MICHIGAN STATE
U N I V E R S I T Y

February 10, 2023

MEMORANDUM

TO: Dr. Mark Largent, Associate Provost for Undergraduate Education
                   and Dean of Undergraduate Studies

FROM: Joy Speas, University Curriculum Administrator

RE: Request for a <u>New</u> Bachelor of Science Degree in Mathematics-Secondary Education

                <u>For Transmittal to the University Committee on Undergraduate Education (UCUE)</u>

The request referenced above is being sent to the University Committee on Undergraduate Education (UCUE) in accordance with the *Bylaws for Academic Governance*, 4.4.

<u>UCUE Response Requested:</u>

Please ask the committee to consider the request referenced above and provide consultative commentary. Please mail the related materials referenced under the heading <u>Attachments</u> at the end of this memorandum to the committee members.

After receiving the committee's consultative response, the Provost will make a determination to forward or not to forward the request to the University Committee on Curriculum for its approval of curriculum and degree requirements.

If you have any questions, please call me at 5-8420.

Thank you.

<u>Attachments</u>:

1.   Request to Establish a New Academic Program form dated February 3, 2023: Bachelor of Science Degree in Mathematics-Secondary Education and attachments.

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University Curriculum and Catalog

Hannah Admin. Building
426 Auditorium Road
Suite 430
East Lansing, MI 48824

517-355-8420
Fax: 517-355-9601

View a Program	
Joy Speas, Office of the Registrar	Tuesday, 2/7/2023

Program Name: Mathematics-Secondary Education Degree: BS Sequence Number: 1	Program Request ID: 4910

Effective Dates: Fall 2023 - Open   Status: Interim   Initial Action: New
Requested Date: 12/7/2022 1:10:10 PM

1. Department/School/College:

  10032574 .... Department of Mathematics

2. Name of Program:

  Mathematics-Secondary Education

3. Name of Degree:

  BS

4. Type of Program:

  Major

5. Effective Start Semester:

  Fall 2023

6. Target student audience for the program:

  Students planning to get certified to teach mathematics at the Secondary level

7. Enrollment:

  What is the expected enrollment per year: 30

  What is the minimum enrollment acceptable: 10

8. Source of budget for the program:

  To align academic planning and curricular change, ALL requests for NEW funds must be included in the College's annual planning letter. Provost approval of new funds and the effective date for the new program must align. If funding is not approved, then the program request will not be forwarded to Faculty Senate.

  Internal reallocation

If new funds, was this request included in the College's annual planning letter?
Indicate yes or no. If no, then this is a department or college fund reallocation (If the program is implemented, no additional resources are required.).
no new funds required in our department

9. Projected Costs as compared to other programs in unit:

Lower

10. Staff requirement:

How many additional staff will be required: 0

Who will provide the primary instruction. Describe any external linkages(industry, government, etc.):
Math Department Faculty

11. Will additional equipment be required:

Approximate cost: 0

Source of funding:

12. Will additional library materials be required:

Approximate cost: 0

Source of funding: NA

13. Will additional space be required:

Type: NA

Approximate amount: 0

14. If the program requirements contain a named concentration, do you wish for the concentration to be noted on the student's transcript?:

No

15. Detailed Description:

[A] Based on an extensive discussion with representatives from the College of Education, and agreement by the Mathematics Undergraduate Studies Committee, this proposal will create a new major: B. S. In mathematics for secondary education. This is necessitated by the new 6-12 teacher certificate standards in the state of Michigan and university's desire to have students complete the Bachelor's degrees in 4 years while completing the teacher certification requirements.
The former pathway, a 4 year BS + 1 grad year, will no longer be an option. Based on current requirements of the Math BS, it is not possible for a student to complete all requirements for the Math BS and Teacher certification in 4 years. Therefore, this new degree offers the core needed for students pursuing Secondary Education for Mathematics.
Standards for the Preparation of Teachers of Mathematics (michigan.gov) (https://www.michigan.gov/-/media/Project/Websites/mde/educator_services/prep/standards/mathematics_standards_59_712.pdf?rev=88a6c576b1b248cc8829dc64f8a41421)

[B] MSU continues to offer students the option of getting certified to teach Mathematics at the Secondary level via relationship between the Dept of Mathematics and College of Education.

