Introduction

This assessment plan defines the goals and objectives of the University of Wisconsin-Platteville Mathematics Department and provides a mechanism for evaluating their implementation. The plan is designed to evaluate the service provided by the Mathematics Department to its primary student clientele, who are described in the mission statement. Following the mission statement is a list of the student learning outcomes for our program areas. The areas are: general education; mathematics majors; mathematics middle/secondary education majors; service courses for education majors; and service courses for engineering, sciences and other majors. The assessment methods and feedback channels for program improvement are then described.

Mission Statement

The purpose of the mathematics curriculum is to provide all students with quantitative skills to function proficiently in a societal and professional capacity. In addition to offering majors and minors in mathematics, the Mathematics Department offers courses to support both the general education requirements of the University and the major and minor programs of other departments. Within this mission, the Mathematics Department strives to furnish an open, enlightened environment, with frequent student/faculty interaction, resulting in high quality undergraduate education that will develop and enhance students’ computational and reasoning skills.

The goals of the Mathematics Department at UW-Platteville are to:

a. provide mathematics courses that:
   • support the mathematics majors and minors which will enable students to pursue careers in education, business, and industry,
   • prepare students to continue their study of mathematics at the graduate level,
   • support the professional programs within the various colleges of the University, or
   • fulfill the general education mission of the University by providing graduates with the quantitative reasoning skills to function proficiently in a professional capacity;

b. provide a format for mathematical discussion within the University (and larger) community;

c. keep abreast of research trends in mathematics and in the national mathematics education community; and

d. provide students with opportunities to experience mathematics outside of their course work.

Student Learning Outcomes

1. General Education

Each student graduating from UW-P should have the knowledge to recognize mathematics in the world around them and be able to use that recognition to solve problems that arise. To this end, by the end of their sophomore year, students should have completed a basic competency requirement in computational skills and quantitative perception. A student who successfully completes a course satisfying the competency requirement in math will:
a) acquire problem solving skills using the methods of mathematics;
   • recognize that a problem needs to be solved
   • identify problem type and choose an appropriate problem solving strategy
   • utilize a chosen strategy to obtain a solution to a problem
   • evaluate the plausibility of a computed result
b) use the recognition of patterns to solve problems;
   • predict the value of the next term in a sequence of observations
   • understand the use of formulas related to problems of the same type
   • conjecture an answer to a problem based on the ability to solve a related problem
c) work with fundamental notions of number and space;
   • use numbers to measure, to compute, and to indicate quantity
   • understand the properties of different types of numbers
   • work with basic geometric concepts of two- and three-dimensional space
   • represent geometric relationships algebraically
d) distinguish between valid and invalid reasoning; and
   • distinguish between logical and illogical mathematical statements
   • determine the logical consistency of an argument
   • correctly apply axioms and known results to new problems
e) remain alert to the plausibility of solutions.
   • identify when a proposed solution violates rules of mathematics
   • know when a given answer is not consistent within the parameters of the problem
   • judge acceptable limits of error when evaluating the appropriateness of a solution

2. Mathematics Majors

Along with the general education requirements, mathematics majors should take a core of required mathematics courses while selecting other courses with regard to their career plans. A student’s future plans may include, for example, teaching, statistical applications, computer applications, or pre-professional preparation. Required and elective mathematics courses for majors shall:

   • prepare students with the skills needed to pursue careers in education, business, and industry;
   • provide a theoretical foundation that will prepare students to continue their study of mathematics or statistics at the graduate level; and
   • provide students with opportunities to experience mathematics outside of their regular course work.

Upon graduation, mathematics majors should be able to:

   a) communicate mathematics effectively;
   b) demonstrate a computational ability in solving a wide array of mathematical problems;
   c) differentiate between valid and invalid mathematical reasoning;
   d) develop mathematical ideas from basic axioms;
   e) utilize mathematics to solve theoretical and applied problems; and
   f) identify applications of mathematics in other disciplines and in society.
3. **Mathematics Middle/Secondary Education Major**

These are mathematics majors who are preparing to teach at the middle and secondary school level. These students take courses from both the Mathematics Department and the School of Education. In addition to fulfilling the requirements of both an education major and a mathematics major, these students must also complete requirements in the areas of content, and teaching and professional development. The successful student will:

- a) understand basic geometric concepts and proofs;
- b) communicate mathematics effectively using various instructional strategies;
- c) effectively assess student work, and use that assessment to design activities incorporating a variety of instructional resources;
- d) be familiar with the different philosophies of various high school curricula and be open to the use of any curriculum in the motivating and teaching of mathematics to students;
- e) appreciate the value of professional development, being familiar with the various organizations concerned with mathematics education; and
- f) be aware of the role of the teacher in the community.

4. **Service Courses for Education Majors**

These students from the School of Education are preparing to teach at the early childhood, elementary and/or middle school level. While not mathematics majors, the student completing the mathematics education courses and seeking licensure for these levels will:

- a) demonstrate knowledge in mathematics (with a thorough understanding of the mathematics at the early childhood/elementary and middle level), including the concepts and procedures of mathematics and the connections and relationships among mathematical concepts;
- b) apply fundamental heuristic strategies towards the solution of mathematical problems;
- c) be able to communicate mathematics effectively; and
- d) demonstrate knowledge of how mathematics is used in other disciplines and in society.

Additionally, the student completing the mathematics education courses will:

- e) communicate mathematics effectively using various instructional strategies;
- f) effectively assess student work, and use that assessment to design activities incorporating a variety of instructional resources;
- g) demonstrate familiarity with research results addressing the learning and teaching of mathematics; and
- h) be familiar with the various organizations focused on mathematics education.

5. **Service Courses for Engineering, Science, and Other Majors**

The mathematics department serves all engineering and science majors. A majority of these students are served by a three-semester Calculus sequence, followed by courses selected from Differential Equations, Linear Algebra, Statistics, and others. In addition, other majors across campus have specific requirements in mathematics, such as Applied Calculus, Elementary
Statistics, and Discrete Mathematics. Upon completion of the mathematics requirement for their particular major, these students will:

a) demonstrate problem solving skills and an ability to reason mathematically;
b) demonstrate an understanding of the mathematical ideas relevant to their program or major; and
c) identify, formulate, and solve problems within their discipline.

**Assessment Tools**

**Description of Assessment Tools**

The degree to which the Mathematics Department is meeting its stated student learning outcomes shall be measured using the following tools.

- The UW-P Math Skills Assessment exam augments the ACT-CAAP. Members of the Mathematics Department have developed this instrument to gauge a student’s ability to answer questions that utilize basic math skills. It is administered biennially by the members of the Mathematics Department Assessment Committee to students in general education mathematics courses.
- Professional exams are administered to certain majors by outside agencies. The Fundamentals of Engineering (FE) exam is administered twice each year to a sample of engineering majors. A portion of the exam assesses student knowledge in the areas of calculus, differential equations, and statistics. The PRAXIS II is administered by the DPI to measure general mathematical knowledge of secondary education mathematics majors.
- The ACT-CAAP exam is the choice of the UW System for assessing math, writing, and critical thinking skills. The Assessment Oversight Committee gives this exam every two to five years to a sample of rising juniors, statistically analyzes the data, and feeds the results back to the relevant organizations (e.g., the UUCC and the various departments involved).
- The Exit Survey of graduating seniors (attached) is administered to mathematics majors by the student’s academic advisor at the end of the student’s last semester on campus. This survey asks the student to rate their perception of the mathematics program and how well the program prepared them for their new career.
- Alumni and Employer surveys (also attached) are sent each spring to alumni of 1, 5, or 10 years, with completed surveys being returned to the Mathematics Department or the EMS Dean’s office. These assess the quality of the preparation the program provided the alumni in their employment.
- In-house surveys are given by the Mathematics Department to other degree programs at UW-P with the intent of program evaluation. An example of this type of survey is the client department survey that was carried out by the Mathematics Department’s Service Courses committee to determine the extent to which the syllabi of courses required by various programs match the mathematical needs of those programs.
- Reports generated by external agencies (e.g., HLC, NCATE, DPI, and ABET) and from internal curriculum or program reviews by the UUCC, the APC, or the ASC.
- Satisfactory completion of mathematics courses required of mathematics and education majors.
- Senior Seminar is a capstone course that requires students to research a mathematical topic and present the results orally and in writing. It is traditionally completed in their final year.
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Feedback Channels

The relevant faculty groups are listed below. The order of the list suggests the route that any program change suggested by assessment activities should move through committees.

- Mathematics Department Assessment Committee: The Assessment Committee will be in charge of all assessment responsibilities of the Department. This includes, but is not limited to, the development or selection and administration of assessment instruments requested by the department, the Chair, or as a result of its own initiative.
- Mathematics Department Curriculum Committee: The Curriculum Committee regularly evaluates and makes recommendations on the mathematics curriculum. The Assessment Committee may make recommendations to the Curriculum Committee regarding the major and minor programs, as well as the general education and service responsibilities of the department. (Mathematics Department Handbook 12/02)
- Mathematics Department Faculty: Initiatives recommended by the Department Curriculum Committee are subject to the approval of the department as a whole.
- College of Engineering, Mathematics, and Science Executive Council: This body acts in lieu of a curriculum committee for the college, and thus any curriculum and program changes agreed upon by the department must pass through this body before being implemented.
- University Assessment Oversight Committee: The responsibility for evaluating any department’s assessment efforts and the job of administering any university-wide assessments belongs to this committee.
- University Undergraduate Curriculum Commission: This commission evaluates and acts upon curricular changes proposed by the College Curriculum Committees. Any program changes must be approved by this commission before going forward. The role of assessment activities in motivating changes should be made clear to this commission.