DEPARTMENT OF
HIGHER EDUCATION &
WORKFORCE DEVELOPMENT

New Program Report

Date Submitted:
04/04/2023

Institution
Missouri Baptist University

Site Information

Implementation Date:
8/22/2022 12:00:00 AM

Added Site(s):

Selected Site(s):

Missouri Baptist University, 1 College Park Drive, St. Louis, MO, 63141

CIP Information

CIP Code:
131322

CIP Description:
A program that prepares individuals to teach biology programs at various educational levels.

CIP Program Title:
Biology Teacher Education

Institution Program Title:
Master of Science in Science Education-Biology

Degree Level/Type

Degree Level:
Master Degree

Degree Type:
Master of Science

Options Added:

Collaborative Program:
N

Mode of Delivery

Current Mode of Delivery

Online

Student Preparation

Special Admissions Procedure or Student Qualifications required:
No special admissions criteria over and above regular graduate admissions standards.

Specific Population Characteristics to be served:
n/a

Faculty Characteristics

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Special Requirements for Assignment of Teaching for this Degree/Certificate:
Faculty teaching in this program will have terminal degree in mathematics as required by HLC for faculty teaching in graduate level programs.

Estimate Percentage of Credit Hours that will be assigned to full time faculty:
100% of courses in this program are taught by full time faculty.

Expectations for professional activities, special student contact, teaching/learning innovation:
Capstone course: This course is intended to provide an avenue for intensive study of current topics or problems in mathematics. The course will involve close collaboration between students and faculty, and topics and content will vary depending on the interests of students and faculty.

Student Enrollment Projections Year One-Five

Year 1	**Full Time:** 0	**Part Time:** 3	
Year 2	**Full Time:** 0	**Part Time:** 3	
Year 3	**Full Time:** 0	**Part Time:** 4	**Number of Graduates:** 2
Year 4	**Full Time:** 0	**Part Time:** 4	
Year 5	**Full Time:** 0	**Part Time:** 5	**Number of Graduates:** 6

Percentage Statement:
n/a

Program Accreditation

Institutional Plans for Accreditation:
No specialized accreditation will be sought.

Program Structure

Total Credits:
30

Residency Requirements:
24 of 30 hours must be earned in residence.

General Education Total Credits:
0

Major Requirements Total Credits:
30

Course(s) Added

COURSE NUMBER	CREDITS	COURSE TITLE
EDUC 573	3	Applications of Technology
ETOP 563	3	Legal Issues in Regular and Special Education
BIOL 573	3	Advanced Methods in Biology Education
BIOL 543B	3	Methods of Inquiry I
BIOL 563A	3	Molecular Genetics

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ECTA 523	3	Integration of Curriculum, Instruction, and Assessment
BCHM 553	3	Biochemistry II
BIOL 533A	3	Immunology
ETOP 583	3	Perspectives on Diversity in Education
BIOL 543	3	Advanced Human Physiology

Free Elective Credits:
0

Internship or other Capstone Experience:
NSCI 583 Special Topics

Assurances

I certify that the program will not unnecessarily duplicate an existing program of another Missouri institution in accordance with 6 CSR 10-4.010, subsection (9)(C) Submission of Academic Information, Data and New Programs.

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

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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Thebeau

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PROGRAM IDENTIFICATION SHEET

Instructions:

- Please save this file to your desktop with the following format: year of submission.program name. (example: "2011.BS-Biochemistry")
- Please answer ALL aspects of the topics noted in the form below. Incomplete or inadequate responses will result in requests for additional information and may delay the overall approval process.
    - Please DO NOT TYPE in the boxes of this form containing the numbered headings (ex. "I. Academic Division/School"). Each response should begin in the "blank" box just below the heading box.
- Proposals should be written so that colleagues outside your discipline are able to comprehend your proposal.
- Submit one hard copy (signed by division chair) and one electronic copy (Microsoft Word) of this completed form to the Chair of the Academic Affairs Committee.

I.	**Academic Division/School** *a. Is this program an undergraduate or graduate program?* *b. Under which MBU academic division does this program fit?*
	a. Graduate Program *b.* Natural Sciences Division
II.	**Needs Analysis** *Please address* *a. justification of the need for proposed program (clientele served, economic need, educational need); documentation on how this need was established (cite local, state (http://www.missourieconomy.org/), and national workforce projections (http://www.bls.gov/, http://www.dol.gov/))* *b. identification and documentation of potential employers of graduates; description and documentation of qualifications prospective employers require* *c. projected enrollment when program begins (including new FTE and students who may be migrating to the new program from an existing program); projected enrollment in 5 years; method(s) of reaching projections; contingency plan if enrollment projections are not achieved* *d. identification of other programs in the field, particularly similar programs at other institutions in our traditional market area as well as national online programs (public and independent); identification of MBU's niche given the programs listed above.*

Justification of the need for proposed program

MBU's ECP's Perspective:

High school teachers who wish to be approved to teach dual credit must have the same credentials as adjunct instructors on campus. According to the Higher Learning Commission (HLC) requirements, this requires the high school teacher to hold at least a master's degree in the discipline that they are

teaching. If the teacher holds a master's degree in a different discipline, then they must have at least 18 hours of graduate credit in the discipline.

