## PROGRAM REVIEW REPORT SUMMARY

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| 1. | Reporting Institution | Eastern Illinois University |
| 2. | Program Reviewed | 27.0101 MA in Mathematics |
| 3. | Date | $1 / 27 / 2022$ |
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## 5. OVERVIEW

There are two options in the M.A. program in Mathematics- Mathematics and Secondary Mathematics Education. The Mathematics Education option is generally targeted at in service teachers, while the Mathematics option was geared toward students wishing to teach at a community college or continue their study of mathematics beyond an undergraduate degree. This degree used to also have an option in Elementary/Middle Level Mathematics Education but that option saw a decline in demand as elementary/middle teachers opted for a more general graduate program in education that they could supplement with some graduate level mathematics education coursework. The Mathematics Education option is primarily a summer program and is now entirely online. Students also have options to take one class online per semester during the regular academic year (online). Currently, the Mathematics option for this degree is on hiatus but will be eliminated later this academic year. This situation will be detailed later in this report.

In the M.A. program students increase their competence in independent reading of mathematical materials (including curriculum and assessments), structure and apply mathematical knowledge appropriate to the option, learn to effectively communicate mathematics, and master selected mathematical content. In both options students engage in research appropriate to the discipline. In the Mathematics Education option, students also can potentially gain the ability to teach dual credit courses.

Graduate faculty are engaged with students and in their field. In the Mathematics option students could pursue a thesis (highly encouraged) or complete additional coursework along with some presentations to the department. This work is directed by a member of the mathematics faculty. Additionally, students took a seminar/research course every semester they are in the program to learn how to read, interpret and extend mathematics research. In the Mathematics Education option, students complete an action research project as a culminating experience to apply pedagogical principles learned. This project is always directed by a member of the mathematics education faculty. Results from this work are presented at a research day symposium in the summer. Often, action research projects results are turned into manuscripts and submitted for publication. Additionally, students in the Mathematics Education option complete a mathematics content project.

## 6. MAJOR FINDINGS AND RECOMMENDATIONS

a. (1) changes in the overall discipline or field.

Changes in teacher licensure and needs for dual credit teaching initially greatly impacted the Mathematics Education option in terms of increased enrollment in graduate courses. As a result, the department adjusted the number of content hours in the Mathematics Education option so as to ensure students took the correct number of hours needed in order to be able to teach dual credit classes. Every year there are always a number of significant results or progress made on open problems (Riemann hypotheses, sum of three cubes, Collatz conjecture to name few) in the field of mathematics but these generally have little direct impact on the program or the nature of courses we teach. This work does provide opportunities to read and look at new research in the field.

## (2) student demand

The Mathematics option has seen a decline in enrollments over the past few years to the point that the program is now on hiatus. The main impetus for this decline is that the program had several graduate assistantships taken away or reallocated to other programs. The Graduate School at Eastern wants more self-sufficient students in the program. However, it is the case that most Masters programs in mathematics that meet year round consistently offer some form of financial assistance, generally in the form of graduate assistantships. As we are a smaller state school and given that we have competing institutions close to Eastern, our ability to attract and retain students in the program is difficult without any financial assistance. At its height, the Mathematics option of the program had 9 students, nearly all supported by assistantships. These students took courses and each taught one course per semester in the department. Since Fall 2020 no new students have been admitted to this option and all current students were allowed to complete the program. While we continue to receive interest from students in the program (mainly international students), all need financial assistance. As such, after an initial move to put the Mathematics option on hiatus the department has decided to eliminate to the option at this time.

The Mathematics Education option is primarily a summer program and as a result enrollment in courses is greatest in the summer, while during the year enrollment remains low as students have the option to take one courses online each fall and spring semester. Most semesters the program has 2-3 students enrolled, while in summer we have had as many as 14-16. The demand for this program varies. There are more teachers interested in gaining the ability to teach dual credit classes than there are wanting to earn a graduate degree. Because of this, while course enrollments in summer classes are decent, the actual number of declared majors is relatively low. However, a new push to better advertise and requirement students us under way.

