



**PHILADELPHIA UNIVERSITY**

**FACULTY OF SCIENCE**

**DEPARTMENT OF BASIC SCIENCES  
AND MATHEMATICS**

**BENCHMARK STATEMENTS**

**FOR THE**

**MATHEMATICS PROGRAM**

**2008 – 2009**

# Benchmark Statements for the Mathematics Program

## Introduction

Mathematics has commonly been recognized as the queen of science. But more than its role as a mere language and foundation of scientific studies and computing, Mathematics has now found an increasingly significant influence in many diverse fields, from management to medicine and from government to psychology.

At Philadelphia University, our program is designed to make Mathematics both a strong discipline and fun. We integrate classroom technology into traditional and modern teaching methods. Our curriculum is slightly oriented toward producing well trained Mathematics teachers. However it will also accommodate those who wish to pursue careers in non-teaching work forces and/or graduate studies.

The mission of the Mathematics Department at Philadelphia University is to provide learning-centered mathematics education to students. The department offers courses for both full-time and part-time students is committed to quality learning-centered mathematics education valuing traditions and incorporating current effective pedagogical trends in the discipline, appropriate technology, and assessment of student learning.

Our teaching staff are well qualified in their fields of specialties in both Pure and Applied Mathematics. These include Algebra, Analysis, Dynamical Systems, Mathematical Education, Mathematical Physics, Number Theory, Optimization Techniques, Statistics, and Topology.

## Aims of the Program

More than preparing the students for future jobs, the goals of an education, and mathematics education in particular, should include the following objectives.

- Learning to calculate, manipulate and solve problems
- Learning to read with critical thinking
- Learning to write with clear logic and to prove, defend, and explain what they write
- Learning to think abstractly and creatively

- Learning to formulate and test hypotheses
- Learning to construct mathematical proofs and arguments
- Learning to appreciate the beauty, power, and preciseness of mathematics

## **Learning Outcomes**

1. Students will acquire the ability to read, write, listen to, and speak mathematics
2. Students will be able to reason and communicate mathematically.
3. Students will demonstrate a mastery of competencies identified by the competency-based syllabi for specific courses.
4. Students will use appropriate technology to enhance their mathematical thinking and understanding and to solve mathematical problems and judge the reasonableness of their results.
5. Students will engage in substantial mathematical problem solving and will become problem solvers.
6. Students will acquire the ability to use multiple approaches-numerical, graphical, symbolic, and verbal-to solve mathematical problems.
7. Students will be confident in their mathematical abilities.

These objectives are obtained through

- Lectures
- Seminars
- Computer Simulations
- Guided Homeworks and Projects
- Presentations
- Computer-based Assignments
- Workshops
- Practical
- Training Courses
- Independent Reading
- Internet

## **A- Knowledge and Understanding Skills**

1. Students develop flexibility, perseverance, and strategies in attacking problems.

2. Students are able to organize and interpret information forms abstractions and generalizations
3. Students have positive attitude toward mathematics.
4. Students recognize the connections of mathematics in real life situations.
5. Students gain confidence in mathematical thinking.
6. Students are prepared to allow progress to higher levels of mathematics.

## **B- Thinking skills**

1. The ability to find ways to solve problems when no routine path is apparent .
2. The ability to gather data, make conjectures, assemble evidence, and build arguments to support or refute conjectures.

## **C- Subject-Based Practical skills**

1. The ability to translate information from real world into mathematical language
2. using signs, symbols, graphs.
3. The ability to present mathematical ideas in written, visual, and oral formats.
4. The ability to make links among mathematical ideas and to other disciplines.
5. The ability to use appropriate technology to solve meaningful mathematical problems.
6. To understand and appreciate the power and limitations of technology.

## **D- Skills for life and work (general skills)**

The ability to use a mathematics writing software to write mathematical text.  
The ability to write a computer program.

## **Mathematics Career**

An undergraduate degree in Mathematics will open the way to a future filled with wide opportunities for jobs and professions. More and more, government positions require skills involving the direct use of mathematics. In addition, mathematics

professions such as actuaries, accountants, and statisticians are quite high in demand worldwide.

A major in Mathematics, furthermore, will make the person literate and knowledgeable in many fields by way of intellectual discipline. This alone will enable the person to make a positive contribution to society. It also prepares those who wish to pursue an advance degree in related fields like statistics, actuarial science, cryptography, or mathematical modeling.

A graduate in Mathematics can go for a teaching career, which is indeed both challenging and rewarding, or else they can easily fit into an advance study in almost any related field, whether basic sciences or social sciences. Outside the educational institution, a graduate with a Mathematics degree can find a job as

1. Actuarial Scientist
2. Statistical Analyst
3. Accountant
4. Crypto-analyst
5. Defense and Security Analyst
6. Various government positions