[C] The core subject area for this major is Mathematics. This degree will be available through the College of Natural Science in the Department of Mathematics

[D] The goals of this program are to adequately prepare students to teach Mathematics at the Secondary level by gaining:

-a thorough foundation of Mathematics, both in content and practice as presented by MTH courses

-a thorough understanding of Educational pedagogy and instructional methods as presented by TE courses

-a thorough core understanding in the sciences as presented by CNS core requirements

- through foundation in general education as presented by MSU's university requirements

[E] The following faculty have assisted with the development of this program:

Michael Brown – Teaching Specialist, Department of Mathematics

Willie Wong – Associate Professor, Mathematics Department

Kristen Bieda - Associate Professor, Department of Teacher Education and Program in Mathematics Education

[F] The Department of Mathematics will monitor program completion requirements. Successful completion will be determined by successful completion of all course listed in section [G] below. Collaboration between the Department of Mathematics and College of Education to provide advising resources for student success will be included.

[G] Requirements for the Bachelor of Science Degree in Mathematics -- Secondary Education

1. University Requirements

    The University requirements for bachelor's degrees as described in the Undergraduate

    Education section of this catalog; 120 credits, including general elective credits, are
    required for the Bachelor of Science degree in Mathematics-Secondary Education.

    The University's Tier II writing requirement for the Mathematics-Secondary Education major is met

    by completing Mathematics 309 and Mathematics 396. Those courses are referenced in

    item 3.b. below.

    Students may substitute the TE 101 and TE 102 for two ISS requirements. Students
    may substitute TE 341 for one IAH requirement. Those courses are referenced in item

    3.d. below.

2. The requirements of the College of Natural Science for the Bachelor of Science
    degree. (19 to 23 credits):

            The credits earned in certain courses referenced in requirement 3. Below may be counted

toward College requirements as appropriate.

3. The following requirements for the major:

  a. The following courses outside the Department of Mathematics (19 to 23 credits):

(1) One course of at least 3 credits in biological science, entomology, microbiology, physiology, plant biology, or integrative biology. (3 or 4 credits) And at least 2 credits in laboratory in biological science, chemistry, entomology, microbiology, physics, physiology, plant biology, or integrative biology. These are met by

    2.c. below and 1 additional credit if not taking CEM 185H.

(2) One course from each of the following groups (8 or 10 credits):

    (a) CEM 141 General Chemistry 4

        CEM 151 General and Descriptive Chemistry 4

        CEM 181H Honors Chemistry I 4

        LB 171 Principles of Chemistry I 4

    (b) CEM 142 General and Inorganic Chemistry 3

        CEM 152 Principles of Chemistry 3

        CEM 182H Honors Chemistry II 4

        LB 172 Principles of Chemistry II 3

    (c) CEM 161 Chemistry Laboratory I 1

        CEM 185H Honors Chemistry Laboratory I 2

        LB 171L Introductory Chemistry Laboratory I 1

(3) One of the following groups of courses (8 to 10 credits):

    (a) PHY 183 Physics for Scientists and Engineers I 4

        PHY 184 Physics for Scientists and Engineers II   4

    (b) PHY 193H Honors Physics I -Mechanics 4

        PHY 294H Honors Physics II – Electromagnetism 4

    (c) LB 273 Physics I 4

        LB 274 Physics II 4

    (d) PHY 173 Physics I 5

        PHY 174 Physics II 5

b. A total of 33-37 credits in courses in the Department of Mathematics including

(1) One course from each of the following two groups (7 or 8 credits):

    (a) MTH 132 Calculus I 3

        MTH 152H Honors Calculus 3

        LB 118 Calculus I 4

    (b) MTH 133 Calculus II 4

        MTH 153H Honors Calculus II 4

        LB 119 Calculus II 4

(2) One of the following courses (4 credits):

        MTH 234 Multivariable Calculus 4

        MTH 254H Honors Multivariable Calculus 4

        LB 220 Calculus III 4

(3) One of the following two groups of courses (4 or 7 credits):

    (a) MTH 299 Transitions 4

        MTH 309 Linear Algebra I 3

    (b) MTH 317H Honors Linear Algebra   4

(4) The following 4 courses (12 credits):

