WEBER STATE UNIVERSITY

2012-2013 WSU Five-Year Program Review

Self-Study

DEPARTMENT OF MATHEMATICS

December, 2012

Department: MATHEMATICS

Semester Submitted: FALL 2012

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The visit to campus will take place in February or March 2013.

A. Introduction

The Mathematics Department oversees the Mathematics Programs and the courses Math 1030 and above. The Developmental Mathematics Program oversees the courses Intermediate Algebra (Math 1010) and below. The current Program Review is of the Mathematics Programs within the Math Department. Only Math 1010 gives credit toward a student's degree.

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B. Program Mission Statements

* MATHEMATICS DEPARTMENT MISSION STATEMENT *

DEPARTMENT ROLE

The main purpose of the department is to provide students with the tools necessary to competently integrate mathematics into their personal and professional lives. We strive to create an environment that makes that possible. Quality teaching of relevant courses is our central objective. Another objective is to provide students the opportunity to work on projects beyond the classroom.

Students taking mathematics have various goals that include intellectual enrichment, employment in industry, teaching and graduate work. We offer a curriculum that meets or exceeds their needs in each area, both in terms of content and of teaching styles. Since mathematics is central to many fields, we design our course offerings in a manner sensitive to the needs of other disciplines.

Because mathematics is a rapidly developing field and the best teachers are those who remain active in their discipline, we engage in such activities as mathematical and educational research, in service teacher training, and course and curriculum development. Professional and scholarly work is both expected and encouraged.

STRATEGIC PLAN

In order to best fulfill our role within the University, we should pursue the following objectives. No priority is intended in the order in which items are listed.

Learning:

- Provide faculty with the support they need to be professionally active by providing more released time and reassigned time for research and/or teaching projects.
- Modify the curriculum as needed to best meet the needs of our students in ways suggested by both national trends and our own research.
- Decrease the reliance on large lecture sections.
- Design and offer classes that integrate curriculum from other related fields with mathematics.
- Better coordinate the mathematics taught on campus in order to avoid unnecessary duplication and maintain standards.

Access:

- Hire new faculty as needed.
- Reduce our reliance on adjuncts.
- Improve facilities, which include the following items:
    - A Math Ed room equipped with large tables, sufficient technological tools, storage and projection facilities
    - Electronic classrooms
    - Adequate office facilities

- Improved computer laboratories
- Adequate tutorial facilities
- Equipment in need of repair/replacement

- Provide each faculty member with a computer in his/her office which will run all pertinent software.
- Work with local school districts to improve the mathematical preparation of incoming students.

Community:

- Build research groups as the opportunity arises.
- Increase salaries to maintain a productive faculty and to attract talented newcomers.
- Increase resources for items such as travel, library holdings, journal subscriptions, recruitment and advisement.
- Streamline the campus committee-structure so that results obtained are more nearly commensurate with effort expended.

This was revised April 2012.

University Mission Statement for the General Education
QUANTITATIVE LITERACY REQUIREMENT

MISSION – It is the mission of Weber State University to produce graduates that can reason quantitatively within the context of their majors and career goals. This includes understanding information and reasoning that is numerical, geometric, algebraic, graphical, and statistical -- and at the level of sophistication of college algebra.

OBJECTIVES – A quantitatively literate person should be able to:

1. Interpret mathematical models such as formulas, graphs, tables, and schematics, and draw inferences from them.
2. Represent mathematical information symbolically, visually, numerically, and verbally.
3. Use arithmetical, algebraic, geometric, and statistical methods to solve problems.
4. Estimate and check answers to mathematical problems in order to determine reasonableness, identify alternatives, and select optimal results.
5. Recognize that mathematical and statistical methods have limits.

The above mission statement and learning objectives were developed (by the University Curriculum Committee for general education) to meet the goals stated in the 1999 report of the Regents' Task Force on General Education and current USHE policy (R470)

Established by The WSU Faculty Senate, Spring 2011.

C. Curriculum

There are two departments that are responsible for mathematics instruction at Weber State University. The Developmental Mathematics Program (Dev Math) oversees the courses Intermediate Algebra (Math 1010) and below. Only Math 1010 gives credit toward a student's degree. The Mathematics Department (Math) oversees the courses Math 1030 and above. Although the division of teaching duties started at the beginning of Summer 2007, the two programs work together at the interface and share some resources. Each of the instructors (or lecturers) in the Dev Math Program teach one course a semester for Math as part of their contractual duties.

The courses offered by the Math Department can be loosely classified as having three main overlapping missions. The main mission is the education of mathematics majors and minors. The second and largest in

terms of enrollment is the General Education Quantitative Literacy (QL) requirement. The third is providing foundations and methods courses for Elementary Education Majors.

The QL requirement was stipulated by the State Board of Regents as being at least one course beyond high school Intermediate Algebra. There are four main QL courses at WSU. Math 1030, Contemporary Mathematics and 1040 Introduction to Statistics are terminal in the sense that they are not prerequisites for other Math courses. College Algebra and Pre-calculus are also QL courses. Finally, besides testing out, any MATH course with a College Algebra or Pre-calculus pre-requisite can serve to satisfy the QL requirement. These courses (and their prerequisites) are virtually the same across the state, as per Regents Articulation agreements.

All Elementary Education Majors must take Math 1050, College Algebra, and the two course sequence Math for Elementary Teachers. In addition, students can extend their license from K-6 to K-8 by taking Trigonometry, Calculus I, and four upper division Math Ed courses expressly designed for these students. These Math Ed courses are not required of other majors or minors.

Courses for the Majors and Minors start with Calculus. The Mathematics Department has three majors or emphases. The Regular Emphasis is more traditional and theoretical. It is recommended to those students intending to go to graduate school. If they were to choose their electives properly they could still be well trained for industrial employment. The Applied Emphasis prepares majors to gain employment in industry, but again by choosing their electives properly, they could still qualify for graduate school. The Applied Emphasis has six tracks (see the catalog excerpt below) that give students a direction to go based on their interests and lists of required and elective courses appropriate to the track. All students come in for advising, and the exact program they do is worked out with the Chair of the department. The Chair also makes substitutions according to the student's interest and also to mitigate the impact of some required courses being offered only every other year. The Mathematics Teaching Emphasis prepares majors to teach in Utah secondary schools. All but three of the courses for the Teaching major are state requirements for certification. One of those three, Euclidean Geometry is a prerequisite for one of the state's required courses, Foundations in Euclidean and Non Euclidean Geometry. About 60% of the majors are declared for the Teaching Emphasis.

Many of our courses provide service to other majors and minors, such as science majors, business majors, engineering and engineering technology majors. We are open to suggestions by others in regards to these courses, but most are very standard across the country.

1. Program Requirements for Majors and Minors

The following program details are taken from the 2012-2013 WSU Catalog:

All Mathematics Majors

- **Program Prerequisite:** Not required for Mathematics and Applied Mathematics majors. Mathematics Teaching majors must meet the Teacher Education admission and licensure requirements (see Teacher Education Department).
- **Minor:** Required only for the regular mathematics major.
- **Grade Requirements:** A grade of "C" or better in courses required for this major (a grade of "C-" is not acceptable), in addition to an overall 2.0 GPA and a 2.0 GPA in mathematics classes numbered 1210 or above.
- **Credit Hour Requirements:** A total of 120 credit hours is required for graduation; 31-46 of these are required within the major. A total of 40 upper division credit hours is required (courses numbered 3000 and above); at least nine credit hours of upper division Mathematics must be completed at Weber State University.

Advisement

All Mathematics majors should see the Mathematics Department to be assigned an advisor. They should meet with their advisors at least once a year to help plan their programs and check on their progress. Call 801-626-6095 for more information or to schedule an appointment. (Also refer to the Department Advisor Referral List.)

Admission Requirements

Declare your program of study (see Program of Study (Major/Minor) Declaration) with your advisor. There are no special admission or application requirements for the Regular or Applied mathematics emphases. Mathematics Teaching majors must meet the Teacher Education admission and licensure requirements (see Teacher Education Department).

General Education

Refer to Degree and General Education Requirements for either Bachelor of Science or Bachelor of Arts requirements. PHYS 2210 will fulfill requirements for both the major and general education. PSY 1010 (3) in the Social Sciences area is recommended for the Mathematics Teaching emphasis.

Mathematics (BA or BS)

Language Courses Required fulfill the BA (14 credit hours)

- 6 credit hours of foreign language

and the following language arts courses

- MATH 1210 - Calculus I **(4)**
- MATH 1220 - Calculus II **(4)**

Major Course Requirements for Mathematics BS or BA Degree

Mathematics Courses Required (30 credit hours)

- MATH 1210 - Calculus I **(4)**
- MATH 1220 - Calculus II **(4)**
- MATH 2210 - Calculus III **(4)**
- MATH 2270 - Elementary Linear Algebra **(3)**
- MATH 2280 - Ordinary Differential Equations **(3)**
- MATH 4110 - Modern Algebra I **(3)**
- MATH 4120 - Modern Algebra II **(3)** or MATH 4320 - Topology **(3)**
- MATH 4210 - Introductory Real Analysis I **(3)** and
- MATH 4220 - Introductory Real Analysis II **(3)**

Mathematics Electives (at least 12 credit hours)

Complete any upper division Mathematics courses (not including any required courses) so that required mathematics courses and mathematics electives total at least 42 credit hours.

Minor *A minor is required.*

Support Courses Required (10 credit hours)

- PHYS 2210 PS - Physics for Scientists and Engineers I **(5)**
- PHYS 2220 - Physics for Scientists and Engineers II **(5)**

Graduate School Preparation

It is highly recommended that students planning on graduate work in Mathematics take Linear Algebra (MATH 3270) and Topology (MATH 4320) in addition to the above. See the Mathematics Department for counseling.

Mathematics Teaching (BA and BS)

Language Courses Required fulfill the BA (14 credit hours)

- 6 credit hour of foreign language

and the following language arts courses

- MATH 1210 - Calculus I **(4)**

- MATH 1220 - Calculus II **(4)**

Major Course Requirements for Mathematics Teaching BS or BA Degree
Mathematics Courses Required (48 credit hours)

- MATH 1210 - Calculus I **(4)**
- MATH 1220 - Calculus II **(4)**
- MATH 3110 - Foundations of Algebra **(3)** or MATH 4110 - Modern Algebra I **(3)**
- MATH 2120 - Euclidean Geometry **(3)**
- MATH 2210 - Calculus III **(4)**
- MATH 2270 - Elementary Linear Algebra **(3)**
- MATH 2280 - Ordinary Differential Equations **(3)**
- MATH 3120 - Foundations of Euclidean and Non-Euclidean Geometry **(3)**
- MATH 3160 - Number Theory **(3)**
- MATH 3410 - Probability and Statistics I **(3)**
- MATH 4210 - Introductory Real Analysis I **(3)**
- MTHE 3010 - Methods and Technology for Teaching Secondary Mathematics **(3)**
- MTHE 4010 - Capstone Mathematics for High School Teachers **(3)**
- Two upper division MATH courses not otherwise required **(6)**

Support Courses Required (5-10 credit hours)
Complete either

- PHYS 2210 PS - Physics for Scientists and Engineers I **(5)**
- or
- CHEM 1210 PS - Principles of Chemistry I **(5)** and
- CHEM 1220 - Principles of Chemistry II **(5)**

A student must also complete requirements for a secondary education licensure as determined by the Jerry and Vickie Moyes College of Education .

Mathematics, Applied (BA or BS)

Language Courses Required fulfill the BA (14 credit hours)

- 6 credit hours of foreign language

and the following language arts courses

- MATH 1210 - Calculus I **(4)**
- MATH 1220 - Calculus II **(4)**

Major Course Requirements for Applied Mathematics BS or BA Degree The Applied Mathematics Program provides an opportunity for WSU students to apply mathematics to different fields. The program requires 19 credit hours of core lower division mathematics courses, a minimum of 12 credit hours of upper division applied mathematics courses and additional upper division courses in specified fields, including mathematics, so the total upper division credit hours reaches at least 40. To design a specific program different from the following tracks, students must get approval from a Mathematics Department advisor.

Lower Division Mathematics Courses Required for All Tracks (19 credit hours)

- MATH 1200 - Mathematics Computer Laboratory **(1)**
- MATH 1210 - Calculus I **(4)**
- MATH 1220 - Calculus II **(4)**
- MATH 2210 - Calculus III **(4)**
- MATH 2270 - Elementary Linear Algebra **(3)**
- MATH 2280 - Ordinary Differential Equations **(3)**

1. Regular Track

A traditional diversified program in applied mathematics.

Required Upper Division Mathematics Courses (12 credit hours)

- MATH 3410 - Probability and Statistics I **(3)**
- MATH 3550 - Introduction to Mathematical Modeling **(3)**
- MATH 3710 - Boundary Value Problems **(3)** or MATH 3280 - Dynamical Systems **(3)**
- MATH 4610 - Numerical Analysis I **(3)**

Mathematics Electives (at least 12 credit hours) *Complete at least an additional 12 credit hours of upper division Mathematics courses.*

Support Courses Required (6-10 credit hours) *Complete 2 calculus based courses outside the Mathematics Department, for example PHYS 2210 PS - Physics for Scientists and Engineers I (5), ECON 3030 - Managerial Economics (3), CHEM 3400 - Molecular Symmetry and Applied Math for Physical Chemistry (3), etc.*

Graduate School Preparation It is recommended that students planning on graduate work in Applied Mathematics take MATH 4210 /MATH 4220 - Introductory Real Analysis II and all Mathematics courses in the future area of graduate study. See the Mathematics Department for counseling.

2. Computing Track

Additional Required Lower Division Courses (16 credit hours)

- CS 1400 - Fundamentals of Programming **(4)**
- CS 1410 - Object-Oriented Programming **(4)**
- CS 2420 - Introduction to Data Structures and Algorithms **(4)**
- MATH 1630 - Discrete Mathematics Applied to Computing **(4)**

Required Upper Division Mathematics Courses (15 credit hours)

- MATH 3410 - Probability and Statistics I **(3)**
- MATH 3550 - Introduction to Mathematical Modeling **(3)**
- MATH 3610 - Graph Theory **(3)**
- MATH 4610 - Numerical Analysis I **(3)**
- MATH 4620 - Numerical Analysis II **(3)** or MATH 3620 - Enumeration **(3)**

Electives (at least 25 credit hours) *Complete at least an additional 25 credit hours of upper division courses in Computer Science or Mathematics. At least 6 of these credit hours must be in Computer Science.*

3. Physical Mathematics Track

Required Upper Division Mathematics Courses (18 credit hours)

Complete 6 of the following courses

- MATH 3280 - Dynamical Systems **(3)**
- MATH 3410 - Probability and Statistics I **(3)**
- MATH 3550 - Introduction to Mathematical Modeling **(3)**
- MATH 3710 - Boundary Value Problems **(3)**
- MATH 3810 - Complex Variables **(3)**
- MATH 4610 - Numerical Analysis I **(3)**
- MATH 4710 - Partial Differential Equations **(3)**

Electives (at least 22 credit hours) *Complete at least an additional 22 credit hours of upper division courses in Chemistry, Geosciences, Mathematics, or Physics. At least 6 of these credit hours must be outside Mathematics.*

4. Engineering Mathematics Track

Required Upper Division Mathematics Courses (18 credit hours)
Complete 6 of the following courses

- MATH 3280 - Dynamical Systems **(3)**
- MATH 3410 - Probability and Statistics I **(3)**
- MATH 3550 - Introduction to Mathematical Modeling **(3)**
- MATH 3710 - Boundary Value Problems **(3)**
- MATH 3810 - Complex Variables **(3)**
- MATH 4610 - Numerical Analysis I **(3)**
- MATH 4620 - Numerical Analysis II **(3)**
- MATH 4710 - Partial Differential Equations **(3)**

Electives (at least 22 credit hours) *Complete at least an additional 22 credit hours of upper division Mathematics or upper division courses from the Engineering Technology programs. At least 6 of these credit hours must be outside of Mathematics.*

5. Actuarial/Financial Mathematics Track
Required Upper Division Mathematics Courses (15 credit hours)

- MATH 3410 - Probability and Statistics I **(3)**
- MATH 3420 - Probability and Statistics II **(3)**

And three of the following courses

- MATH 3550 - Introduction to Mathematical Modeling **(3)**
- MATH 3710 - Boundary Value Problems **(3)**
- MATH 4610 - Numerical Analysis I **(3)**
- MATH 4710 - Partial Differential Equations **(3)**

Electives (at least 25 credit hours) *Complete at least an additional 25 credit hours of upper division Mathematics courses or courses from the list below offered by the John B. Goddard School of Business and Economics:*

- ACTG 3110 - Intermediate Financial Accounting I **(3)**
- ACTG 3120 - Intermediate Financial Accounting II **(3)**
- ECON 3030 - Managerial Economics **(3)**
- ECON 4010 - Intermediate Microeconomic Theory **(3)**
- ECON 4020 - Intermediate Macroeconomic Theory **(3)**
- ECON 4550 - Introduction to Econometrics **(3)**
- ECON 4560 - Mathematical Economics **(3)**
- FIN 3200 - Financial Management **(3)**
- FIN 3300 - Investments **(3)**
- FIN 4400 - Financial Problems - Corporate Finance **(3)**
- MGMT 3010 - Organizational Behavior and Management **(3)**
- MKTG 3010 - Marketing Concepts and Practices **(3)**
- QUAN 3610 - Business Statistics II **(3)**

6. Natural/Life Sciences Track
Required Upper Division Mathematics Courses (12 credit hours)

- MATH 3410 - Probability and Statistics I **(3)**
- MATH 3550 - Introduction to Mathematical Modeling **(3)**
- MATH 3710 - Boundary Value Problems **(3)** or MATH 3280 - Dynamical Systems **(3)**
- MATH 4610 - Numerical Analysis I **(3)**

Electives (at least 28 credit hours) *Complete at least an additional 28 credit hours of upper division courses in Botany, Mathematics, Microbiology or Zoology. At least 6 of these credit hours must be outside of Mathematics.*

Mathematics Departmental Honors

Please contact the Mathematics Department for advisement and permission prior to enrolling in Honors courses.

- ***Program Prerequisite:*** Be declared as a Mathematics major and complete all corresponding requirements.
- ***Grade Requirements:*** Maintain an overall GPA of 3.3 and a mathematics GPA of 3.3.
- ***Additional Requirements:*** Complete an undergraduate project/research-study or equivalent supervised by a faculty mentor, and present the findings in a public forum. To fulfill this requirement, students must enroll in MATH 4910 and complete the following:
    a. Research or equivalent project supervised by faculty mentor, and
    b. Presentation of research and required attendance at seminar talks.

  Students may sign up for MATH 4910 any semester, subject to the approval of the faculty mentor. If the presentation takes place in a later semester, students will receive a T grade until the presentation is complete. The setting for the presentation will be determined by the faculty mentor.

Students who have not completed their General Education requirements are encouraged to take Honors General Education classes.

Mathematics Minor

- ***Grade Requirements:*** A grade of "C" or better in all courses used toward the minor (a grade of "C-" is not acceptable).
- ***Credit Hour Requirements:*** Minimum of 20 credit hours for regular emphasis and 24 credit hours for Mathematics Teaching minor. At least one upper-division mathematics course for three credit hours must be completed at Weber State University.

Students who select the Mathematics Teaching Minor must satisfy the Teacher Education admission and licensure requirements (see *Teacher Education Department*).

