Program Name Biomathematics

Program Mission In adherence to the missions of the Mathematics and Biology Departments of the University of Scranton, the Biomathematics major is designed to impart a combined knowledge of mathematics and biology by teaching, and to advance the knowledge of biomathematics by research in biology and mathematics, and to serve the students and the community. The goal of a Biomathematics education is to provide the students with the competency to employ quantitative reasoning to make informed judgments in a real-life situation, to utilize logical and critical thinking to make contributions to the society by advancing the knowledge of biology in light of mathematical reasoning. As the mission of the University is "dedicated to freedom of inquiry, the pursuit of wisdom, integrity and truth, and the personal growth and development of all who share in its life and ministry," the Mathematics and Biology Departments strive to pursue these goals in their curriculums.

Referring to your annual assessment reports, please reflect on and report any changes or improvements you have made to your program as a result of evidence you have gathered

For year 1, the Department examined the following PLOs for Biomathematics:a) Read, write and communicate mathematics effectively b) Use computing tools in modeling or problem solving For year 2, the Department examined the following PLOs for Biomathematics:a) Demonstrate college-level knowledge in foundational mathematics, e.g., Calculus and Linear Algebra b) Demonstrate college-level knowledge in applied mathematics c) Demonstrate college-level knowledge in fields related to biomathematics For year 3, the Department examined the following PLOs for Biomathematics:a) Construct models to solve real-world problems b) Demonstrate competence in analytical and critical reasoning In reviewing the annual assessment report for the Biomathematics program, we can see that students are learning foundational mathematics in courses such as Math 114, 221, 222, and 351. Students are also able to demonstrate college-level knowledge in applied mathematics based on the artifacts collected to assess this PLO and the associated instruments used to assess these artifacts. Based on our assessment of the "read, write, and communicate effectively" PLO for the Biomathematics program, the Department intends to introduce elements of eloquentia perfecta (EP) into the program by implementing EP level II writing into the Biomathematics curriculum in Math 463. Furthermore, we have already implemented changes in the Biomathematics curriculum based on assessing the PLOs "demonstrate college-level knowledge in applied mathematics" and "demonstrate college-level knowledge in fields related to biomathematics." For example, the biology cognate course requirements for the Biomathematics program have been modified so that students gain a more appropriate grounding in biology as it relates to the field of Biomathematics.

Curriculum

The curriculum provides more than one opportunity for students to meet the Program Learning Objectives

Which key courses and assignments does the program use to ensure that students are meeting these program learning outcomes?

Math 114, 221, 222, 310, 341, 351, 463

Program Learning Outcomes to be Assessed

Program Biomathematics

Program Learning Outcome

1).Demonstrate college-level knowledge in foundational mathematics, e.g., Calculus and Linear Algebra

How will you collect and analyze the evidence that students are meeting the PLO (e.g. Review aggregate scores on embedded questions; review scores on standardized tests; use a rubric to score samples of student writing).

We will collect and analyze evidence that students are meeting the above PLOs for the Biomathematics Program in the following ways: a.Review student performance on the Biomathematics capstone projects (typically MATH 463) b.Collect artifacts from student work in key courses

Where in the program does the evidence reside? Evidence can reside in a particular course, sections of a particular course, or outside of courses (e.g. survey of graduates)

: The evidence resides in particular courses, namely Math 114, 221, 222, 310, 341, 351, 463, and the capstone project.

Is the evidence direct or indirect Direct evidence is actual student outputs, which can be analyzed or aggregated using quantitative or qualitative methods. Indirect is secondary information, such as perceptions, attitudes, or self-ratings.

Direct (performance in courses and on capstone project)

What tools are necessary to collect evidence? (Rubics, Portfolio,Embedded Exam Questions etc.)

portfolios and rubric for capstone project

Are there benchmarks that you will use to interpret your results? Benchmarks are associated with quantitative evidence and can be determined based on disciplinary norms or previous results on the same assignment, survey, etc.

As an example of one benchmark, we will use past performance on the capstone project.

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Program Learning Outcome

2).Demonstrate college-level knowledge in applied mathematics

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Program Biomathematics

Program Learning Outcome

3).Construct models to solve real-world problems

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Program Learning Outcome

4).Use computing tools in modeling or problem solving

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Program Learning Outcome

5).Demonstrate competence in analytical and critical reasoning

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Program Learning Outcome

6).Read, write, and communicate mathematics effectively

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Program Learning Outcome

7).Demonstrate college-level knowledge in fields related to biomathematics

How will you collect and analyze the evidence that students are meeting the PLO (e.g. Review aggregate scores on embedded questions; review scores on standardized tests; use a rubric to score samples of student writing).

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