        MTH 304 Algebra and Calculus for Sec. Ed. 3

        MTH 305 Discrete and Comp. Math for Sec. Ed. 3

        MTH 330 Higher Geometry 3

        MTH 396 Math Capstone for Secondary Education 3

(5) One of the following courses (3 credits):

MTH 310 Abstract Algebra I and Number Theory 3
MTH 418H Honors Algebra I 3
(6) One of the following courses (3 credits):
MTH 320 Analysis I 3
MTH 327H Honors Introduction to Analysis 3
c. The following computational and statistics courses from outside the department of Mathematics.
(7 credits)
(1) One of the following courses (4 credits):
CMSE 201 Computational Modeling and Data Analysis I 4
CSE 231 Introduction to Programming I 4
(2) The following course (3 credits):
STT 430 Intro to Probability and Statistics 3

d. The following Professional Education Courses in the Department of Teacher Education (36 credits)
(1) All of the following course from the shared professional sequence (18 credits):
TE 101 Social Foundations of Justice and Equity in Education 3
TE 102 Pedagogy and Politics of Justice and Equity in Education 3
TE 150 Reflections on Learning 3
CEP 240 Diverse Learners in Multicultural Perspective 3
TE 302 Literacy and Adolescent Learners in School and Community Contexts 3
TE 341 Teaching and Learning of (Bi)Multilingual Learners 3
(2) All of the following course from the subject-specific professional sequence (18 credits):
TE 314 Clinical Experiences in Mathematics Education I 3
TE 414 Clinical Experiences in Mathematics Education II 3
TE 415 Seminar in Mathematics Education I 3
TE 416 Seminar in Mathematics Education II 3
TE 417 Student Teaching Internship in Mathematics Education 6

[H] All courses will be offered MSU's main campus. However, components of TE courses will included visits to schools for observation and student teaching experiences.
[I] Current teaching certificate plans will no longer be an option.
[J] N/A

16. Are there admissions requirements for this program?:

Grade or grade-point average requirements and if so in which course(s), portfolio requirement, audition, essay, etc. If there are not admission requirements other than those required by the University policy indicate "none".
None from the Math department. The college of education has a minimum 2.5 major gpa requirement.

DEPARTMENT LEVEL APPROVAL STATUS

Approved: Department of Mathematics
1/27/2023 8:31:34 AM by Brian Chadwick for Keith Promislow, Chairperson

SIGNOFFS STATUS

Signed Off: College of Education
1/27/2023 8:40:21 AM by Carrie Oney

Signed Off: Lyman Briggs College
2/3/2023 2:30:05 PM by Niki Rudolph for Kendra Spence Cheruvelil, Acting Dean

COLLEGE LEVEL APPROVAL STATUS

Approved: College of Natural Science
2/3/2023 2:42:41 PM by Lynmarie Posey for LynnMarie Posey, Associate Dean

Comments: Approved by NatSci Curriculum Committee 12/19/22.

Call us: (517) 355-3300

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Site Accessibility (/siteaccessibility.aspx#)

DRAFT

UNDERGRADUATE PROGRAMS

The Department of Mathematics offers degree opportunities leading to a Bachelor of Arts or a Bachelor of Science in Mathematics, a Bachelor of Arts or a Bachelor of Science, Mathematics, Advanced, a Bachelor of Science in Computational Mathematics, and a Bachelor of Science in Actuarial Science. The Bachelor of Arts degree programs require a higher level of foreign language competency, while the Bachelor of Science degree programs require science proficiency beyond that established by the college.

[a Bachelor of Science in Mathematics-Secondary Education,]

Graduates with the Bachelor of Art and Bachelor of Science degrees find a wide range of career options in industry and teaching fields. The Bachelor of Arts and Bachelor of Science programs prepare students for continuing study in top graduate schools or for the pursuit of careers in mathematically intensive fields. The Bachelor of Science in Computational Mathematics prepares students for either for graduate study or for careers that rely upon computational models and tools.

[The Bachelor of Science in Mathematics-Secondary Education prepares students to teach mathematics at the secondary level.]