MBU ECP currently partners with more than 40 high schools. Anecdotal evidence from those high schools suggests that as credentialed teachers retire, it is becoming increasingly more difficult to replace them because their colleagues do not have the graduate credentials.

The 2018 article entitled "Rural Recruiting Problems" published by Inside Higher Ed https://www.insidehighered.com/news/2018/01/23/colleges-and-states-scramble-comply-instructor-credential-rules-dual-credit-courses also suggests that schools in rural areas struggle even more markedly in finding high school teachers who meet the HLC requirements for dual credit teaching.

Another insightful article, entitled "Addressing a Major Barrier to Dual Enrollment" https://files.eric.ed.gov/fulltext/ED598308.pdf states clearly that "an acute shortage of qualified instructors threatens to derail dual enrollment (a.k.a. "dual credit" in Missouri), an effective and popular college transition strategy, just as the movement is picking up steam."

The MBU Early College Partnerships (ECP) program has had an average annual revenue of $750,000 and an average annual enrollment of 3,000 students over the past ten years. These numbers show that the ECP program serves as a profit center and a significant contributor to overall enrollment. As such, it is vital to maintain enrollment in the dual credit model of delivery. Of the credit hours earned through MBU ECP, approximately 90% of those were through the dual credit model and 90% of those hours are earned are through Natural Sciences. To maintain and grow enrollment, a generous pool of credentialed high school teachers must be available. Additionally, the University is now offering an Associates of Arts degree and many high school students, especially those in rural areas, are showing interest in pursuing this degree. Some community colleges have partnered with the high schools to offer early college programs that will enable students to obtain an Associate of Arts degree while still attending high school. To stay competitive, MBU ECP is also pursuing similar partnerships with local high schools. The Associate of Arts degree requires ten hours of credit from Natural Sciences which the students will need to obtain through credentialed dual credit teachers.

Currently, high school teachers who wish to obtain their credentials must turn to competing institutions, such as Saint Louis University and the University of Missouri – St. Louis, to earn graduate credit. Once a teacher begins to make connections inside an institution, it seems that they may tend to keep their association through dual credit offerings.

With a Master of Science in Biology Education, Chemistry Education, or Mathematics Education, MBU ECP would have a legitimate option for its partnering schools to offer to their teachers. In addition, since the Natural Sciences courses make up 90% of the dual credit courses, most of the current and potential dual credit teachers would benefit from master's level courses in their discipline.

MBU's Division of Natural Sciences Perspective:
In addition to strengthening and developing new ECP partnerships, Missouri Baptist University has a unique opportunity to aid in the development of all secondary educators. All certified Missouri educators are required to perform ongoing Professional Development Hours (https://dese.mo.gov/educator-quality/certification/required-professional-development-hours). College credit hours offered by Missouri Baptist University can be used as a source of professional development hours. Additionally, earning a master's degree in conjunction with 10 years of experience or national certification allows Missouri educators exemption from the professional development requirement. The Master of Science in Biology Education, Chemistry Education, or Mathematics Education being proposed allows any Missouri educator to fulfill professional development hours while working toward professional development exemption status in an online format.

The planned online format of this degree allows educators to complete the degree coursework while maintaining full-time teaching status. In addition to fulfilling Missouri professional development requirements, the online format of this degree allows educators nationally to also work toward a Master of Science in Biology Education, Chemistry Education or Mathematics Education. Professional development and/or seeking a master's degree is central to most state educator certification requirements.

In addition to professional development, many school districts factor in graduate degrees and credits when determining an instructor's pay scale. By offering this master's degree, Missouri Baptist University would gain the ability to draw potential students from ECP, professional development, financial, and career advancement pools.

In addition to the financial benefits raised through tuition, this Master of Science program will expand the recognition and influence of Missouri Baptist University. This program has the potential to yearly serve up to 19 high school teachers, which each have an impact on hundreds of high school students. This recognition has the potential to spread Missouri Baptist University's name and our science and education prowess throughout high schools and school districts. This program also can be used as a marketing tool to highlight our university's forward-thinking commitment to developing science and math educators who can address modern scientific concerns. The importance of STEM fields over the next few generations is unquestioned, and Missouri Baptist University has the opportunity invest in graduate STEM education through this MSSE program. This commitment to the future will show our partners and the entire St. Louis community our willingness to proactively confront the challenges and needs of today and tomorrow.

The Natural Sciences division is also blessed with mostly terminally degreed instructors. This allows the NAS division to offer the graduate level, content specific courses necessary to fulfill the 18 hrs of graduate credit in the discipline.

<u>Identification and documentation of potential employers of graduates</u>

The target pool of candidates for this program is currently employed high school or middle school teachers. Theses teachers are expected to complete the program while employed and upon the graduation from the program, take on expanded roles within their institution.

Projected enrollment when program begins
The target enrollment is ten students.

Identification of other programs in the field, particularly similar programs at other institutions in our traditional market area as well as national online programs

There are very few programs in this area that are offering what we would like to offer. Our program would offer both an education degree and the opportunity to achieve 18 hours of content needed to teach ECP and/or undergraduate courses.

Institutions in our traditional market area

- University of Missouri - Science Education (MEd)

Online Institutions

- Western Governor's University – Master of Arts in Teaching Science
- Grand Canyon University - Master of Science (MS) in Chemistry Education, Master of Science (MS) in Chemistry Education, Master of Science in Mathematics with an Emphasis in Education
- Colorado State University - Master of Natural Sciences Education (M.N.S.E.)

III. **Programmatic goals**

Include

a. *summary of proposed program's educational and career objectives*
b. *brief overview of curriculum (how many new courses, revisions of existing courses, etc.)*
c. *learning outcomes students should demonstrate upon completion and plan for assessment*

Summary of proposed program's educational and career objectives

Master of Science in Biology Education, Chemistry Education and Mathematics Education are fully online programs offered by the Natural Sciences Division. Each degree couples a concentration in Biology, Chemistry, or Mathematics with pedagogical instruction and research. The main goal of these degrees is to produce middle school and high school science teachers with advanced content competency and pedagogical strategies. The graduates from this program can inspire their students through their ability to impart their science and/or math skills, and to make knowledge of their discipline interesting and relevant.

These programs are offered in response to the growing needs of the greater St. Louis area and the state of Missouri where qualified high school science teachers are in demand to teach dual credit classes and prepare students for AP tests.

Brief overview of curriculum (how many new courses, revisions of existing courses, etc

Each of the degrees will consist of a Curriculum and Instruction Core and a Content Area (Biology, Chemistry, or Mathematics) Core. The four Curriculum and Instructor Core courses will consist of existing graduate courses already being offered in the education division. Each content core (Biology, Chemistry, Math) will consist of six courses. One of the six content courses will be a dual

listing of a preexisting course (GRED 543). The five remaining courses from each content core will be new courses.

Learning outcomes students should demonstrate upon completion and plan for assessment

Graduates of the Master of Science Program:

1) Enhance their depth and breadth of understanding of selected relevant topics in science/math education.
2) Gain tools to improve learning and engagement by immersing in coursework related to curriculum development, instructional theory, and pedagogy.
3) Augment their instructional skills with courses that explore classroom management, presentation skills, communication, and discipline.
4) Apply theories and best practices of curriculum, instruction, and assessment relevant to their roles in education.
5) Use technology effectively to support collaboration and engagement in the process of knowledge construction.
6) Engage in reflection and critical inquiry to explore educational issues related to curriculum and instruction.

IV. **Degrees and/or Certifications**
B.S., B.A. (or both), Certificate, A.S., A.A.S., M.A, etc.

MASTER OF SCIENCE IN BIOLOGY EDUCATION

MASTER OF SCIENCE IN BIOLOGY EDUCATION REQUIREMENTS: 30 hours Total*

- REQUIRED CURRICULUM AND INSTRUCTION CORE: 6 - 12 Hours
  - ECTA 523 Integration of Curriculum, Instruction, and Assessment
  - EDUC 573 Applications of Technology
  - ETOP 563 Legal Issues in Regular and Special Education
  - ETOP 583 Perspectives on Diversity in Education

- BIOLOGY CORE: 18 Hours
  - BIOL 543 - Advanced Human Physiology
  - BIOL 563A – Molecular Genetics
  - BIOL 533A – Immunology
  - BCHM 553 - Biochemistry II
  - BIOL 573 - Advanced Methods in Biology Education
  - BIOL 543B - Methods of Inquiry I

