses are being offered on a rotation, once every two years. This faculty member also has a background in special education and will teach the course in exceptional child. As the program grows, the department will need to offer these courses more frequently.

In this department, faculty need PK-12 teaching experience in addition to a graduate degree in the field. Adjunct professors may have a graduate degree if they are teaching undergraduate courses. Previous adjunct professors include the local superintendent and practicing teachers for the secondary/middle school methods courses, as well as two staff from the Regional Center for Professional Development. In 2020-21, the department anticipates needing no adjunct professors because of the additional capacity from the new hires, with the possible exception of student teaching supervision in spring 2021.

5.G. Alumni and Employer Survey

The state already administers an alumni and employer survey for those working in public Missouri schools. S&T receives aggregated, anonymous data annually. These data are a part of the Missouri Educator Preparation Annual Performance Report and have been psychometrically tested and found to be sound (DESE, 2015).

Results from S&T's surveys indicate that employers and alumni are satisfied with the preparation they received from the program. 92% of alumni and 89% of principals report S&T's teacher preparation as "good" or "very good." 94% of principals rated S&T alumni as being effective or highly effective on their teacher evaluations. Detailed data from these surveys can be found in the appendix.

5.H. Program Accreditation

DESE has already approved the elementary and middle school program curricula, and S&T is listed as an approved provider on their website. Every teacher preparation program in the state receives an annual report card that serves as state accreditation approval. S&T does not currently have enough completers to generate a report (Fall 2019), but this will change in subsequent years as our population grows.

Currently, the S&T education certification programs are not nationally accredited. There are two options at present: the more established Council for Accreditation of Educator Preparation and the newer Association for Advancing Quality in Educator Preparation. DESE has a partnership agreement with both organizations; however, the state of Missouri does not require national accreditation for teacher certification programs.

While the department has the capacity to pursue national accreditation, the expense, annual dues in addition to at least \$10,000 the year of a visit, is not feasible with the current budget reductions. In five years, based on enrollment and budget feasibility, the department may begin the process for AAQEP accreditation.

References

Marder, M. Brown, C., & Plisch, M. (2019). Recruiting teachers in high-needs STEM-fields: A survey of current majors and recent STE graduates. American Physical Sciences Society for Physics. <https://www.aps.org/policy/reports/popa-reports/stemteachers.cfm>

McCardle, E. (Summer, 2019). The middle of somewhere. *Ed Magazine*, Harvard University Graduate School of Education. Retrieved from <https://www.gse.harvard.edu/news/ed/19/05/middle-somewhere>

Missouri Department of Elementary and Secondary Education (2015). Ensure equitable Access to excellent educators. Retrieved from <https://dese.mo.gov/sites/default/files/Educator-Equity-Plan-Missouri.pdf>

Missouri Department of Elementary and Secondary Education (2015). Missouri's first-year educator surveys. Retrieved from <https://dese.mo.gov/sites/default/files/fy-survey-tech-manual.pdf>

Missouri Department of Higher Education (2011). Statewide Academic Program Review. Retrieved from <https://dhewd.mo.gov/documents/ProgramReviewSummaryReport.pdf>

Appendix - Comparison Institutions

Not all states offer middle school as a separate teaching certification; in some states the secondary certification includes these grade levels.

Comparison Institution	Education Degrees Offered
University of Missouri-Kansas City	BA in Elementary Education, BA in Middle School Education https://education.umkc.edu/academics/undergraduate-programs/middle-school/ MAT
University of Missouri-Columbia	B.S. in Education with emphasis in elementary, yearlong student teaching B.S. in Education with emphasis in middle school mathematics, language arts, science, or social studies
University of Missouri-St. Louis	B.S. In Education in Elementary Education with emphasis in TESOL (Teaching English to Speakers of Other Languages) or special education. B.S. in Education in Middle School Education with emphasis in science, mathematics, language arts, or social studies. Link to Degree Offerings
Missouri State	B.S. in Early Childhood Education (birth-grade3) B.S. in Elementary Education and accelerated master's program. B.S. in Middle School Education Link to Degree Offerings
Truman State	Masters of Arts in Education in elementary education. Certification Program Info

Saint Louis University	B.A. in Education with emphasis in early childhood or elementary education. Link to Degree Offerings
Colorado School of Mines	Partnership with University of Northern Colorado Teacher Residency/NSF Noyce Scholarship funding Post-baccalaureate certificate https://www.mines.edu/teacherprep/getting-started/
California Tech	No education department found.
Carnegie Mellon	No education department found.
Georgia Tech	No education department found.
MIT	Teacher Education Program offers licensure for students who have completed STEP courses and bachelor's degree. https://education.mit.edu/teacher-licensure/
Michigan Tech	Program offers teacher certification with completion of major in the typical secondary education content areas. No elementary ed program. https://www.mtu.edu/cls/undergraduate/certification/majors-minors/
Worcester Polytechnic Institute	Teacher prep program, but no education degree. https://www.wpi.edu/academics/undergraduate/teacher-preparation-program
Case Western Reserve	Primary major and licensure, but no education degree. https://artsци.case.edu/teacher-education/programs/

Drexel	<p>BS in Elementary Education (<u>part-time or full-time option</u>)</p> <p>Options for emphasis in PreK-4, PreK-4 Special Education, middle level (4-8) math and english, middle level science and english, and middle level math and science.</p> <p>https://drexel.edu/soe/academics/undergraduate/Degrees/BS-in-Elementary-Education/</p>
Iowa State	<p>BS in Elementary Education (K-6 in the elementary classroom and k-8 in a chosen endorsement area).</p> <p>https://www.education.iastate.edu/find-majors/elementary-education/</p>
Montana Tech	No elementary education program.
SIU Edwardsville	<p>BS in elementary education (1-6)</p> <p>https://www.siu.edu/academics/undergraduate/degrees-and-programs/elementary-education/</p>
Kansas State University	<p>BS in Elementary Education (certification K-6)</p> <p>https://coe.k-state.edu/academics/bachelor/elementary.html</p>
University of Kansas	<p>BS in Elementary Education.</p> <p>https://ct.ku.edu/academics/teacher-education/elementary-education/bachelors-degree/overview-benefits</p>
University of Arkansas	<p>B.S.E in Elementary Education (K-6)</p> <p>https://catalog.uark.edu/undergraduatecatalog/collegesandschools/collegeofeducationandhealthprofessions/elementaryeducation/eel/</p>



Office of the Provost

September 18th, 2020

To whom it may concern,

Missouri is in the midst of a teacher crisis that has been deeply exacerbated by COVID-19. The documented shortage of qualified STEM teachers across our state has a direct negative effect on the college readiness of high school students entering all University of Missouri System schools. STEM-focused academic preparation begins at the elementary (grades 1-6) and middle school levels (grades 5-9). Crucial decisions about math placement, college aspirations, and career counseling begin not in high school but in middle schools. Thus, high-quality educational experiences in STEM for elementary and middle-school students are imperative and are crucial to prepare a workforce ready to engage in the many pressing problems of today. Missouri S&T's proposal for a B.S. degree in education, specifically focused on preparing elementary and middle-school STEM teachers, leverages existing strengths in STEM at S&T while filling a critical gap in workforce preparedness, particularly for south central Missouri.


This proposed B.S. in education also serves an important need for gender inclusion in STEM education. In middle school, and often as early as elementary school, many girls begin to lose interest in STEM topics, making high-quality teachers and role models even more important. Seventy-five percent of S&T alumni who are teaching high school in Missouri public schools are women, and most of them are in STEM fields. The addition of a B.S. degree in elementary and middle school education at Missouri S&T, in conjunction with our highly successful secondary education certification programs, has the potential to decrease the STEM teacher shortage in the state of Missouri and foster an increasingly diverse pipeline of students into a variety of STEM fields.