Students with a Bachelor of Science degree in Actuarial Science are sought after by insurance companies, banks, investment firms, government agencies, and businesses that weigh the financial consequences of risk. Course work prepares students for the Society of Actuaries examinations as well as the Validation by Educational Experience course work necessary to become an Associate of the Society of Actuaries.

A Minor in Mathematics and a Minor in Actuarial Science are also available.

[Insert   1]

MINOR IN MATHEMATICS

The Minor in Mathematics, which is administered by the Department of Mathematics, will broaden students' understanding and application of mathematical concepts to their chosen field of study.

The minor is available as an elective to students who are enrolled in bachelor's degree programs at Michigan State University other than the Bachelor of Arts and Bachelor of Science Degree in Mathematics. With the approval of the department and college that administer the student's degree program, the courses that are used to satisfy the minor may also be used to satisfy the requirements for the bachelor's degree.

MATHEMATICS-SECONDARY EDUCATION

The Bachelor of Science Degree in Mathematics-Secondary Education adequately prepares students to teach mathematics at the secondary level. Students gain a thorough foundation of mathematics, both in content and practice, and a comprehensive understanding of educational pedagogy and instructional methods.

Requirements for the Bachelor of Science Degree in Mathematics-Secondary Education

CREDITS

1. The University requirements for bachelor's degrees as described in the *Undergraduate Education* section of this catalog; 120 credits, including general elective credits, are required for the Bachelor of Science degree in Mathematics-Secondary Education.

    The University's Tier II writing requirement for the Mathematics-Secondary Education major is met by completing Mathematics 309 and 396. Those courses are referenced in item 3. below.

    Students may substitute Teacher Education 101 and 102 for two ISS requirements.
    Students may substitute Teacher Education 341 for one IAH requirement.

2. The requirements of the College of Natural Science for the Bachelor of Science degree. The credits earned in certain courses referenced in requirement 3. below may be counted toward College requirements as appropriate.

3. The following requirements for the major:
    a. The following courses outside the Department of Mathematics (19 to 23 credits):
        (1) One course of at least 3 credits in biological science, entomology, Microbiology, physiology, plant biology, or integrative biology
        At least 2 credits in laboratory in biological science, chemistry, microbiology, physics, physiology, plant biology, or integrative biology.

        This requirement is met by fulfilling the course requirements in item b. (3) below and 1 additional credit if not taking CEM 185H.
    b. One course from each of the following groups (8 or 10 credits):

(1)	CEM	141	General Chemistry	4
	CEM	151	General and Descriptive Chemistry	4
	CEM	181H	Honors Chemistry I	4
	LB	171	Principles of Chemistry I	4
(2)	CEM	142	General and Inorganic Chemistry	3
	CEM	152	Principles of Chemistry	3
	CEM	182H	Honors Chemistry II	4
	LB	172	Principles of Chemistry II	3
(3)	CEM	161	Chemistry Laboratory I	1
	CEM	185H	Honors Chemistry Laboratory I	2
	LB	171L	Introductory Chemistry Laboratory I	1

    c. One of the following groups of courses (8 to 10 credits):

(1)	PHY	183	Physics for Scientists and Engineers I	4
	PHY	184	Physics for Scientists and Engineers II	4
(2)	PHY	193H	Honors Physics I – Mechanics	4
	PHY	294H	Honors Physics II – Electromagnetism	4
(3)	LB	273	Physics I	4
	LB	274	Physics II	4
(4)	PHY	173	Physics I	5
	PHY	174	Physics II	5

    d. The following courses in the Department of Mathematics (33 to 37 credits):
        (1) One course from each of the following two groups (7 or 8 credits):

	(a)	MTH	132	Calculus I	3
		MTH	152H	Honors Calculus	3
		LB	118	Calculus I	4
	(b)	MTH	133	Calculus II	4
		MTH	153H	Honors Calculus II	4

| | LB | 119 | Calculus II | 4 |

(2)   One of the following courses (4 credits):

	MTH	234	Multivariable Calculus	4
	MTH	254H	Honors Multivariable Calculus	4
	LB	220	Calculus III	4

(3)   One of the following two groups of courses (4 or 7 credits):

	(a)	MTH	299	Transitions	4
		MTH	309	Linear Algebra I	3
	(b)	MTH	317H	Honors Linear Algebra	4