Course Requirements for Mathematics Minor (11 credit hours)

- MATH 1210 - Calculus I ***(4)***
- MATH 1220 - Calculus II ***(4)***
- MATH 2270 - Elementary Linear Algebra ***(3)***

Electives (9-10 credit hours)

Take three courses chosen from the following:

- MATH 2210 - Calculus III ***(4)***
- MATH 2280 - Ordinary Differential Equations ***(3)***
- any upper division mathematics courses (courses numbered 3000 and higher)

Course Requirements for the Mathematics Teaching Minor (26 credit hours)

- MATH 1210 - Calculus I ***(4)***
- MATH 1220 - Calculus II ***(4)***
- MATH 2120 - Euclidean Geometry ***(3)***
- MATH 2270 - Elementary Linear Algebra ***(3)***
- MATH 3110 - Foundations of Algebra ***(3)*** or MATH 4110 - Modern Algebra I ***(3)***
- MATH 3120 - Foundations of Euclidean and Non-Euclidean Geometry ***(3)***
- MATH 3410 - Probability and Statistics I ***(3)***
- MTHE 3010 - Methods and Technology for Teaching Secondary Mathematics ***(3)***

2. Mathematics Requirements for Elementary Education Majors

All elementary education majors must take (excerpt from the 2012-2013 Catalog):

(Math 1050, College Algebra is a prerequisite)

- MATH 2010 Mathematics for Elementary Teachers I (3)
- MATH 2020 Mathematics for Elementary Teachers II (3)

In addition, they can extend their license from K-6 to K-8 by doing the following:

Elementary Education Mathematics Endorsement

A candidate desiring to receive Elementary Education Mathematics Endorsement must

- Fill the requirements of the Elementary Education major, with the exception of EDUC 4300 which is not required for the Elementary Education Mathematics Endorsement.
- Select math as a 9-hour content specialization and take the remainder of the classes required for the Endorsement.

Mathematics Courses Required (18 hours)

(MATH 1050, MATH 2010, and MATH 202 are prerequisites)

- MATH 1060 - Trigonometry *(3)*
- MATH 1210 - Calculus I *(4)*
- MTHE 3060 - Probability and Statistics for Elementary Teachers *(3)*
- MTHE 3070 - Geometry for Elementary Teachers *(3)*
- MTHE 3080 - Number Theory for Elementary Teachers *(3)*
- MTHE 4040 - Mathematical Problem Solving for Elementary Teachers *(3)*
- **or other approved courses numbered above 3000**

Note:

Elementary education majors desiring an Elementary Mathematics Endorsement should consult with the Mathematics Department Chair early in their program. The student will be assigned an advisor to help design his/her course of study.

3. General Education Quantitative Literacy Requirement

All students wanting a bachelor degree or an associate of science or associate of arts degree must fulfill the university Quantitative Literacy Requirement. The following was approved by the University Faculty Senate and is listed in the General Education Requirements section of the university catalog:

a. Completion of one of the following mathematics courses (with a grade of C or above): MATH 1030 QL - Contemporary Mathematics, or MATH 1040 QL - Introduction to Statistics, or MATH 1050 QL - College Algebra, or MATH 1080 QL - Pre-calculus, or any math course with either MATH 1050 or MATH 1080 as a prerequisite.
b. Completion of the three-credit * PHIL 2200 QL - Deductive Logic course with a grade of C of above.
c. A score of 70 or greater on the ACCUPLACER College Level Math exam.
d. A score of 3 or higher on the AP Calculus or AP Statistics exam.

Note: Starting with Summer Semester2013, PHIL 2200 will not satisfy the QL requirement.

*** Weber State University students who anticipate transferring to another institution within the Utah State higher education system should fulfill quantitative literacy (QL) with one of the approved Math QL courses rather than *PHIL 2200*, "Deductive Logic." *PHIL 2200* will not be accepted in transfer as a QL course by another Utah public institution of higher education.**

4. Program Maintenance

Appendix J contains the course frequency, rotation pattern, and enrollment data by area.

We have many more students in the Quantitative Literacy Courses than in our major/minor courses. All faculty teach one QL course per semester. We have a department committee whose name is the Quantitative Literacy Committee, and it is their job to monitor these courses, and suggest changes, textbooks, and assessment tools.

Developmental Mathematics (Math Courses numbered 1010 and below) had been administered by the Mathematics Department up to summer semester 2007. During fall semester 2007, duties for those courses were shifted from Mathematics to Developmental Mathematics. There still has been much cooperation between the two. Each Lecturer (contract faculty) in the that program teaches one course for the math department per semester as an adjunct faculty; a few also teach additional courses for supplement pay.

Courses required for majors/minors run at least every other year, and most run every year. Courses up through Linear Algebra, Math 2270 even run during the summer semester. There is about one upper division course a year that is taught as a "reading course". They are taught voluntarily by faculty to one student (usually) on unpaid overload. This allows students to get courses during a semester in which they are not usually offered. This is typically only done if a student needs a course to graduate before it is offered in our regular rotation.

Great care is taken to schedule upper level courses at non conflicting times. Courses are scheduled in different time slots on a MWF schedule or TTh schedule. This allows a major to enroll in almost any of the required upper level courses.

The courses MTHE 6740 to 6780 courses are operated in the local public schools for in service teachers. They were designed by and have been taught so far by math and developmental math faculty. Completing all the courses allows in-service teachers to raise their certification levels.

There are department committees (Curriculum/Major Programs, Math Education) monitor the curriculum as part of their charges. If it is deemed that a change is necessary, the committee brings it before the department in a meeting for a vote. Paperwork is then done to get appropriate approvals and to get the change, if necessary through the Faculty Senate. For example, changes were recently made to the Mathematics Teaching Major. Two of the formerly required courses were replaced by two electives. This allowed students to more easily complete the course requirements within four years.

There are also departmental committees for other purposes. Charges are drawn up by the department chair for each academic year. See Appendix I for the committees and charges for 2012-2013.

5. Curriculum Maps

The following tables show the relevance or impact on the Math Program Learning Outcomes at three different levels, Low Medium and High:

Weber State University Mathematics Major (Regular Emphasis) Core Courses in Department/Program	Program Learning Outcomes			
	Knowledge of and the ability to apply the concepts of differentiable, integral, and multivariable calculus.	Knowledge of and ability to apply the concepts of matrices and Euclidean vector spaces, and ordinary differential equations.	Ability to comprehend and write proofs that are logically, grammatically, and mathematically correct.	Knowledge of and ability to prove results in analysis and algebra.
MATH 1210 Calculus I	H	L	L	L
MATH 1220 Calculus II	H	L	L	L
MATH 2210 Calculus III	H	M	L	L
MATH 2270 Elementary Linear Algebra	M	H	M	M
MATH 2280 Ordinary Differential Equations	H	H	L	L
MATH 4110 Modern Algebra I	L	M	H	H
MATH 4120 Modern Algebra II	L	M	H	H
or MATH 4320 Topology	L	M	H	M
MATH 4210/4220 Introduction to Real Analysis I & II	H	H	H	H

Weber State University Math Teaching Major Core Courses in Department/Program	Program Learning Outcomes				
	Knowledge of and the ability to apply the concepts of differentiable, integral, and multivariable calculus.	Knowledge of and ability to apply the concepts of matrices and Euclidean vector spaces, and ordinary differential equations.	Ability to comprehend and write proofs that are logically, grammatically, and mathematically correct.	Knowledge of basic probability and statistics, analysis, and number theory.	Knowledge of and ability to teach concepts of high school level mathematics.
MATH 1210 Calculus I	H	L	L	L	L
MATH 1220 Calculus II	H	L	L	L	L
MATH 2120 Euclidean Geometry	L	L	M	L	L
MATH 2210 Calculus III	H	M	L	L	L
MATH 2270 Elementary Linear Algebra	M	H	M	L	L
MATH 2280 Ordinary Differential Equations	H	H	L	L	L
MATH 3110 Foundations of Algebra	L	L	H	M	L
or MATH 4110 Modern Algebra I	L	L	H	M	L
MATH 3120 Foundations of Euclidean & non-Euclidian Geometry	L	L	H	L	L
MATH 3160 Number Theory	L	L	H	H	L
MATH 3410 Probability & Statistics	M	L	L	H	L
MATH 4210 Introduction to Real Analysis	H	M	H	H	L
MTHE 3010 Methods & Technology for Teaching Secondary Mathematics	L	L	L	L	H
MTHE 4010 Capstone Mathematics for High School Teachers	M	L	M	M	M

Note: The letters indicate the impact or relevance of the course for the Learning Outcome: L= Low, M= Medium, H= High

Weber State University Applied Mathematics Major (Applied Emphasis) Core Courses in Department/Program	Program Learning Outcomes			
	Knowledge of and the ability to apply the concepts of differentiable, integral, and multivariable calculus.	Knowledge of and ability to apply the concepts of matrices and Euclidean vector spaces, and ordinary differential equations.	Knowledge and ability to apply the concepts of several areas of applied mathematics (probability and statistics, numerical analysis, partial differential equations, etc.).	Ability to comprehend and write correct mathematical arguments.
MATH 1200 Mathematics Computer Laboratory	L	L	L	M
MATH 1210 Calculus I	H	L	L	M
MATH 1220 Calculus II	H	L	L	M
MATH 2210 Calculus III	H	M	L	M
MATH 2270 Elementary Linear Algebra	M	H	L	M
MATH 2280 Ordinary Differential Equations	H	H	M	M
MATH 3280 Dynamical Systems	M	H	H	M
MATH 3410/3420 Probability & Statistics I & II	M	L	H	M
MATH 3550 Introduction to Mathematical Modeling	M	M	M	M
MATH 3610 Graph Theory	L	L	M	M
MATH 3620 Enumeration	L	L	M	M
MATH 3710 Boundary Value Problems	M	H	H	M
MATH 3810 Complex Variables	H	L	M	M
MATH 4610/4620 Numerical Analysis I & II	M	M	H	M
MATH 4710 Partial Differential Equations	M	H	H	M

Note: The letters indicate the impact or relevance of the course for the Learning Outcome: L= Low, M= Medium, H= High

D. Assessment and Learning Outcomes

The following describes the current state of assessment for the programs in the Mathematics Department. The department mission statement (see the first part of this document) was revised in April of 2012. A concise set of **goals**, a curriculum grid for those goals, and an assessment plan were created in 2001, and the results of assessment have been reported almost yearly. The goals were reviewed and used as a basis to establish program learning outcomes for each of the department's majors and measurable course learning outcomes for each of the required courses. These were discussed and approved by the department during September and October of 2012. The course learning outcomes will provide another set of data that can be collected, analyzed, published, and used to improve instruction. They also provide direct evidence that learning is taking place.

1. Goals

Mathematics students should enjoy resources that are sufficient for achieving their goals. While obtaining mathematical knowledge, they should also have a reasonable freedom in the choice of their courses.