This proposed B.S. in education raises the visibility of the unique elementary and middle school education programs currently in place at S&T and already approved by DESE. There is no concern that this degree program duplicates offerings at another University of Missouri school, because each the education unit at each campus requires separate state approvals that reflect the distinctiveness of each local context. For example, Missouri S&T is one of only two institutions in the entire state that offer embedded *Project Lead the Way Launch* training for pre-service elementary teachers in our STEM Teaching Methods course. This course is in addition to the two math methods courses and one science methods course, giving S&T's elementary education graduates additional preparation unavailable to students at other universities. The curriculum for elementary education students also includes a computer science course, in addition to the other science and math requirements, which provides a unique depth and breadth of STEM preparation for S&T students pursuing a teaching career.



Research demonstrates that most teachers seek employment within 50 miles of their hometowns. Missouri S&T's central location in the state fills a wide educational desert along the I-44 corridor that is simply not served by teacher education programs in areas such as Kansas City, St. Louis, Columbia, or Springfield. Missouri S&T's proposed B.S. in education raises the visibility of our existing offerings, increases our ability to educate the next generation of diverse STEM leaders, capitalizes on S&T's existing strengths in STEM education, aids in Missouri's essential workforce development initiatives, and fills a unique geographic, regional, and STEM-focused need that will serve our region, our state, and the nation. For all of these reasons crucial to the future of education in Missouri, I offer my full support for this proposed BS in education at Missouri S&T.

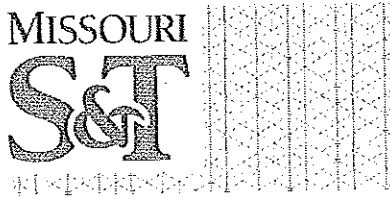
Approved By:



Stephen Roberts, Ph.D.
Interim Provost and Executive Vice Chancellor
For Academic Affairs



Mohammad Dehghani, Ph.D.
Chancellor



The College of Arts, Sciences, and Business fully supports the proposal for the creation of a BS degree in Education. The new degree aligns with the department's strategic plan to raise visibility, increase recruitment of undergraduate students, support the retention of students, and decrease the time to degree. The creation of this degree also supports workforce development in the state of Missouri and addresses a critical need for qualified teachers. The addition of a path to middle school certification addresses a gap in our current curriculum while also providing essential education to students in our state.

The new degree requires the addition of only one course (which exists, but has not been taught) and does not require any additional faculty resources or hires. However, the College is committed to supporting the new department of Teacher Education and Certification. We successfully recruited and hired three new faculty members to support the department's educational and outreach missions: a replacement hire of a literacy specialist, a joint appointment between Teacher Education and MU Extension for a state specialist in youth STEM education and engagement, and a specialist in educational practice with an emphasis in leadership for sustainability, social justice, and participatory culture.

As the proposal demonstrates, there is a high need for qualified teachers, a demand in our area that is not met by other educational options, and a need to have a visible degree in Education rather than a generic BA in Multidisciplinary Studies. Since the Department of Teacher Education and Certification first proposed this new degree, the landscape in higher education as well as K-12 education has shifted dramatically due to the current COVID-19 health crisis. The need for well-trained science educators will only continue to grow. Therefore, we strongly support the full proposal, which promises to support student recruitment, retention, and diversity while increasing graduates and the visibility and reputation of Missouri S&T.

Kate Dronme



Faculty Senate

31 August 2020

Dr. Richard Brow
Interim Deputy Provost
Office of the Provost
Missouri University of Science and Technology

Dr. Brow,

A proposal for the Bachelors of Science in Education and the associated Bachelors in Education Pro Forma statement were received and reviewed by the officers of the Missouri S&T faculty senate. We were asked for input or comment on the proposal. After review, the officers were in unanimous agreement and offered full support for the proposal. In addition, as the Campus Curriculum Chair, I reviewed the proposal as it pertains to curriculum issues. I have no objections and support the establishment of this program.

Respectfully,

A handwritten signature in cursive script that reads "Stephen A. Raper".