- BIOLOGY ELECTIVES: 0 - 6 Hours
  - HSCI 523 - Neurological Diseases
  - HSCI 543 - Environmental Health
  - HSCI 553 - Infectious Disease
  - NSCI 583 – Special Topics in Natural Sciences

MASTER OF SCIENCE IN CHEMISTRY EDUCATION

MASTER OF SCIENCE IN CHEMISTRY EDUCATION REQUIREMENTS: 30 hours Total*

- REQUIRED CURRICULUM AND INSTRUCTION CORE: 12 Hours
  - ECTA 523 Integration of Curriculum, Instruction, and Assessment
  - EDUC 573 Applications of Technology
  - ETOP 563 Legal Issues in Regular and Special Education
  - ETOP 583 Perspectives on Diversity in Education

- CHEMISTRY CORE: 18 Hours
  - CHEM 543C Methods of Inquiry I
  - CHEM 573 Advanced Methods in Chemistry Education
  - CHEM 553 Instrumental Methods for Chemical Analysis
  - CHEM 523 The Chemistry of Natural Products
  - CHEM 503 Study of Processes and Research Methods in Chemistry
  - BCHM 553 Biochemistry II

- CHEMISTRY ELECTIVES: 0 - 6 Hours
  - CHEM 533 - Special Topics in Chemistry
  - CHEM 583 - Chemistry Research

MASTER OF SCIENCE IN MATHEMATICS EDUCATION

MASTER OF SCIENCE IN MATHEMATICS EDUCATION REQUIREMENTS: 30 hours Total*

- REQUIRED CURRICULUM AND INSTRUCTION CORE: 6- 12 Hours
  - ECTA 523 Integration of Curriculum, Instruction, and Assessment
  - EDUC 573 Applications of Technology
  - ETOP 563 Legal Issues in Regular and Special Education
  - ETOP 583 Perspectives on Diversity in Education

- MATH CORE: 18 Hours
  - MATH 543M Methods of Inquiry I

- MATH 573 Advanced Methods in Mathematics Education
- MATH 553A Advanced Calculus I
- MATH 523 Abstract Algebra
- MATH 563 Numerical Analysis
- MATH 583 Advanced Educational Statistics

- MATH ELECTIVES: 0 - 6 Hours
  - MATH 533 – Advanced Differential Equations
  - MATH 593 – Special Topics In Mathematics
  - EDAD 523 - Data Analytics and Technology for Administrators (WDL)

*Student may transfer in up to 6 credits (including prior experience) towards degree.

V. **Primary means of program delivery**
Will this program (at least initially) be delivered via traditional (face-to-face), on-line, or blended/hybrid format?

Classes will be offered online only.

VI. **Primary location**
Will this program be offered (at least initially) only on main campus, extension sites, or both?

Classes will be offered online only.

VII. **Faculty Profile**
Discuss the faculty resources required to support this program, including

a. *number of and credentials of program faculty.*
b. *name and qualifications of each current faculty member who will teach required and/or elective courses in the program*
c. *effect the addition of this program will have on their course load*
d. *number of additional faculty hires that will be required to support implementation and growth of the program*
e. *identify whether any of the faculty positions listed in "b" and/or "d" are critical to the success of the proposed program and a contingency plan in case those faculty members leave the University.*

<u>Number of and credentials of program faculty & name and qualifications of each current faculty member who will teach required and/or elective courses in the program</u>

1. Dr. Mary Vedamuthu, Ph.D. in Chemistry, Professor of Chemistry
2. Dr. Lydia Thebeau, Ph.D. in Biology, Professor of Biology
3. Dr. Shayani Pieris, Ph.D. in Plant Biology, Associate Professor of Plant Biology
4. Dr. Jason Vermette, Ph.D. in Mathematics, Associate Professor of Mathematics
5. Dr. Mark Duerr, Ph.D. in Biochemistry and Molecular Biology, Assistant Professor of Biochemistry and Molecular Biology
6. Dr. Andrew Elvington, Ph.D. in Biology, Adjunct Professor

7. Dr. Dawn Huber, D. C., Assistant Professor of Biology and Biochemistry
8. Dr. Timothy Delicath, Ph.D. in Higher Education Administration and a Minor in Research Methods and Statistics, Associate Professor of Educational Research
9. Mr. Alan Blize, MS in Chemistry + 15 years of Research Experience in Industry
10. Dr. Paul Wilson, DPM, Special Lecturer in Biology

Effect the addition of this program will have on their course load

On average, each of the instructors above will teach two courses (6 credits) each calendar year. Some teachers may teach less, while some may teach more (*Vermette in particular, due to lack of more qualified math faculty*). If these graduate courses replace each instructor's undergraduate load directly, the following list displays the total deficit by undergraduate program.

