

**The Department of Mathematics
Mathematics Element**

**General Education Program
Pacific Lutheran University**

Framing Language and Program Goals

Department of Mathematics Mission Statement

The Department of Mathematics seeks to provide an excellent education for our students as our primary goal. Deeply rooted in the tradition of liberal arts education, mathematics is essential to many areas of study. We serve a diverse group of students and disciplines; we give a solid foundation to the science students, provide the tools needed for professional students, and prepare our mathematics majors for graduate work or for entering the work force. To do this, we provide a variety of learning environments and methods including technologies, group and individual study, and off-campus experiences. We strive to help all students view mathematics as part of the human endeavor, apply mathematics and logical skills as world citizens, and become life-long learners. Through research, we expand fundamental knowledge of mathematics and sustain our intellectual vitality. We invite students to join us on this journey.

Department Goals

1. To advance the university's Principles of General Education and Integrated Learning Objectives.
2. To provide backgrounds for other disciplines.
3. To provide a comprehensive pre-professional program for those directly entering the fields of teaching and applied mathematics.
4. To provide a nucleus of essential courses which will develop the breadth and maturity of mathematical thought for continued study of mathematics at the graduate level.
5. To develop the mental skills necessary for the creation, analysis, and critique of mathematical topics.
6. To provide a view of mathematics as a part of humanistic behavior.

General Education Element Description

Exploring Nature and Number

These courses invite exploration of the natural world around and within us and provide expression of our human inclination to order what we see and to think in quantitative terms.

Mathematics Reasoning

Studying in mathematics sharpens the mind for lifelong service by developing a command of logical argument, abstract reasoning, pattern recognition, and quantitative analysis. The ability to work with quantitative information lies at the heart of informed citizenship in the twenty-first century; it opens the doors to many traditional and new careers; and it enables the individual to navigate in the increasingly complicated quantified world.

General Education Element Learning Outcomes

The student completing a General Education mathematics course will demonstrate:

1. an understanding of and competence with using the symbolic language of mathematics.
Depending on the level of the class, this may include algebraic notation, notational syntax, or the rules for manipulating functions, derivatives, integrals and matrices;

2. an ability to translate between the symbolic language of mathematics, graphical representations of mathematical information and verbal descriptions;
3. an understanding of the process of applying mathematics to solve a problem that is not originally expressed in mathematical form; in particular, the ability to identify variables and to determine relationships between variables in order to formulate a mathematical problem from a verbal description;
4. an ability to recognize mathematical principles relevant to natural and social phenomena, and the ability to use those principles to gain insight into the phenomena;
5. an appreciation for the importance of precise language and thought when doing mathematics;
6. an increased ability to understand and use abstract mathematical concepts;
7. an understanding that mathematics is more than just a collection of facts, rules and algorithms; rather, it is about assembling evidence, applying logic and determining the truth of claims; and,
8. an awareness that mathematics is a creative and on-going intellectual pursuit that has made seminal contributions to the development of modern civilization.

Alignment with ILOs

The above learning outcomes relate directly to the university Integrative Learning Objectives (ILOs) that organize the abilities our students develop in six categories as shown below.

- a. Knowledge Base: Objectives 1, 2, 3, and 4
- b. Critical Reflection: Objectives 3, 4, 5, and 6
- c. Expression: Objectives 1, 2, and 5
- d. Interaction with Others: Objectives 4 and 5
- e. Valuing: Objectives 5, 7 and 8
- f. Multiple Frameworks: Objectives 6, 7 and 8.