The education of a student is a cooperative effort between the student, many faculty in different disciplines, and other university community members such as advisors, librarians, administrators, etc. The Mathematics Department controls only one aspect of this effort, namely the teaching of mathematics. However, this document states overall desirable following goals for students of mathematics:

- Mathematics majors should gain a substantive knowledge and comprehension of the major ideas in the core areas of their fields of study.
    - Mathematics: The main topics are modern and linear algebra and analysis of real-valued functions.
    - Applied Mathematics: The main topics are numerical and statistical analysis, linear algebra, mathematical modeling and differential equations.
    - Mathematics Teaching: The main mathematical topics are the ones contained in mathematics courses required for certification. Mathematics teaching majors should also learn effective approaches for teaching mathematics.
- All mathematics majors should learn a fundamental set of skills that will enable them to succeed in an ever changing world.
    - Problem Solving & Independent Learning: They should be adequately trained to apply their mathematical knowledge in both familiar and new situations. They should also be able to seek new knowledge to help in those endeavors.
    - Technology: They should learn to use appropriate technology, such as computers, as an aide in investigating mathematical problems and teaching.
    - Communication: They should learn to successfully communicate mathematical ideas and solutions of problems with others at the appropriate level.
- Students pursuing Mathematics Minors, Mathematics Teaching Minors, or Elementary Mathematics Endorsements should be able to effectively apply appropriate mathematical ideas and/or teaching approaches in their field.
- Mathematics service courses should meet the overall varied needs of client departments. Students in these courses should obtain the required mathematical knowledge.

Curriculum In a review of the courses required for Mathematics majors it was determined that each required course contributes to each of the following **goals**:

- Mathematics majors should gain a substantive knowledge and comprehension of the major ideas in the core areas of their fields of study.
- All mathematics majors should learn a fundamental set of skills that will enable them to succeed in an ever changing world, including problem solving and independent learning, technology and communication.
- Students pursuing Mathematics Minors, Mathematics Teaching Minors, or Elementary Mathematics Endorsements should be able to effectively apply appropriate mathematical ideas and/or teaching approaches in their field.

2. Program Learning Outcomes Major by Emphasis Using the goals above as a basis, the following learning outcomes based on skills and topic knowledge for each emphasis were established.

Mathematics Major (Regular Emphasis): Students who receive bachelor degrees in Mathematics at Weber State University are expected to have:

1. Knowledge of and the ability to apply the concepts of differentiable, integral, and multivariable calculus.
2. Knowledge of and ability to apply the concepts of matrices and Euclidean vector spaces, and ordinary differential equations.
3. Ability to comprehend and write proofs that are logically, grammatically, and mathematically correct.
4. Knowledge of and ability to prove results in analysis and algebra.

Applied Mathematics Major (Applied Emphasis): Students who receive bachelor degrees in Applied Mathematics at Weber State University are expected to have:

1. Knowledge of and the ability to apply the concepts of differentiable, integral, and multivariable calculus.
2. Knowledge of and ability to apply the concepts of matrices and Euclidean vector spaces, and ordinary differential equations.
3. Knowledge and ability to apply the concepts of several areas of applied mathematics (probability and statistics, numerical analysis, partial differential equations, etc.).
4. Ability to comprehend and write correct mathematical arguments.

Mathematics Teaching Major (Math Teaching Emphasis): Students who receive bachelor degrees in Mathematics Teaching at Weber State University are expected to have:

1. Knowledge of and the ability to apply the concepts of differentiable, integral, and multivariable calculus.
2. Knowledge of and ability to apply the concepts of matrices and Euclidean vector spaces, and ordinary differential equations.
3. Ability to comprehend and write proofs that are logically, grammatically, and mathematically correct.
4. Knowledge of basic probability and statistics, analysis, and number theory.
5. Knowledge of and ability to teach concepts of high school level mathematics.

Curriculum Maps The Curriculum Maps above in C. 5. show the relevance or impact of required courses on the Math Program

3. Course Learning Outcomes Detailed course learning outcomes for each required course in the math program and courses for the elementary education majors were discussed and approved during September and October of 2012. They are listed Appendix H. The curriculum impact grids in C. 5. above show the extent to which these learning outcomes impact the program learning outcomes for the math majors.

4. General Education Quantitative Literacy Course Learning Outcomes/Objectives There are 5 QL objectives for QL courses. These objectives are the same for every course and are not tied directly to the course contents. These are the same as the objectives in the QL Mission Statement (Part B.)

QL Objective 1: Interpret mathematical models such as formulas, graphs, tables, and schematics, and draw inferences about them.
QL Objective 2: Represent mathematical information symbolically, visually, numerically, and verbally.
QL Objective 3: Use arithmetical, algebraic, geometric, and statistical methods to solve problems.
QL Objective 4: Estimate and check answers to mathematical problems in order to determine reasonableness, identify alternatives, and select optimal
results.
QL Objective 5: Recognize that mathematical and statistical methods have limits.

5. Assessment Plan for Mathematics Programs

Assessment is an ongoing process in the Mathematics Department. Externally, broad reviews are conducted regularly by the Board of Regents and by Northwest, ABET, and NCATE accrediting agencies. These generally include reviews of departmental offerings, course content, textbooks, and examinations. In these reviews experienced professionals usually compare our program with others and provide the department with reports detailing its perceived strengths and weaknesses. Other programs also undergo similar external reviews. Based on all these reviews and in consultation with client departments, the Mathematics Department makes necessary changes for improvement of its program.

Internally, the Mathematics Department reviews its entire curriculum periodically, has dialogs with client departments, re-evaluates textbooks annually, keeps current on national curriculum trends, and studies course grade distributions from time to time. In addition, faculty share and review examinations, regularly collect student evaluations of teaching, and undergo annual reviews for merit. Faculty also consult with local school districts, graduate schools, and employers.

Data Collection In data collection a balance must be reached between the cost (time, money, etc.) and usefulness of the data while not imposing unreasonable demands on faculty, university resources, students and graduates. There is no single nationally accepted method, such as standardized testing, for overall assessment. While the core topics of most courses are the same nationally, there is no consensus with regard to the importance or depth of coverage of each topic. Any national comparison would be further complicated by differing entrance standards and missions of universities.

Many evaluation criteria cannot be quantified with a simple numerical scale. For example, there is no national ranking for textbooks. Thus, while the Mathematics Department does review textbooks annually, and uses those reviews to select high quality textbooks, little would be gained from further analysis. This is also true for many other collection/evaluation methods listed below.

The following are feasible means of data collection which can lead to a meaningful assessment. Much of these data could be collected through one instrument, such as a survey, while others have been studied for many years.

- College Graduation Exit Survey
- Post-graduate Survey
- Input from Client Departments
- Feedback from General Education Assessment
- Textbook Evaluation
- Exam Evaluation
- Distribution of Grades in Mathematics Courses
- Distribution of Grades in Client Courses
- Student Research and Contests Results
- Graduate School Acceptance
- Graduate Degrees Earned
- Classroom Observations of Student Teachers
- Profile of Entering Students
- Course evidence of learning grids for courses within the majors
- Course evidence of learning grids for the general education QL courses
- Course evidence of learning grids for courses for elementary major courses

To draw accurate conclusions it will be necessary that the data sets be sufficiently large, be from target populations, and be reliable. In order to generate larger data sets, in some instances groups like majors, minors, and client students, will be lumped together, while in others, such as graduate acceptance rate, the data will be accumulated over several years. For accurate targeting it will be necessary to subdivide some groups, like minors, teaching minors and elementary mathematics endorsements. Finally, the surveys and their results should also be analyzed for unintended biases and reliability of data.

The Mathematics Department is doing the following:

- Maintaining an address file of graduates.
- Administering, over time, exit interviews and a questionnaire that inquires about results of standardized tests, acceptance to graduate school, curriculum strengths and weaknesses, obtaining employment, quality of job training, obtaining advanced degrees, teaching effectiveness, etc.
- Performing surveys of majors that make inquiries about courses and reasons they choose or changed major.
- Study the results of general education assessment and then respond in appropriate ways.
- Establish and maintain measurable program learning outcomes and measurable course learning outcomes.
- Target questions on tests and finals that access whether students are meeting the course learning outcomes and collect the data for the evidence of learning spreadsheets.
- In courses where appropriate, access student papers and/or projects and collect data on these and report on the completion rates.

Assessment Grid The following grid states how and at what level of effectiveness (High, Medium, or Low) the data collected can be used in assessment of the department's program goals:

1. Mathematics majors should gain a substantive knowledge and comprehension of the major ideas in the core areas of their fields of study (pure mathematics, applied mathematics, mathematics teaching).

2. All mathematics majors should learn a fundamental set of skills that will enable them to succeed in an ever changing world, including problem solving and independent learning, technology and communication.
3. Students pursuing Mathematics Minors, Mathematics Teaching Minors, or Elementary Mathematics Endorsements should be able to effectively apply appropriate mathematical ideas and/or teaching approaches in their field.
4. Mathematics service courses should meet the overall varied needs of client departments. Students in these courses should obtain the required mathematical knowledge.

DATA COLLECTION METHODS	**STUDENT LEARNING OUTCOMES**							
	MATHEMATICS KNOWLEDGE			FUNDAMENTAL SKILLS			M, TM, ME*	SERVICE
	Pure	Applied	Teaching	PS&IL**	Tech.	Comm.		
College Graduation Exit Survey	M	M	M	L	M	L	L	
Post-graduate Survey	H	H	H	H	H	H	H	
Input from Client Departments							H	H
Feedback from General Education Assessment								H
Textbook Evaluation	M	M	M	M	L	L	M	M
Exam Evaluation	H	H	H	M	L	M	H	H
Distribution of Grades in Mathematics Courses	H	H	H	M	L	M	H	H
Distribution of Grades in Client Courses	L	M	L	M	M	M	M	H
Student Research and Contests Results	M	M	M	H	H	H	L	
Graduate School Acceptance Rate	H	H	H			L	M	
Graduate Degrees Earned	H	H	H	H		M	M	
Classroom Observations of Student Teachers			H	M	M	H	M	
Course evidence of learning grids, majors	H	H	H	H	L	M	H	
Course evidence of learning grids, QL courses				H	H	L	M	H
Course evidence of learning grids, elementary education courses				H	L	H		

*M: Mathematics Minor, TM: Mathematics Teaching Minor, ME: Elementary Mathematics Endorsements
**PS&IL: Problem Solving and Independent Learning

Measurable Course Learning Outcomes and Action Plan for non QL courses Course learning outcomes for each of the required courses for math majors and elementary majors are listed Appendix H. The curriculum impact grids in C. 5. show the extent to which these learning outcomes impact the program learning outcomes for the math majors. The outcomes are available electronically to department members on the department's network drive. Each time a course above 1080 is taught the instructor will target each of the course learning outcomes with test questions or papers or projects and report the on the student completion rates. See the section on QL below for the assessment plan for the QL course Math 1030, 1040, 1050, 1080. Thresholds will be established according to Bloom's Taxonomy and method of measurement in the range of 65% to 70%. For example a question on a midterm exam is more immediate and will have a rate of 70% while a question on a comprehensive final could have a rate of 65%. Projects or papers will have a rate 70 %. If the completion rates do not meet the thresholds then there will be discussions with the appropriate committee and department to determine the reason and formulate a course of action such as new texts, new approaches, additional homework, etc.

Evidence of learning Spreadsheets Evidence of learning spreadsheets will be used to assess the learning in each course. Instructors of required courses for majors and elementary education math courses will submit the spreadsheets at the time grades are due (Starting Spring of 2013). Exact details vary by course. The spreadsheets are available electronically to department members on the department's network drive. Two samples follow:

A. Evidence of Learning: **MATH 1210 Calculus I**				
Measurable Learning Outcome Students will…	Method of Measurement Direct and Indirect Measures*	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results
1.A: Use algebraic techniques to evaluate limits.	Measure 1: Question on an exam	Measure 1: TBD	Measure 1: TBD	Measure 1: TBD
	Measure 2: Course pass rate	Measure 2: TBD	Measure 2: TBD	Measure 2: TBD
2.A: Find derivative of algebraic and trigonometric functions, defined explicitly or implicitly, using differentiation rules: power, product, quotient, and chain rules and implicit differentiation.	Measure 1: Question on an exam	Measure 1: TBD	Measure 1: TBD	Measure 1: TBD
	Measure 2: Course pass rate	Measure 2: TBD	Measure 2: TBD	Measure 2: TBD
3.A: Interpret derivative as the rate of change and use it to find equation of a tangent line, find velocity and acceleration, approximate value of a function, approximate a zero of a function or solve related rate problems.	Measure 1: Question on an exam	Measure 1: TBD	Measure 1: TBD	Measure 1: TBD
	Measure 2: Course pass rate	Measure 2: TBD	Measure 2: TBD	Measure 2: TBD

A. Evidence of Learning: **MATH 1210 Calculus I**				
Measurable Learning Outcome Students will…	Method of Measurement Direct and Indirect Measures*	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results
4.A: Understand the role of first and second derivatives in the shape of graphs.	Measure 1: Question on an exam	Measure 1: TBD	Measure 1: TBD	Measure 1: TBD
	Measure 2: Course pass rate	Measure 2: TBD	Measure 2: TBD	Measure 2: TBD
5.A: Solve optimization application problems.	Measure 1: Question on an exam	Measure 1: TBD	Measure 1: TBD	Measure 1: TBD
	Measure 2: Course pass rate	Measure 2: TBD	Measure 2: TBD	Measure 2: TBD
6.A: Evaluate definite and indefinite integrals using basic integration techniques, including substitution.	Measure 1: Question on an exam	Measure 1: TBD	Measure 1: TBD	Measure 1: TBD
	Measure 2: Course pass rate	Measure 2: TBD	Measure 2: TBD	Measure 2: TBD
7.A: Interpret the definite integral as a sum and use it to find areas, volumes or the work done by a variable force.	Measure 1: Question on an exam	Measure 1: TBD	Measure 1: TBD	Measure 1: TBD
	Measure 2: Course pass rate	Measure 2: TBD	Measure 2: TBD	Measure 2: TBD
8.A: Be able to use definitions to prove value of a limit, find derivative of a function or evaluate a definite integral, for simple functions.	Measure 1: Question on an exam	Measure 1: TBD	Measure 1: TBD	Measure 1: TBD
	Measure 2: Course pass rate	Measure 2: TBD	Measure 2: TBD	Measure 2: TBD
9.A: Understand important theorems such as Intermediate Value Theorem, Extreme value Theorem, Rolle's Theorem, Differential or Integral Mean Value Theorems or Fundamental Theorem of Calculus.	Measure 1: Question on an exam	Measure 1: TBD	Measure 1: TBD	Measure 1: TBD
	Measure 2: Course pass rate	Measure 2: TBD	Measure 2: TBD	Measure 2: TBD

*At least one measure per objective must be a direct measure; indirect measures may be used to supplement direct measure(s).

B. Evidence of Learning: **MATH 2120 Euclidean Geometry**				
Measurable Learning Outcome Students will…	Method of Measurement Direct and Indirect Measures*	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results
1.A: Know when it is necessary to write a proof and develop the ability to write proofs in the setting of Euclidean geometry.	Measure 1: Question on an exam	Measure 1: TBD	Measure 1: TBD	Measure 1: TBD
	Measure 2: Course pass rate	Measure 2: TBD	Measure 2: TBD	Measure 2: TBD

B. Evidence of Learning: **MATH 2120 Euclidean Geometry**				
Measurable Learning Outcome Students will…	Method of Measurement Direct and Indirect Measures*	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results
2.A: Know and understand definitions and basic theorems regarding Euclidean notions of angles, congruence, parallel lines, similarity, and circles.	Measure 1: Question on an exam	Measure 1: TBD	Measure 1: TBD	Measure 1: TBD
	Measure 2: Course pass rate	Measure 2: TBD	Measure 2: TBD	Measure 2: TBD
3.A: Solve problems and prove theorems relating to Euclidean notions of angles, congruence, parallel lines, similarity, and circles.	Measure 1: Question on an exam	Measure 1: TBD	Measure 1: TBD	Measure 1: TBD
	Measure 2: Course pass rate	Measure 2: TBD	Measure 2: TBD	Measure 2: TBD

*At least one measure per objective must be a direct measure; indirect measures may be used to supplement direct measure(s).

High Impact or Service Learning: Although there are no **required** high impact learning courses in the math programs, majors get some this type of experience in several courses. In a few of the upper level courses students are required to solve problems and write papers individually or in groups and sometimes give presentations on the results. For example, in the Mathematical Modeling Course students create original models/solutions to applied problems and sometimes work on these in groups. In other courses students do group work or write papers. In several of the Math Education courses students create lesson plans and give presentations. During their final semester, Mathematics Teaching Majors student teach in local public schools and are observed and critiqued by Math Faculty. The Math Factor, the student math club also sponsors student presentations. The Department sponsors an annual afternoon seminar on undergraduate research topics in math. As a result we have lately had more students enrolled in our senior project courses.

6. General Education QL Assessment Plan

Beginning in Spring of 2012, the QL committee authored 5 Final Exam Questions for each of the QL courses, Math 1030, 1040, 1050, and 1080. The questions will test the 5 QL learning outcomes in each course. All instructors were to add the questions to their final exams and report the completion rate for each of the questions. The completion rate for each question across all sections and total pass rates for all sections was complied. The results are reported in the evidence of learning outcomes spreadsheets in 7, below. If the thresholds are not reached then discussions will take place between the instructor and the Quantitative Literacy Committee to determine the reason. This will be done each semester (Fall and Spring) until the thresholds are reached. After that the procedure will be done for a sample of the sections each semester.

7. Most Recent Results of Assessment

General Education QL Renewal During the Fall of 2011 courses that satisfied the QL requirement underwent renewal. During 2010-2011 a Mission Statement in B was authored by the University Curriculum Committee and approved by the Faculty Senate. Each QL course was required to reapply for QL status. The department was required to justify that each course met each of the learning outcomes in the QL Mission Statement. The math department's QL courses were re approved by the university curriculum committee and the faculty senate. The proposal for Math 1050, College algebra is given in Appendix G as a sample. The others were similar and are available upon request.

Placement for Quantitative Literacy: A program was put into place (2006-2007) by the administration, based on a university wide committee's recommendation, that forces a student to take placement exams in Mathematics and English. It was revised in Spring of 2012. It requires students to make progress in Developmental Courses, otherwise they can only register for developmental courses (colloquially referred to as a "Three Strikes Rule"). The following paragraph is from the Policy and Procedures Manual (PPM), section 6-2, III D (Revised 5/4/2012):

> Application Requirements by Application Status Based on test results students will be placed in specific English, math or reading courses according to the *WSU Assessment & Placement Standards* document. A fee will be charged for each assessment test. Students are not allowed to register for any course(s) before taking all applicable tests. All students requiring developmental coursework must enroll in and not withdraw from their initial developmental course(s) within the first two semesters. Upon enrolling in a developmental course, these students are then required to make progress (defined as the minimum course grade of C) each subsequent semester (excluding summer) until all relevant minimum developmental requirements (including Math 1010 if applicable) have been met for the students' declared degree program of study (A.A.S., A.S., A.A., or bachelor's degree). Otherwise, a hold will be placed on their registration which can be removed only by the Student Success Center.

Students who are out of compliance with WSU's Assessment & Placement Policy three times or more will be allowed to register only for their required developmental courses until they have been successfully completed with a grade of C or better.

The *WSU Assessment & Placement Standards* document lists the cuts scores for the accuplacer placement test (currently used for both Math and English) for placement. If a student scores lower than 23 on the Math ACT test, they must take accuplacer before they can register. Then they must enroll in the appropriate math course their second semester and keep making satisfactory progress until they reach the quantitative literacy courses. The cut scores for developmental math courses and prerequisites (courses and prerequisite expirations were recently reviewed and revised (Oct and Nov of 2012) by the Assessment and Placement committee. The changes will take effect in Feb 2013. For Math, prerequisites (courses and placement tests) expire after two years.

