

ASSESSMENT PLAN
MATHEMATICS PROGRAM BA & BS
COLLEGE OF SCIENCE AND MATHEMATICS
May 2012

Program Goals

The mathematics degree program is designed to prepare its graduates for a variety of career paths. There are two degrees offered: a pure mathematics degree and a mathematics degree with secondary certification. Both are offered as BS and BA degrees with the only difference between the degrees being the language requirement. Both options prepare students for careers in mathematics as well as engineering, computer sciences, physics, economics, operations research, statistics, actuarial sciences, K-12 teaching and for further graduate studies in related areas. In addition, by incorporating substantial Education courses in a degree plan, the secondary certification option allows students to begin teaching immediately upon graduation in the Colorado K-12 system.

The goals of the program are to enable students: to have competence with standard undergraduate level mathematics; to solve quantitative problems; to appreciate mathematical abstraction and proofs; to communicate their ideas effectively; and to learn mathematics independently.

The program goals are aligned with the College of Science and Mathematics goals:

CSM offers quality, competitive Bachelor's and Master's degree programs that prepare graduates for success in professional and graduate programs, and for careers in the biological and physical sciences and mathematics. The College also supports a strong general education program by providing core curricula in science and mathematics for students pursuing careers in the health and environmental sciences, engineering, technology and teacher education. The CSM provides advanced learning opportunities for students via faculty mentored research projects and internships that promote the discovery of new information and the application of new knowledge. The CSM supports the community, region and related professions through outreach including initiatives that enhance economic development, scientific literacy, and K-12 education.

The program goals are also aligned with the following three University General Education Student Learning Outcomes:

1. Identify, analyze and evaluate arguments and sources of information to make informed and logical judgments, to arrive at reasoned and meaningful arguments and positions, and to formulate and apply ideas to new contexts.
2. Apply numeric, symbolic and geometric skills to formulate and solve quantitative problems.
3. Apply the scientific method, laboratory techniques, mathematical principles and/or experimental design.

Student Learning Outcomes

At the conclusion of the mathematics programs:

1. Students will have facility in the core mathematical content areas: calculus, algebra, and other additional topics.
2. Students will formulate and solve problems using mathematics, working alone or with others at the three cognitive levels: routine problems, non-routine problems and applied problems. They will also be able to formulate and solve applied problems involving applications to other fields and problems involving real-world data.
3. Students will create, analyze and use mathematical abstraction. They will understand and write formal mathematical arguments. They will appreciate the standards for mathematical rigor, elegance and beauty.
4. Students will produce and deliver effective oral and written presentations of mathematical material and ideas.
5. Students will find and select appropriate written sources of mathematics and learn independently from these sources.

Assessment Procedures

1. During their senior year and at the conclusion of one of the two capstone courses: Math 421 Advanced Calculus or Math 327 Abstract Algebra, all mathematics majors will take the Major Fields Test (MFT) in Mathematics. This exam is particularly effective at assessing student learning outcomes 1 and 2. Students' scores are broken down by major subject areas contained in learning outcome 1 and by cognitive areas in learning outcome 2. CSU – Pueblo data will be compared with National data and presented as part of the yearly assessment of the program. The overall results will inform the department of any possible changes to the programs' curricula and methods of delivery. Criterion: Overall and in the content and cognitive breakdown areas of the MFT, ninety percent of CSU – Pueblo mathematics majors will score at or above the 50th percentile on the MFAT standardized exam.
2. For Math Majors – Students will present their own work, usually an oral presentation of a final written paper, as part the capstone course Math 493 – Seminar. This procedure effectively assesses student outcomes 3, 4 and 5. Students' final presentations will be reviewed by a team of professors of mathematics. Criterion: At least 90% of all majors will be graded as proficient in the oral and written presentation of the final capstone project. Proficiency as determined by a scoring rubric designed by the department. (The first draft of this rubric will be created during the Fall 2011 semester, prior to the first delivery of Math 493 during the Spring 2012 semester.)

For Math Majors with Secondary Emphasis – Students’ videotapes from lessons given as part of their assessment for Math 447 – Materials and Methods of Teaching Secondary School Mathematics and students’ final papers from Math 463 – The History of Mathematics will be reviewed by a team of professors of mathematics. Criterion: At least 90% of all majors will be graded as proficient in oral and written presentations. Proficiency as determined by a scoring rubric designed by the department. (The first draft of this rubric will be created during the Fall 2011 semester and parallel the rubric developed for the Seminar course.)