While the Elementary/Middle Level option served a real purpose and helped a decent number of elementary/middle level teachers earn graduate degrees, we have found many elementary/middle level teachers pursue a more general Masters in education instead of mathematics education. As such, that option is being eliminated.

## (3) societal needs

For the Mathematics Education option, the need for a teacher to enroll can come from a variety of different places with the main two being professional advancement and the other being a desire to teach dual credit courses. The ability to do action research is also an important skill in improving one's own teaching. For the Mathematics option, when it was active, most students were either looking to teach at the community college or go on to a Ph.D program in mathematics or a related field. Among our 14 most recent graduates, three are currently

## PAGE 2, IF NECESSARY: 6. MAJOR FINDINGS AND RECOMMENDATIONS

5) other elements appropriate to the discipline in question

Recruitment of students into the graduate program is essential. Currently, we have typically tried to draw students from our own undergraduate program or from secondary mathematics teachers within a 1-2 hour radius from the University. As the Mathematics Education option has moved completely online, the advertisement and recruitment of students needs to expand to attract more students.

## b. Major findings and recommendations

The department currently assesses its students/majors in several ways. In the Mathematics option we measured depth of knowledge through key performance indicators in various classesMathematics Seminar, Real Variables, Linear Algebra, Topology, Complex Variables, and Differential Geometry. We additionally measured critical thinking and problem solving through teaching evaluations and work completed in the mathematics seminar. Both oral and written communication skills were evaluated through teaching and presentations given at department colloquia. Finally, advanced scholarship through research and creative activity were assessed through thesis work and the associated thesis defense. During the time the program was active, student excelled in these categories.

The Mathematics Education option is currently assessed in several ways. The department uses standards from both the National Council of Teachers of Mathematics (NCTM) and the Association of NCTM and the American Mathematical Association of Two Year Colleges (AMAYTC) as guides for assessing content knowledge through the various graduate courses offered in the program. Students are assessed on critical thinking and problem solving skills on specific items within each content course. Students are assessed on pedagogical ideas through course items in mathematics education courses. Students are assessed on effective writing and research in the research courses and through the action research project. Effective communication is assessed through the presentation of the action research project.

## c. Actions taken since the last review

The Mathematics option was an effective program that graduated successful students who were able to pursue their desired path. As the graduate assistantships were pulled away, the ability to compete with other programs and attract students diminished. As a result, the option is being eliminated.

The Mathematics Education option has undergone some changes since the last review. As described earlier, there is a stronger demand for teachers to be able to teach dual credit course and to accommodate, the department increased the number of content hours in the program, while reducing the number of graduate level general education courses. The number of mathematics education classes remain the same. The option currently requires an independent study project that is content based. The original idea was to provide teachers ways to connect the content they were learning to their classroom. However, with the newer focus on dual credit, this project is not as necessary.

Another change to the Mathematics Education program is that it has been moved to being completely online. This allows students the option to take content courses during the regular academic year (currently one content course is offered online each semester), as well as take the regular capacity of classes in the summer. The program should have a wider range of reach now that it is online.

Finally, several previous topics courses have been turned into dedicated content courses. Part of the purpose for this change was that some community colleges would not accept topics

## COMMENTS FROM THE COLLEGE DEAN:

The MA in Mathematics has undergone recent changes. At present, the department has proposed a fully online Mathematics Education program that is awaiting approval by the Council on Graduate Studies at EIU. The program is designed to meet a strong demand for teachers interested in obtaining credentials to offer dual credit courses. The impetus for the shift to an online format is the changing requirements of students, most of whom are presently active in the workplace and are unable to participate in a face-to-face residential program. If approved, the fully online program will launch in fall 2022. The Mathematics MA option has been placed on hiatus due to low demand. The department is providing courses to teach out students currently enrolled in the program, but is not accepting new applications.

We recommend a decision of Program flagged for priority review.

## VPAA Decision:

Program in good standing0
Program flagged for priority review
Program enrollment suspended

## VPAA Explanation:

The summary above provides an overview of significant program changes that have been implemented within the Mathematics M.A. degree. Due to low enrollment, the M.A. program suspended new enrollment and is being eliminated. However, to meet high demand for graduate-level mathematics courses for teachers seeking dual-credit certification, the program has proposed a new, fully-online Mathematics Education M.A. as well as a dual-credit certificate. Both pathways are expected to see healthy enrollment.

## Resources for Completing the Eight-Year IBHE Program Review Report

Section 5. Overview
This section will focus the review for your reader.
In no more than half a page, please explain your program's mission and its relationship to Eastern's mission (and, if applicable, to the mission of graduate education). Identify similar programs in the state; distinguish your program from them. You also should identify your program's student learning objectives and career/further education objectives, and summarize significant changes, achievements (by faculty and students and the program itself), and plans for the future.

## Section 6. Major Findings and Recommendations

These are the standard IBHE questions:

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a. Description and assessment of any major changes in the program:
(1) changes in the overall discipline or field
(2) student demand
(3) societal needs
(4) institutional context for offering the degree
(5) other elements appropriate to the discipline in question
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What, if any, internal or external events have affected your program since the last review? Have enrollments, degree production, costs, student satisfaction, job placement, etc. changed significantly? Has the discipline's governing body approved a new name for the programs it represents; updated/revised curricular requirements; identified new markets; developed new emphases? Have nationwide demographic changes or social policies affected enrollments or requirements for good or for ill?

In addition to the items included in the "Accountability" section of the VPAA website (see the left-hand navigation box at http://castle.eiu.edu/~acaffair/ ), the resources listed below may help you to respond to item 6.a:

1. The IBHE Data Bank http://www.ibhe.state.il.us/Data\ Bank/default.htm includes the Data Book, which provides statewide discipline-based data on enrollments, degree production, and costs; as well as a variety of other data on statewide enrollments, degree production, credit hour production, and costs.
2. The Institutional Research web page available at https://www.eiu.edu/ir/ houses EIU'sData Books and the IBHE Alumni survey results, as well as a great deal of information about EIU students (ACT scores, degrees awarded, retention rates, etc.)
3. Occupational projections are available from many professional journals and organizations, as well as:
a. the Bureau of Labor Statistics http://stats.bls.gov/
b. ISBE's Educator Supply and Demand Report http://www.isbe.state.il.us/research/htmls/supply and demand.htm
c. the Illinois Workforce Information Center
http://www.ides.illinois.gov/Pages/Workforce Information_Center.aspx
4. Staff members in the Office of Institutional Research also are available to aid you in assembling and analyzing administrative data.

## b. Description of major findings and recommendations, including evidence of learning outcomes and identification of opportunities for program improvement

While $6 . \mathrm{b}$ also asks you to discuss other significant findings, it is basically the assessment section of the program review. As such, the responses here are crucial to your review's success. Departments that cannot demonstrate that their assessment programs meet the established guidelines will be expected to revise those programs within six months of the final review deadline. The IBHE's assessment guidelines are appended to this document.

Since your overview already identifies your student learning objectives, focus here on the assessment program and its results. What measures are you using to assess learning? How well are students achieving the objectives identified for them? What are their specific strengths and weaknesses? What changes have you made and will you be making as a result of assessment? Emphasize direct assessment, but mention the indirect measures you are using as well. Support your generalizations with specific data/evidence. And be sure to include feedback from key stakeholders-students, alums, employers, peer reviewers, etc.-since the IBHE requires it.

## c. Description of actions taken since the last review, including instructional resources and practices, and curricular changes

## d. Description of actions to be taken as a result of this review, including instructionalresources and practices, and curricular changes

$6 . \mathrm{c}$ and 6 .d are straightforward. However, by this point, you already may have mentioned the most significant actions your department has taken/is planning to take. Do not repeat yourself. Merely refer the reader to a previous section or sections.

## Section 7. Outcome

After consultation with the College Dean, the Provost's Office will indicate whether the program will be deemed "in good standing" or "flagged for priority review." The latter category is used to identify programs experiencing serious concerns-significantly low enrollments, high costs, negative accreditation findings, below-average pass rates on statewide exams, below-average employment placement rates, a continuing lack of satisfaction among students or employers, etc. Departments will be asked to examine and address the identified concern(s) and report the results in an interim review, due in 1-3 years. Typically, however, the IBHE program review results in a positive decision, and the next review is due in eight years.