Evidence of Learning: QL Courses – Spring 2012 During Spring of 2012 the first evidence of learning data for the QL courses was collected. (See the assessment of QL courses in the plan above.)
There are 5 objectives for QL courses. These objectives are the same for every course and are not tied directly to the course contents.
QL Objective 1: Interpret mathematical models such as formulas, graphs, tables, and schematics, and draw inferences about them.
QL Objective 2: Represent mathematical information symbolically, visually, numerically, and verbally.
QL Objective 3: Use arithmetical, algebraic, geometric, and statistical methods to solve problems.
QL Objective 4: Estimate and check answers to mathematical problems in order to determine reasonableness, identify alternatives, and select optimal results.
QL Objective 5: Recognize that mathematical and statistical methods have limits.

The direct measure (measure 1) used was one question per objective in the final exam in each course in almost all sections (some instructors did not correctly assess the objectives). These final exams are comprehensive and have the lowest average of all exams. Students' course average scores are higher than their final exam scores. However, the final exams provide a uniform measure across all sections. The indirect measure (measure 2) is the individual course passing rate. Passing rate = (# of students with a course grade of "C" or better) / (# of students who completed the course)

Based on Bloom's Taxonomy and how closely an objective is tied to the course content, two different thresholds are used for objectives 1-3 and 4-5. The evidence learning spreadsheets and grade distributions follow:

Evidence of Learning Spreadsheets for quantitative Literacy Courses

Spring 2012 - Math 1030 (6 sections, 153 students)					
Measurable Learning Outcome	Measure 1: Average Score Measure 2: Course passing rate	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results
QL Objective 1	Measure 1	75%	95%	Students successfully met this objective.	None
	Measure 2	70%	90%	Students successfully met this objective.	None
QL Objective 2	Measure 1	75%	55% [1]	Students did not meet this objective.	Increase emphasis in the classroom. Be sure course topics are uniformly covered. See note 1.
	Measure 2	70%	90%	Students successfully met this objective.	None
QL Objective 3	Measure 1	75%	78%	Students successfully met this objective.	None
	Measure 2	70%	90%	Students successfully met this objective.	None
QL Objective 4	Measure 1	65%	77%	Students successfully met this objective.	None
	Measure 2	70%	90%	Students successfully met this objective.	None
QL Objective 5	Measure 1	65%	74%	Students successfully met this objective.	None
	Measure 2	70%	90%	Students successfully met this objective.	None

1. Two instructors did not fully cover the topic that was used for the direct measure. Excluding the result of those two instructors, the average score was 80%.

Evidence of Learning: Math 1040 (4 sections, 113 students)					
Measurable Learning Outcome	Measure 1: Average Score Measure 2: Course passing rate	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results
QL Objective 1	Measure 1	75%	92%	Students successfully met this objective.	None
	Measure 2	70%	84%	Students successfully met this objective.	None
QL Objective 2	Measure 1	75%	93%	Students successfully met this objective.	None
	Measure 2	70%	84%	Students successfully met this objective.	None
QL Objective 3	Measure 1	75%	79%	Students successfully met this objective.	None
	Measure 2	70%	84%	Students successfully met this objective.	None
QL Objective 4	Measure 1	65%	82%	Students successfully met this objective.	None
	Measure 2	70%	84%	Students successfully met this objective.	None
QL Objective 5	Measure 1	65%	72%	Students successfully met this objective.	None
	Measure 2	70%	84%	Students successfully met this objective.	None

Spring 2012 - Math 1050 (21 sections, 504 students)					
Measurable Learning Outcome	Measure 1: Average Score Measure 2: Course passing rate	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results
QL Objective 1	Measure 1	75%	76%	Students successfully met this objective.	None
	Measure 2	70%	77%	Students successfully met this objective.	None
QL Objective 2	Measure 1	75%	49% [2]	Students did not meet this objective.	Increase emphasis in the classroom. Investigates the appropriateness of the problem. See note 2.
	Measure 2	70%	75%	Students successfully met this objective.	None
QL Objective 3	Measure 1	75%	78%	Students successfully met this objective.	None
	Measure 2	70%	77%	Students successfully met this objective.	None
QL Objective 4	Measure 1	65%	58% [3]	Students successfully met this objective.	Increase emphasis in the classroom. Be sure course topics are uniformly covered. See note 3.
	Measure 2	70%	77%	Students successfully met this objective.	None
QL Objective 5	Measure 1	65%	81%	Students successfully met this objective.	None
	Measure 2	70%	77%	Students successfully met this objective.	None

2. Instructors reported that although the topic of the chosen problem was covered, a typical problem for that topic would be a two part problem and since the asked question had only one part students were confused. Either a different problem or both parts of the problem will be asked in future.

3. Some instructors did not fully cover the topic that was used for the direct measure.

Spring 2012 - Math 1080 (7 sections, 123 students) [4]					
Measurable Learning Outcome	Measure 1: Average Score Measure 2: Course passing rate	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results
QL Objective 1	Measure 1	75%	84%	Students successfully met this objective.	None
	Measure 2	70%	71%	Students successfully met this objective.	None
QL Objective 2	Measure 1	75%	58% [5]	Students did not meet this objective.	Increase emphasis in the classroom. Investigates the appropriateness of the problem. See note 5.
	Measure 2	70%	71%	Students successfully met this objective.	None
QL Objective 3	Measure 1	75%	81%	Students successfully met this objective.	None
	Measure 2	70%	71%	Students successfully met this objective.	None
QL Objective 4	Measure 1	65%	61%	Students did not meet this objective.	Increase emphasis in the classroom.
	Measure 2	70%	71%	Students successfully met this objective.	None
QL Objective 5	Measure 1	65%	87%	Students successfully met this objective.	None
	Measure 2	70%	71%	Students successfully met this objective.	None

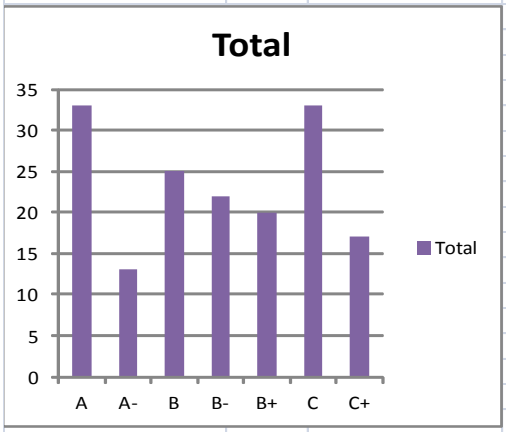
4. One instructor gave the problems as optional extra credit. The result of that section has been omitted.
5. Instructors reported that although the topic of the chosen problem was covered, a typical problem for that topic would be a two part problem and since the asked question had only one part students were confused. Either a different problem or both parts of the problem will be asked in future.

Note: Instructors reported that the chosen problems for Math 1080 had too much concentration on one topic, exponential functions. Therefore, the problem for the objective 3 will be changed for overall improved balance of topics on the final exam.

PASS RATES:	90%	MATH 1030			84%	MATH 1040

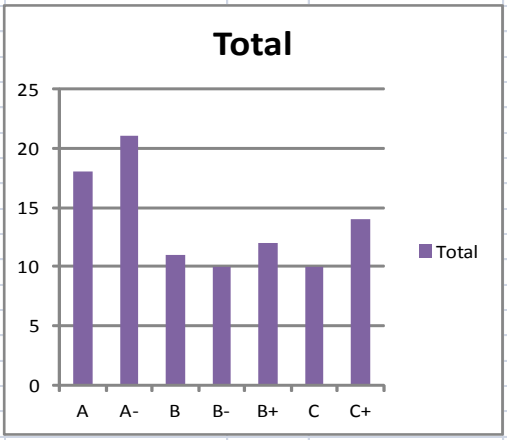
PASSING ONLY

Count of 1030 Grade	
1030 Grade	Total
A	33
A-	13
B	25
B-	22
B+	20
C	33
C+	17
Grand Total	**163**



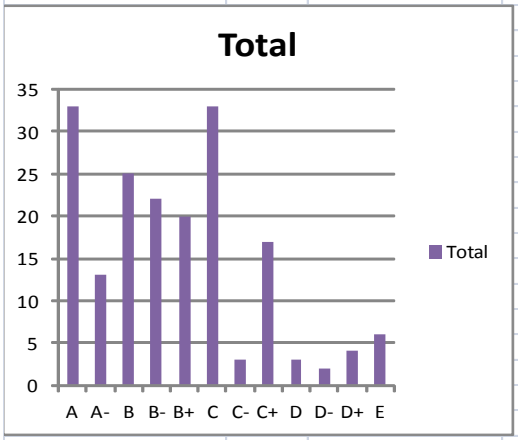
PASSING ONLY

Count of 1040 Grade	
1040 Grade	Total
A	18
A-	21
B	11
B-	10
B+	12
C	10
C+	14
Grand Total	**96**



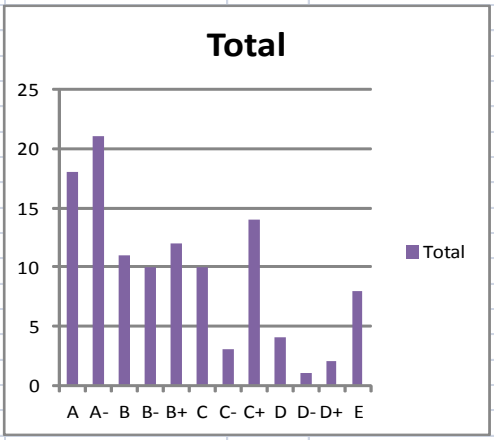
ALL LETTER GRADES

Count of 1030 Grade	
1030 Grade	Total
A	33
A-	13
B	25
B-	22
B+	20
C	33
C-	3
C+	17
D	3
D-	2
D+	4
E	6
Grand Total	**181**



ALL LETTER GRADES

Count of 1040 Grade	
1040 Grade	Total
A	18
A-	21
B	11
B-	10
B+	12
C	10
C-	3
C+	14
D	4
D-	1
D+	2
E	8
Grand Total	**114**