3. At the conclusion of their final semester every major will complete an exit survey and be interviewed by the department chairperson. Students will give their overall impressions as to the strengths and weaknesses of the program, especially as they relate to the student learning outcomes. With the perspective the majors have accumulated based taking the Major Field Test in Mathematics, the Graduate Record Exams, their applications to graduate schools (and their acceptances, if any), and their experiences applying for related employment opportunities in the field (e.g. K-12 teaching), the students can begin to assess their preparation they’ve acquired in the mathematics program. The exit interview directly addresses this in the questions at the bottom of page two. These address student learning outcomes 1, 2 and 3.

Also during this assessment students’ initial career placement will be noted and followed in subsequent years. The advancement of alumni in their careers will be noted as part of the program’s assessment. Criterion: At least 90% of all majors will evaluate the department’s major program as “excellent.”

Assessment Results

Major Field Tests are taken in December and in April. Results are typically returned several months later. The previous two test results are reported to the department faculty at the first department meeting held during convocation week in the fall. Summaries of student exit surveys from the previous two semesters are also reported at that time. The minutes of this meeting along with the supporting documentation (summary score results and comparisons) will be archived and supplied to the assessment committee when requested.

Evaluation of the items from Assessment Procedure 2 is *still* in the developmental phase. Departmental discussions at the end of the Fall 2011 semester recommended that Math 493 Seminar be offered in the Spring 2012 semester as a course to attach a final capstone project. Dr. Bruce Lundberg was assigned as the instructor. Unfortunately, at this time, the course is not a major requirement and the course did not meet minimum enrollment and was cancelled. Thus, this coming fall the department will entertain the motion to add Math 493 Seminar for one credit hour to the math major requirements. The requirement will not become effective for several years, but we will continue to offer it with the intention to use the results of the senior project for program assessment. The department has also discussed the possibility of incorporating a senior project to an existing, required course like Math 327 or Math 421 for this

purpose. Dr. Janet Barnett is supportive of the senior capstone project and she has been assigned to both of those courses for the coming academic year.

Continuous Process

Initiation and support for program improvements and the development of actions plans are primarily the responsibility of the department chair working together with the departmental Curriculum Committee and the departmental Advisory Committee. Input from the assessment committees, the college dean and the university provosts' offices will also be sought.

Developed by:

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CORE COURSES MATHEMATICS MAJOR

[illegible]

CORE COURSES MATHEMATICS MAJOR/SECONDARY CERTIFICATION

[illegible]

Department of Mathematics and Physics
Colorado State University - Pueblo
Exit Interview

Name: _____ Telephone: _____

Email: _____

Program of Study: _____

About the program:

What did you like most about your mathematics experience at CSU-Pueblo?

What are, in your opinion, the indispensable, core courses in the major?

Can you think of things that should be changed?

Can you think of things that should not be changed?

What are your overall perceptions of the degree program?

What is your overall satisfaction with advising?

Are you confident in securing appropriate employment/graduate study?

Have you recommended the program to others?

Did your program of study meet the goals you set upon entering the program?

Other comments:

How would you rate your capabilities in the following areas?

Circle one

5 = excellent – 1 = poor

5 4 3 2 1 A strong grounding in the fundamentals of calculus

5 4 3 2 1 Ability to identify and solve mathematical problems

5 4 3 2 1 A strong grounding in linear and abstract algebra

5	4	3	2	1	Ability to communicate effectively in writing
5	4	3	2	1	Ability to communicate effectively orally
5	4	3	2	1	Ability to read and write proofs
5	4	3	2	1	Awareness of the applications of mathematics

About you

Have you been admitted to any professional or graduate programs? Where?

Do you plan to pursue a teaching career?

Do you plan to pursue a career in government or public service?

Did you tutor other college students? How many?

Did you tutor K-12 students?

Did you do any internships? How many?

Did you take research courses? How many

What are your future employment/graduate school plans?

We would like to keep in contact with you. May we contact you in the future? If so, please provide your email address and permanent home address below:

