## Eight-Year Program Review IBHE Report Summary: see attached Resources page

## PROGRAM REVIEW REPORT SUMMARY

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

The BA in Mathematics features two programs of study- one intended for teacher licensure and one that emphasizes advanced pure and applied mathematics. During the last review, the major had two non-teacher licensure degree options, but those two options have been streamlined into one program of study. The teacher licensure option has undergone some changes in course offerings and now provides more content focus in applied statistics.

The department mission statement is focused on fostering creative and logical thinking, using mathematics to model practical and theoretical situations, and building a solid preparation for careers, research, or future study. The program operates with the goal of ensuring all students (a) learn the appropriate core mathematical content, (b) being able to effectively communicate in mathematics, and (c) demonstrate critical thinking skills. Further the department expects our teacher licensure candidates to demonstrate that they can meaningfully impact the learning of secondary mathematics students. To accomplish this last goal, the department is now more involved in assessing the student teaching experience for majors.

While this program is one of many among state universities in Illinois, it is one of the few to offer mathematics education courses within a department that also offers mathematics content courses. This is a significant philosophical difference from programs that consider mathematics education and teacher licensure entirely the domain of education departments. Additionally, the inclusion of computer science within our department creates unique opportunities for students in terms of research, connections across disciplines, and coursework integration.

Across mathematics and mathematics education faculty, ten different faculty contributed to nearly 60 publications in a variety of state, national, and international journals, and other outlets. One faculty member continued to contribute to a national secondary mathematics textbook series, while another served as editor for a national journal. One student participated in the Budapest Semester in Mathematics Education. In addition to this work, faculty routinely work with students in independent settings and produce publications and presentations based on that work.

## 6. MAJOR FINDINGS AND RECOMMENDATIONS

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

Although there are several significant mathematical discoveries in the field every year, the discipline of mathematics remains relatively stable as far as the undergraduate curriculum is concerned. Changes in the availability of information, texts, and resources have allowed (in some cases) more flexibility in offering coursework and experiences while also creating challenges for academic honesty and work. Advances in technology allow for modeling opportunities and connections with mathematics that might otherwise be unobtainable.

In mathematics education, the state was adopting new standards for teaching secondary mathematics as the last review was being written. Those standards created a need to modify to the content and methods experienced in some courses. Additionally, the National Council of Teachers of Mathematics (NCTM) twice changed the standards used to assess mathematics teacher licensure programs since the last review and that further impacted the types of experiences needed in mathematics education coursework, the assessments the department used to determine program effectiveness, and tangentially the content covered in one mathematics course.

## (2) student needs

To say that the state economic issues from June 2015 to August 2017 and the current COVID pandemic have impacted our programs would be an understatement. The economic issues that state experienced greatly impacted our ability to offer our courses due to lost faculty and it further hindered our ability to attract and retain students. Currently the COVID pandemic has impacted student decisions regarding attending face to face programs and has challenged us to consider how to best offer courses in a virtual environment.

Looking at the combined numbers for majors in both mathematics and for mathematics for teacher licensure since the last report, the numbers have declined from a high of 77 to our current low of 32. Within those numbers, the number of math majors has become less than the number of teacher licensure majors by an almost $2: 1$ margin. Teacher licensure majors dropped to a low of 9 during this time but has since rebounded to a current number of 21 and appears to be steadily growing.

Within the department, we have taken steps to attract additional students through increased scholarship opportunities, recruitment of students through our dual credit offerings in the Chicago area, and by being more involved in the student teaching experience. Additionally, the department sends weekly e-mails and letters to both prospective and recently admitted (but not necessarily committed) students. The university also now offers numerous more opportunities for students to explore and discover the university prior to high school graduation and the department takes part in several of those activities.

## (3) societal needs

The Bureau of Labor Statistics indicates that occupations in mathematics and statistics have a faster than average growth demand. Further, just over $70 \%$ of employers require a bachelor's degree and nearly half those employed have an advanced degree. The report also indicates there is a demand for about 5000 people in the field every year. Key areas of need are government, healthcare, and general research and development. The Illinois Department of Employment Security report indicates that jobs in both applied and theoretical math have a $24.8 \%$ growth rate, while identified as a small occupation, the 10 -year growth rate is also faster than the average. The ISBE 2020 report shows an $87 \%$ retention rate and a need for just over 15,000 new math teachers every year. Enrollment in high school is relatively stable and so this demand should remain steady or increase

Nearly all program graduates get jobs soon after (if not before) graduation. The demand for

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

## b. Major findings and recommendations

The teacher licensure program is assessed through criteria provided by the Council for the Accreditation Educator Preparation (CAEP) Specialized Professional Association (SPA) which is NCTM. Additionally, the department assesses students in the teacher licensure option in various ways to gain feedback about the program overall. The previous CAEP SPA assessment report was written and reviewed in 2014 and our program achieved national recognition status. A new assessment report was just submitted in 2021 and we expect to achieve the same recognition status once more.