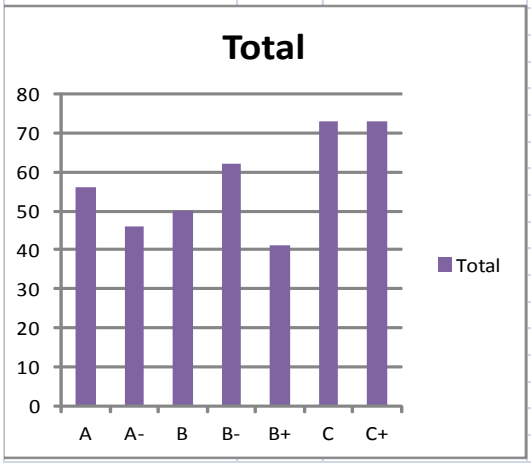


77% MATH 1050

PASSING ONLY

Count of 1050 Grade

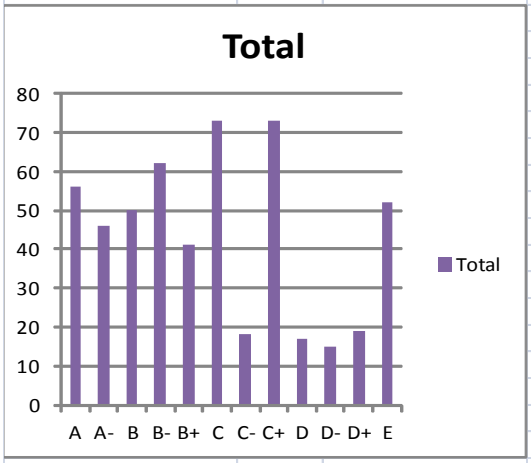
1050 Grade	Total
A	56
A-	46
B	50
B-	62
B+	41
C	73
C+	73
Grand Total	**401**



ALL LETTER GRADES

Count of 1050 Grade

1050 Grade	Total
A	56
A-	46
B	50
B-	62
B+	41
C	73
C-	18
C+	73
D	17
D-	15
D+	19
E	52
Grand Total	**522**



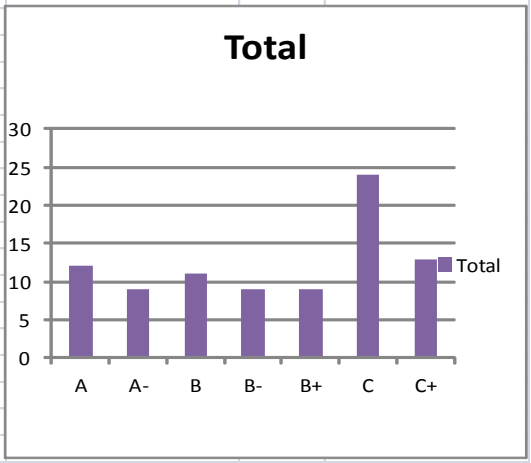
FAILING ONLY

71% MATH1080

PASSING ONLY

Count of 1080 Grade

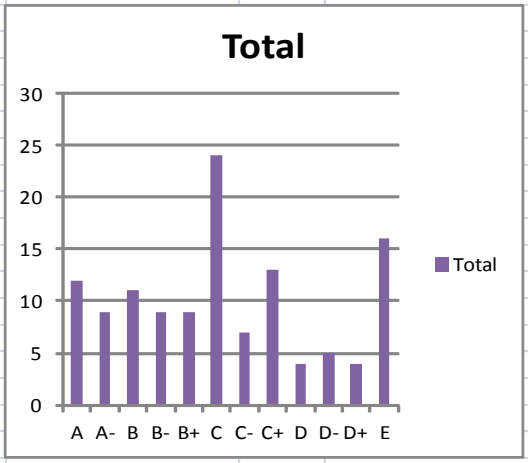
1080 Grade	Total
A	12
A-	9
B	11
B-	9
B+	9
C	24
C+	13
Grand Total	**87**



ALL LETTER GRADES

Count of 1080 Grade

1080 Grade	Total
A	12
A-	9
B	11
B-	9
B+	9
C	24
C-	7
C+	13
D	4
D-	5
D+	4
E	16
Grand Total	**123**



FAILING ONLY

Exit Survey Update: Below is the data collected on our exit survey through Spring of 2012. Some majors and minors do not return the survey.

Graduation Questionnaire, Department of Mathematics

1. I have a favorable impression of the mathematics department.
   Disagree 1 2 3 4 5 6 7 Agree
   Mean: 5.8 Count: 67

2. The mathematics faculty displayed a thorough knowledge of mathematics.
   Disagree 1 2 3 4 5 6 7 Agree
   Mean: 6.5 Count: 67

3. The mathematics faculty were well-prepared for their day-to-day teaching duties.
   Disagree 1 2 3 4 5 6 7 Agree
   Mean: 6.1 Count: 67

4. I was positively challenged by the mathematics curriculum.
   Disagree 1 2 3 4 5 6 7 Agree
   Mean: 6.3 Count: 67

5. The variety of mathematics course offerings was adequate to meet my immediate post-graduate (employment, graduate school, etc.) needs.
   Disagree 1 2 3 4 5 6 7 Agree
   Mean: 5.9 Cnt: 42

6. The frequency of mathematics course offerings was adequate for my progress toward graduation.
   Disagree 1 2 3 4 5 6 7 Agree
   Mean: 4.9 Count:67

7. I received effective academic advising from the mathematics department.
   Disagree 1 2 3 4 5 6 7 Agree
   Mean: 5.7 Count:67

8. I was given sufficient exposure to the uses and limitations of technology in mathematics.
   Disagree 1 2 3 4 5 6 7 Agree
   Mean: 4.9 Count:67

9. In mathematics courses I was expected to engage in problem solving.
   Disagree 1 2 3 4 5 6 7 Agree
   Mean: 6.4 Count:67

10. In mathematics courses I was expected to engage in independent learning.
    Disagree 1 2 3 4 5 6 7 Agree
    Mean: 6.2 Count:67

11 In mathematics courses I was expected to appropriately communicate my results.
   Disagree 1 2 3 4 5 6 7 Agree
   Mean: 5.9 Count:67

12a. The teaching in the mathematics courses below calculus was good.

Disagree 1 2 3 4 5 6 7 Agree __ Does not apply to me

Mean: 6.0 Count: 30

12b. The teaching in the calculus sequence was good.

Disagree 1 2 3 4 5 6 7 Agree __ Does not apply to me

Mean: 5.9 Count: 61

12c. The teaching in the upper division mathematics courses (not mathematics education) was good.

Disagree 1 2 3 4 5 6 7 Agree __ Does not apply to me

Mean: 5.9 Count: 63

12d. The teaching in the lower division mathematics education courses was good.

Disagree 1 2 3 4 5 6 7 Agree __ Does not apply to me

Mean: 5.6 Count: 33

12e. The teaching in the upper division mathematics education courses for secondary teachers was good.

Disagree 1 2 3 4 5 6 7 Agree __ Does not apply to me

Mean: 6.2 Count: 24

12f. The teaching in the upper division mathematics education courses for elementary teachers was good.

Disagree 1 2 3 4 5 6 7 Agree __ Does not apply to me

Mean: 7.0 Count: 2

Graduates are also asked to fill out another document. The first part requests contact information for future data, and the second has the following questions:

Written Response Questions (the confidential results will be shared upon request)

1. What are your immediate post-graduation plans (employment, graduate school, etc.)?

2. Did you apply to graduate school? If so, where did you apply and were you accepted?

3. Did you take any national exam (GRE, actuarial, etc.)? If so, please state the exam and your results.

4. Did you participate in any national competitions, or professional conferences, or receive any honors? If so, please supply the details.

5. Were there one or two courses that were particularly good? Please elaborate.

6. Were there one or two courses that could be improved? Please elaborate.

7. Were there one or more instructors that were particularly effective? Please elaborate.

8. Were there one or two instructors that were less effective? Please elaborate.

Analysis of Exit Survey: The survey continues to show that the department is doing a good job of preparing our majors for future success. Those that are seeking employment are finding teaching positions or jobs in industry. Others are being accepted to graduate school.

The responses show that faculty are generally doing a good job in the classroom. Students want courses for majors offered more frequently. We are sympathetic to this and we are requesting more faculty. We will also work to make courses more easily available.

Several of our recent graduates are in graduate school in mathematics or related areas, and a few have finished Ph.D.'s in mathematics. A few more are working as programmers/engineers in industry. Even more are now high school teachers.

The numbers of declared mathematics majors has been increasing. One thing that we are starting is the Extended Campus Program in Mathematics. This is an effort to get transfer students who have essentially completed the first two years of our program and who would be able to graduate after two more years. This is a recruitment effort to get more majors, but so far none have enrolled under this program. We have designed a brochure and sent advertisements to a number of other universities.

E. Academic Advising

Advising Strategy and Process: The chair of the department is the official academic advisor for all mathematics majors and minors. Other faculty members are encouraged to advise students as well, but students will always eventually be sent to see the chair to be declared. Typically a student will call, come in, or make an appointment to talk to the chair. They are given information about the math programs and potential careers. They are declared as majors or minors in the university electronic records and they are given help planning a schedule. Students are encouraged to contact the chair when they need more advice or help planning a schedule. Some students desire a personal year by year schedule. In this case one is planned. Other questions are answered as they arise.

The Math Teaching Major and licensure for secondary education has many requirements, math courses as well as education courses. Possible course sequence plans for the Mathematics Teaching Major are posted on one of the math department web pages and distributed in handouts. All students are advised to contact the College of Education concerning the education requirements. Students must complete all math courses prior to their final semester of student teaching. The chair must verify and "sign off" that all their courses outside the College of Education are completed or are In Progress at the beginning of the students' next to last semester.

The chair also gives advice to students or other advisors on the university quantitative literacy requirement as needed.

Future elementary school teachers that want to emphasize mathematics are advised by our Math Education faculty on an as needed basis. These students also receive advice from the College of Education.

The Developmental Mathematics Program does the advising of students in developmental courses.

Effectiveness of Advising and Changes

Exit data is being collected to assess the quality of advising in the Mathematics Department (see above questionnaire, question 7). In addition, a very recent survey of majors (for other purposes) indicated that

some desired more contact with a faculty mentor. The chair has begun assigning a faculty member to each declared major (and minor if the student desires). Course sequence plans for the mathematics major and the regular track of the applied math major are being developed. There are already course sequence plans for the math teaching major.