(4)   All of the following courses (12 credits):

	MTH	304	Algebra and Calculus for Secondary Education	3
	MTH	305	Discrete and Computational Mathematics for Secondary Education	3
	MTH	330	Higher Geometry	3
	MTH	396	Capstone in Mathematics for Secondary Education (W)	3

(5)   One of the following courses (3 credits):

	MTH	310	Abstract Algebra I and Number Theory	3
	MTH	418H	Honors Algebra I	3

(6)   One of the following courses (3 credits):

	MTH	320	Analysis I	3
	MTH	327H	Honors Introduction to Analysis	3

e.   The following computational and statistics courses from outside the Department of Mathematics (7 credits):

(1)   One of the following courses (4 credits):

	CMSE	201	Computational Modeling and Data Analysis I	4
	CSE	231	Introduction to Programming I	4

(2)   The following course (3 credits):

	STT	430	Introduction to Probability and Statistics	3

f.   The following Professional Education Courses in the Department of Teacher Education (36 credits):

(1)   All of the following courses from the shared professional sequence (18 credits):

	CEP	240	Diverse Learners in Multicultural Perspective	3
	TE	101	Social Foundations of Justice and Equity in Education	3
	TE	102	Pedagogy and Politics of Justice and Equity in Education	3
	TE	150	Reflections on Learning	3
	TE	302	Literacy and Adolescent Learners in School and Community Contexts	3
	TE	341	Teaching and Learning of (Bi)Multilingual Learners	3

(2)   All of the following courses from the subject-specific professional sequence (18 credits):

	TE	314	Clinical Experiences in Mathematics Education I	3
	TE	414	Clinical Experiences in Mathematics Education II	3
	TE	415	Seminar in Mathematics Education I	3
	TE	416	Seminar in Mathematics Education II	3
	TE	417	Student Teaching Internship in Mathematics Education	6

COLLEGE OF NATURAL SCIENCE

1. Request to establish a **Bachelor of Science** degree in **Mathematics-Secondary Education** in the Department of Mathematics. The University Committee on Undergraduate Education (UCUE) will consider this request at its February 16, 2023 meeting.

   a. **Background Information**:

   Based on an extensive discussion with representatives from the College of Education, and agreement by the Mathematics Undergraduate Studies Committee, this proposal will create a new major, a Bachelor of Science Degree in Mathematics-Secondary Education. The new 6-12 teacher certificate standards (*https://www.michigan.gov/-/media/Project/Websites/mde/educator_services/prep/standards/mathematics_standards_59_712.pdf?rev=88a6c576b1b248cc8829dc64f8a41421*) in the state of Michigan necessitate the need for the new program along with the university's desire to have students complete the Bachelor's degree in 4 years while completing the teacher certification requirements.

   The former pathway, a 4-year bachelor's and one year of graduate study, will no longer be an option. Based on current requirements of the Bachelor of Science Degree in Mathematics, it is not possible for a student to complete all requirements for the existent Mathematics BS and teacher certification requirements in 4 years. Therefore, the proposed new degree offers the core requirements needed to adequately prepare students pursuing Secondary Education in Mathematics, and providing the option of becoming certified to teach Mathematics at the Secondary level.

   b. **Academic Programs Catalog Text**:

   The Bachelor of Science Degree in Mathematics-Secondary Education adequately prepares students to teach mathematics at the secondary level. Students gain a thorough foundation of mathematics, both in content and practice, and a comprehensive understanding of educational pedagogy and instructional methods.

   Requirements for the Bachelor of Science Degree in Mathematics-Secondary Education