The assessments required of teacher licensure candidates are numerous and administered and collected during academic courses and during student teaching. These assessments include course grades, licensure test results, a math portfolio, peer teaching performance, student teaching performance, impact on student math learning, and to a lesser extent edTPA. Each assessment provides a measure of results applicable to our program. Teacher licensure students generally do quite well on the licensure test, all student teaching measures (scoring meet or exceeds standards in nearly all categories on assessment rubrics). These measures provide us data to assess how well we are meeting program and department goals for teacher licensure students.

For non-teacher licensure candidates, the department targets four specific content courses to measure content knowledge through course grades (Calculus III, College Geometry I, Abstract Algebra, Probability and Statistics I, Linear Algebra, and Differential Equations I). We want $100 \%$ of students to earn a grade of ' $\mathrm{C}^{\prime}$ or better on their first attempt in course, we find that for all courses, expect one, this is the case. Communication of mathematical ideas is essential. That that end we measure this is several ways. All majors have written work reviewed in the Foundations of Mathematics course and students have an intensive writing and presentation assignment in the Mathematics Seminar course. Critical thinking skills for are also measured in the Mathematics Seminar. The data shows that students are meeting our goals. While we have made changes to our programs (discussed in the next section), the assessment results show that we are providing what we need for students to be successful.

The department also administers an end of program survey to graduated students. The survey asks for responses on perception of the program, purpose of degree, and plans for future. Response rate on this survey has been low since it is voluntarily completed (not a graduation requirement) and so we do not yet feel we are getting actionable data. With that in mind, the department does see that those who complete survey all have specific plans for future either through already being employed or continuing to graduate school.

## c. Actions taken since the last review

The non teacher licensure mathematics degree had both a pure and an applied option at the time of the last review. Because the differences between the two programs was not significant and because the department was making several course substitutions for students in both options, these two pathways were combined into one. The mathematics degree is now a compilation of core courses from both options and still allows for electives and student research if desired. One advantage this brings is that it provides students exposure to several branches of mathematics. Along with this change, several classes had their prerequisite modified to allow earlier access to courses and to be more in line with what other instructions do.

The teacher licensure program has under gone revisions mainly based on state mandates, and student population. Additionally, the Common Core Standards for Mathematics was just coming into adoption at the time of last review and Illinois still uses these standards for high


## COMMENTS FROM THE COLLEGE DEAN:

The BA in Mathematics at EIU is comprised of two components: one focused on pure and applied mathematics, and the other intended for the preparation of students interested in teacher licensure at the secondary level. In contrast to the growth in the BS in Computer Science in the department, the BA program has witnessed an overall decline in enrollment since the last IBHE report, but there has been a recent rebound of students in the Teacher Licensure program relative to the pure and applied program. The number of Fall 2021 majors in both components was 32. At a societal level, the data show a growing need for mathematics practitioners and a very strong need for mathematics teachers at the K-12 level. The Mathematics and Computer Science Department continues to play a key role in offering courses that support the General Education curriculum, along with the preparation of students pursuing degrees in the natural and social sciences.

We recommend a decision of Program in Good Standing.

## VPAA Decision:

Program in good standing

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Program flagged for priority reviewProgram enrollment suspended

## VPAA Explanation:

The summary above provides an overview of program changes that have been implemented within the Mathematics B.A. degree. While it is noted that the number of graduates and majors is low, the mathematics major and program curricula are integral to EIU's general education program as well as the social and natural sciences. While every effort should be made to improve total majors, the program is mission critical and is thus in good standing. To address its decline in enrollment, the program has offered more scholarships, recruited through dual-credit courses offered to Chicago schools, sent a steady stream of recruitment messages, and focused attention on the careful assessment and coaching of student teachers. During the review period, the program made changes in a number of different venues, and to serve several different audiences: national teacher licensure requirements, Common Core Standards within methods courses (accommodating statistics and probability), and (for non-teacher preparation majors) the combination of two options (pure and applied) into a single mathematics program. Bifurcated in its purpose, EIU's mathematics program serves both teacher-preparation students and math research, a fact that makes the program uniquely poised to develop future practitioners of mathematics both inside and outside the field of education-in industry and in

## 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.