CHEM – 15 credit hours

BCHM – 3 credit hours

BIOL – 15 credit hours

MATH – 18 credit hours

Number of additional faculty hires that will be required to support implementation and growth of the program

No additional full-time faculty will be needed to start and sustain this program.

Identify whether any of the faculty positions listed in "b" and/or "d" are critical to the success of the proposed program and a contingency plan in case those faculty members leave the University.

Due to the expertise offered by the primary faculty in their respective fields and credentialing, loss of any of the primary instructors (Vedamuthu, Duerr, Pieris, Vermette) would require replacement to support both their graduate and undergraduate course loads.

VIII. **Academic Support**

What types of academic support will this program require for implementation and growth? Specifically address

a. library resources
b. IT
c. Distance Learning
d. Student Development (including Student Services, Academic Success Center)
e. other

All areas of academic support are presently in place.

Library resources

Students in this program would need access to digital versions of education and content specific journals. Listed below are some of the common journals. Professors may have specific journal access needs by course.

- Nature
- Cell
- Journal of Chemical Education
- American Educational Research Journal
- TBD

IT/Distance Learning

Student IT/Distance Learning support needs should be met by the current IT/Distance Learning infrastructure, support, and staff.

Student Development (including Student Services, Academic Success Center)

Due to the high-level content of this program, student development support would be minimal. Students would be expected to interact directly with faculty.

Other

Graduate admissions and advisors would have the additional caseload of program applicants and students.

IX. **Program Review/Assessment and Accreditation**

Include

a. *outline of the 5-year plan for programmatic review including external and internal methods for assessment of program objectives and student learning outcomes*
b. *use of programmatic review for program improvement*
c. *accrediting body relevant to this program, including discussion of the plan for program accreditation and proposed timeline to application for accreditation.*

Outline of the 5-year plan for programmatic review including external and internal methods for assessment of program objectives and student learning outcomes

Course Level Assessments aligned to program and course-level learning objectives.

Use of programmatic review for program improvement

Analysis of course level assessments will be conducted annually for program improvement as needed.

Accrediting body relevant to this program, including discussion of the plan for program accreditation and proposed timeline to application for accreditation.

There is not an accrediting body specific for this graduate program.

X. **Facilities, Equipment**

Discuss physical resources for this proposed program, including

a. *laboratories, equipment needs*
b. *ongoing/consumable supplies*
c. *maintenance costs, etc.*

Laboratories, equipment needs

All courses will be offered online and require no extra on-campus lab or equipment resources.

Faculty may need additional computer and peripheral resources for interacting with students.

- Computers
- Webcams
- Microphones
- Tablets

Course development stipends will need to be budgeted and disbersed.

Ongoing/consumable supplies

All courses will be offered online and require little to no ongoing/consumable supplies outside of IT resources.

Maintenance costs, etc.

All courses will be offered online and require little to no maintenance costs outside of IT resources.

XI. **Proposed Program Budget**

Prepare a preliminary budget including

a. *capital costs of establishment of program*
b. *intangible costs or liabilities*
c. *PR costs*
d. *HR costs (new faculty, support staff, etc.)*
e. *additional library resources*
f. *accreditation (including consulting fees, etc.)*

Capital costs of establishment of program

See Budget

Intangible costs or liabilities

No liabilities

PR costs

- Using existing ECP network to get word out
- Advertising via MBU University Communications
- Advertising to local high schools

HR costs (new faculty, support staff, etc.)

- Adjunct/Overload contracts
- Added graduate admissions and advisor workload – no additional cost as they can assume the additional responsibilities in current workload.

Additional library resources
Journal subscriptions (institutional or is there an option for just a division?)

Accreditation (including consulting fees, etc.)
No accreditation

XII. **Areas of Special Concern**
Please include any atypical concerns or issues that may affect the program such as
a. financial aid eligibility of prospective students
b. special or optional admission requirements, etc.

- General graduate admissions requirements: 2.75

SUGGESTED DATE OF IMPLEMENTATION: Fall 2022

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ENDORSEMENTS

UNIT	APPROVE	DISAPPROVE	SIGNATURE	DATE
Division	_____	_____	_____	_____
VP for Business Affairs	_____	_____	_____	_____
Academic Affairs (U/G)	_____	_____	_____	_____
Graduate Affairs (Grad)	_____	_____	_____	_____
Faculty	_____	_____	_____	_____
Provost	_____	_____	_____	_____
President	_____	_____	_____	_____

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IMPLEMENTATION: Yes ____ No _____ Effective Date: _____