   CREDITS

   1. The University requirements for bachelor's degrees as described in the *Undergraduate Education* section of this catalog; 120 credits, including general elective credits, are required for the Bachelor of Science degree in Mathematics-Secondary Education.
      The University's Tier II writing requirement for the Mathematics-Secondary Education major is met by completing Mathematics 309 and 396. Those courses are referenced in item 3. below.
      Students may substitute Teacher Education 101 and 102 for two ISS requirements.
      Students may substitute Teacher Education 341 for one IAH requirement.
   2. The requirements of the College of Natural Science for the Bachelor of Science degree.
      The credits earned in certain courses referenced in requirement 3. below may be counted toward College requirements as appropriate.
   3. The following requirements for the major:
      a. The following courses outside the Department of Mathematics (19 to 23 credits):
         (1) One course of at least 3 credits in biological science, entomology, Microbiology, physiology, plant biology, or integrative biology
         At least 2 credits in laboratory in biological science, chemistry, microbiology, physics, physiology, plant biology, or integrative biology.
         This requirement is met by fulfilling the course requirements in item b. (3) below and 1 additional credit if not taking CEM 185H.
      b. One course from each of the following groups (8 or 10 credits):

				CREDITS
(1)	CEM	141	General Chemistry	4
	CEM	151	General and Descriptive Chemistry	4
	CEM	181H	Honors Chemistry I	4
	LB	171	Principles of Chemistry I	4
(2)	CEM	142	General and Inorganic Chemistry	3

		CEM	152	Principles of Chemistry	3
		CEM	182H	Honors Chemistry II	4
		LB	172	Principles of Chemistry II	3
	(3)	CEM	161	Chemistry Laboratory I	1
		CEM	185H	Honors Chemistry Laboratory I	2
		LB	171L	Introductory Chemistry Laboratory I	1
c.	One of the following groups of courses (8 to 10 credits):				
	(1)	PHY	183	Physics for Scientists and Engineers I	4
		PHY	184	Physics for Scientists and Engineers II	4
	(2)	PHY	193H	Honors Physics I – Mechanics	4
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	(4)	PHY	173	Physics I	5
		PHY	174	Physics II	5
d.	The following courses in the Department of Mathematics (33 to 37 credits):				
	(1)	One course from each of the following two groups (7 or 8 credits):			
		(a)	MTH	132	Calculus I	3
			MTH	152H	Honors Calculus	3
			LB	118	Calculus I	4
		(b)	MTH	133	Calculus II	4
			MTH	153H	Honors Calculus II	4
			LB	119	Calculus II	4
	(2)	One of the following courses (4 credits):			
		MTH	234	Multivariable Calculus	4
		MTH	254H	Honors Multivariable Calculus	4
		LB	220	Calculus III	4
	(3)	One of the following two groups of courses (4 or 7 credits):			
		(a)	MTH	299	Transitions	4
			MTH	309	Linear Algebra I	3
		(b)	MTH	317H	Honors Linear Algebra	4
	(4)	All of the following courses (12 credits):			
		MTH	304	Algebra and Calculus for Secondary Education	3
		MTH	305	Discrete and Computational Mathematics for Secondary Education	3
		MTH	330	Higher Geometry	3
		MTH	396	Capstone in Mathematics for Secondary Education (W)	3
	(5)	One of the following courses (3 credits):			
		MTH	310	Abstract Algebra I and Number Theory	3
		MTH	418H	Honors Algebra I	3
	(6)	One of the following courses (3 credits):			
		MTH	320	Analysis I	3
		MTH	327H	Honors Introduction to Analysis	3
e.	The following computational and statistics courses from outside the Department of Mathematics (7 credits):				
	(1)	One of the following courses (4 credits):			
		CMSE	201	Computational Modeling and Data Analysis I	4
		CSE	231	Introduction to Programming I	4
	(2)	The following course (3 credits):			
		STT	430	Introduction to Probability and Statistics	3
f.	The following Professional Education Courses in the Department of Teacher Education (36 credits):				
	(1)	All of the following courses from the shared professional sequence (18 credits):			
		CEP	240	Diverse Learners in Multicultural Perspective	3
		TE	101	Social Foundations of Justice and Equity in Education	3
		TE	102	Pedagogy and Politics of Justice and Equity in Education	3
		TE	150	Reflections on Learning	3

TE	302	Literacy and Adolescent Learners in School and Community Contexts	3
TE	341	Teaching and Learning of (Bi)Multilingual Learners	3

(2) All of the following courses from the subject-specific professional sequence (18 credits):

TE	314	Clinical Experiences in Mathematics Education I	3
TE	414	Clinical Experiences in Mathematics Education II	3
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TE	417	Student Teaching Internship in Mathematics Education	6

Effective Fall 2023.