Stephen A. Raper, Ph.D.
Associate Professor, EMSE
2020 - 2021 Faculty Senate President

MINERS DIG DEEPER



ROLLA PUBLIC SCHOOLS

D. Kent King Administration Center

DR. AARON ZALIS
Superintendent

DR. KYLE DARE
Assistant Superintendent
Human Resources & Support Services

MR. CRAIG HOUNSOM
Assistant Superintendent
Curriculum & Instruction

July 31, 2019

Dear Governor Parsons, Commissioner Mulligan, and Coordinating Board for Higher Education:

The Rolla 31 School District fully supports the MoExcels application for a STEM Educational Excellence Center at Missouri University of Science and Technology. This initiative would be focused on improving the STEM educational experiences of students in rural schools in the region, as well as recruiting more students into STEM and related educational fields. Exposure to high quality STEM experiences in elementary and middle school makes students more likely to take those courses in high school and pursue related fields following graduation.

In the state of Missouri, we are experiencing a crisis with the growing teacher shortage. Finding fully qualified teachers, particularly in STEM areas, is difficult for school districts in rural areas. Aspects of the proposal require a strong partnership between our school district and Missouri S&T. These partnership activities include establishing a teaching cadet program with a focus on recruitment of students from underrepresented backgrounds; continuing to host preservice teachers in student teaching and other field experiences; and contributing feedback to the development of programs such as middle school and the post-baccalaureate certification.

The proposal for the STEM Educational Excellence Center and corresponding new programs would be an asset to our region and the entire state. Our school district fully supports its implementation and creation of these new, needed programs of middle school STEM and a post-baccalaureate teacher certification option.

Please do not hesitate to contact me if I can be of further assistance.

Sincerely

Aaron Zalis Ed.D
Superintendent
Rolla 31 School District

CRAWFORD COUNTY R-II SCHOOLS

#1 Wildcat Pride Drive
Cuba, Missouri 65453
Phone # (573) 885-2534

Jonathan T. Earnhart, Superintendent
Dr. Curt Graves, Assistant Superintendent
www.cuba.k12.mo.us

July 18th, 2019

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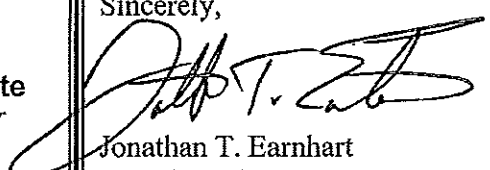
Missouri Department of Higher Education,

I am writing this letter in support of Beth Kania-Gosche and her pursuit of the MoExcels Grant. I have had in-depth conversations with Kania-Gosche and fully support her in her endeavor to increase STEM opportunities for students, expand the certification programs at The University of Missouri S&T, and to broaden the pipeline of STEM educators.

As a district that is close to this University, all of these programs would be a tremendous asset to us and our student. As a small district with limited funds, we are constantly searching for affordable ways to increase STEM opportunities for our students. The number of applicants we get for open positions have been very limited, especially this past year. If they are able to expand their certificate options to expand into elementary and Middle School, we believe that would increase the number of qualified applicants for open positions within our district. Our greatest challenge is finding teachers with certification in Math and Science. We believe that the University can be a great asset in this area as well.

I fully support Mrs. Kania-Gosche in her pursuit of the MoExcels grant. If I can be of further assistance, please do not hesitate to contact me.

Sincerely,



Jonathan T. Earnhart
Superintendent



"One School, One Community, One Family"



Office of the Provost

December 9th, 2020

To whom it may concern,

We approve this final proposal for the B.S. in education and we are looking forward to having it in our portfolio.

Approved By:

A handwritten signature in black ink, appearing to be "S. Roberts", written over a horizontal line.

Stephen Roberts, Ph.D.
Interim Provost and Executive Vice Chancellor
For Academic Affairs

A handwritten signature in black ink, appearing to be "M. Dehghan", written over a horizontal line.

Mohammad Dehghan, Ph.D.
Chancellor