F. Faculty

Currently the mathematics faculty consists of 12 full-time people and one three-quarter time person. Last year there was a retirement and one non tenured faculty did not get tenure. We currently have approval to search for only one replacement. The Developmental Program has one full time director, ten full time lecturers, and one three-quarter time Assistant Professor. Each lecturer and the one professor of Development Math teaches one course (mostly QL) for the Math Department per semester. Over the last 5 years Math has employed 24 different people as adjunct instructors (developmental math employs many more). There is a group of regular adjuncts that teach at least one course per semester and several are teaching 2 or more. In addition, Faculty from the Department of Computer Science have taught 2 or 3 sections of Math 1630, Discrete Mathematics Applied to Computing per year as adjuncts for Math . The past year is typical, see the tables below. For the 2011-2012 academic year Mathematics taught over 17,800 student credit hours. The average "On Load" TCH per FTE was 26.44 and with overload it was 29.15 for contract faculty (14.75 full time equivalent that year). The number of majors reported in the appendix is lower than department records, see the table below which presents averages for the year and includes double majors. The program graduates data looks accurate. About half our graduates are teaching majors.

2011-2012 Faculty TCH,

Faculty TCH, Includes reassigned time, project courses, and extra teaching	TCH
M Akelbek	21
D Blackinton	40
Chloe Cai	24
J Chan	18
M Cocos	45
S Akelbek	40
Foster	24
A Ghoreishi	38
K Kidman	26
G Kvernadze	41
M Ondrus	22
J Peters	33
TH Steele	11
P Talaga	24
Wills	23
Total	430

Note, 14.75X24=354

2011-2012 Dev Math TCH

Courses taught by Dev Math for the Math dept, Includes overload	TCH
Acor	12
Allred	8
L Baker	12
Hansen	8
Imig	8
Mckee	8
Poore	16
Quesnell	9
Schilling	7
Thaeler	6
Yonkee	8
Total 11	102

2011-2012

Adjunct	TCH
S Baker	24
BECK	4
Ellis	20
M Emami	4
R Emami	15
Fuller	4
Haueter	12
Hollepeter	8
Hunt	20
Marx	9
Peterson	4
Rague	12
Ruiz	10
Salt	19
Schweitzer	8
Walthers	15
N Wheeler	12
R Wheeler	12
Total 17	212

Declared Majors and Minors					
Year	2008-2009	2009-2010	2010-2011	2011-2012	fall 2012
Math		20	58	54	57
Math		75	97	76	78

Teaching					
Applied Math		20	25	21	26
Total Majors	87	115	180	151	161
Minors					65

Faculty Demographic Information and Qualifications

As of the 2012-2013 academic year the Mathematics Department has four full-time tenured full professors, one three-quarter-time tenured full professor, one full-time tenured associate professor, six full-time assistant professors (tenure-track), and one full-time instructor specialist (tenured). The Developmental Mathematics Program has one full time tenured associate professor, eleven full-time lecturers (non-tenure-track). Of the Mathematics faculty, thirteen have Ph.D.'s, and one has a Masters Degree. Of the Developmental Mathematics faculty, one has a doctorate, five have masters, and five have bachelors. In the Mathematics Department, three of the faculty are female, eleven are male. There are no minorities, although six are from foreign countries including 2 from Asia. In the Developmental Mathematics Program, eight are female, four are male, with no minorities. Areas of faculty expertise include Real Analysis, Algebra, Differential Equations, Linear Algebra, Approximation Theory, Combinatorics, Matrix Theory, Statistics, Numerical Analysis, and Mathematics Education. Years of teaching experience vary from one year to over thirty years. See appendix B for more details.

Diversity

The department faculty is diverse in the sense of what nationalities are present and where people got their degrees, through conscious efforts to develop a broad applicant pool. Five years ago we hired two women. In addition two members are from Asia. We will continue to make efforts to increase diversity.

Programmatic/Departmental Teaching Standards

The department feels that standards are appropriate. To a certain extent we must develop our own majors. They need to have skills needed in their future courses and jobs. Feedback from students and employers indicate that our graduates are well trained. For QL courses see the grade distributions above.

Evidence of Effective Instruction

Graduate Exit survey: We continue to request graduate exit surveys from all graduates as a part of the graduation sign-off of majors and minors. These surveys continue to show that the department is doing a good job of preparing our majors for future success. The responses show that the faculty is generally doing a good job in the classroom. The results have been fairly consistent with student evaluations. GRE scores are also requested, although very few students have reported them.

Several of our recent graduates are in graduate school in mathematics or statistics, and a few have finished Ph.D.'s in mathematics. A few more are working as programmers, engineers, or statisticians. Even more are now high school teachers. Our graduates seem satisfied with the education that they have been given.

Three years ago we started a yearly afternoon seminar in which faculty members present topics for undergraduate research and undergraduate projects. The first year we had three students work with faculty on projects. There were six in each of the last two years. These students have given about 5 talks a year within the department and more talks or presentations in forums for undergraduate research. Several students have returned to give talks after graduation. The research has resulted in four publications for these students after graduation.

We are trying to increase our numbers of majors, and we have a committee dedicated to this task. We are continually looking at the graduate exit surveys for new ideas on how to accomplish this and how to increase

the success of our majors. A few faculty are working on college committee with the Dean to conduct surveys and apply for grants for this purpose.

Better quality will result if there are more full time faculty members. There is a financial problem that prevents this from happening. More faculty in general are needed to keep the class sizes down to a more manageable size (WSU advertises low class sizes, about 25 and access to faculty). The core faculty is large enough to provide stability, but just barely. We are experiencing increased enrollments in calculus and the post calculus service courses due to program changes and new programs in engineering. We have never received positions for this. This year we are down two faculty and two of the higher quality regular adjuncts have quit. One of those adjuncts taught two or more of the upper division Math Ed courses a year. We are in the process of searching for a Math Ed faculty. In reviewing the adjunct faculty applications, the chair has found only three that he feels comfortable with. On interviewing them, two are teaching a lot of courses in other WSU departments or at other state universities.

Mentoring Activities, Review and Professional Development

Orientation of new faculty and staff is handled by the department chair, and any other faculty member(s) he has help him for any specific situation. This is typically done in conversations between the chair and the new hire both formally and informally.

For ongoing review and development, the chair meets with each faculty member once a year in the annual faculty review, and goals are agreed on by the faculty member with the chair. Plans, committee assignments, and opportunities are discussed. Tenure track people are subject to additional reviews for tenure and promotion. These are very extensive reviews performed by a department committee, a college committee, the Dean, and sometimes the Provost. All Tenure Track contract and adjunct faculty have student evaluations done in each course they teach. Tenured faculty are required to have student teaching evaluations administered in at least two courses per year. All evaluations are seen by the chair, and become part of the annual faculty review. These reviews show that a subset of the faculty is very active in research and has published several articles in refereed journals. There were 9 in 2009-2010, 4 in 2010-2011, and 4 in 2011-2012. Over the last three years there have been 11 conference presentations and 13 talks within the university mostly within the departmental colloquia series or to the Math Club. We usually have 3 or 4 invited speakers per year give research level presentations in the departmental colloquia series. We have been able to fund all math faculty requests to attend conferences or meetings by using department budgets, requests to the Dean and internal grants at the university level. An increased department travel budget would make this more accessible. Over the past three years the department have received 12 internal grants and 1 small external grant. In addition one faculty member is working under a grant that a local public school district received from the State of Education.

Teaching is performed at a high level of competence. Service is performed as needed, and the Mathematics Department has been represented on University Committees and on the Faculty Senate.

Adjunct instructors teaching courses for the Math Department attend an orientation meeting at the beginning of the fall semester. Departmental policies and procedures are discussed. The meetings have also included other activities. They can also ask questions of the chair (and others) at any time. Adjuncts are required to turn in their graded final exams for each course they instruct. The department chair reviews these finals, teaching evaluations, and grade distributions. The chair meets with each adjunct at least once every two years to go over their final exams, teaching evaluations, and standards. He inquires about their courses, answers questions, and makes suggestions. Plans are still being considered of how to better train adjuncts, and how to better mentor and assess them. Class room visits are being considered, but there does not seem to be enough

time. Questions are answered by the chair and other faculty as they arise. Policies and procedures are revised as needed.

Adjunct Faculty and Lecturers in developmental math courses are being dealt with by the Developmental Math program. Each Lecturer is reviewed each year by the Director. Every three years each undergoes a more detailed peer review by a peer committee which includes at least one faculty member from the math department since the lecturer teaches at least one QL course for Math a semester.

G. Support Staff, Administration, Facilities, Equipment, and Library

The Department of Mathematics receives support mostly from the legislature. Some student fees are used to help support the tutoring in the solution space. We have several scholarship funds that were made possible by donations. Occasionally faculty members have received grants to help them accomplish what they desire. Mostly these grants are in-state, but sometimes they are national. Our funds are not adequate for our needs, but to the extent that they are able, the Dean and the Provost provide good support.

Staff

The Math department has one classified staff person, the department secretary. She has been at Weber State for two years. She helps immensely with the administration of the Math Department. She keeps supplies and equipment organized and arranges for repairs. She has provided very effective signage for courses, faculty and safety. She is very adept at using the computer for administration: schedules, budgets, purchasing, records, etc. In addition she supports the faculty with data collection and analysis: pass rates, surveys, teaching evaluations, etc. She is very helpful with students, providing information and directions. We are very lucky to have her. Previous staff have not been as highly qualified nor have done as much data collection and analysis. The Dev Math Program has their own staff.

We have students working as tutors in the Solution Space (the tutoring lab housed in the math area). A few students have been hired as graders, and efforts are underway to provide more. The support is mostly adequate, especially since Developmental Mathematics came into being, with the extra secretary.

Ongoing Staff Development: The upper administration provides regular training for all secretaries on procedures and administrative changes. There is also training on the use computer programs available to all faculty and staff.

Adequacy of Administrative Support

The Solution Space (tutoring lab in Building 4) was run by the Developmental Mathematics Program up to 2010 for developmental math students. In 2010 a new program (TERM) began. The operation was transferred to Student Support Services. They provide some training for the tutors and have worked with us to hire tutors that can tutor up through Calculus II. The tutors are mostly math majors and they do a great job, based on reports from students who use them. Many students take advantage of this help. Continual efforts are made to advertise that help is available there. Planning is underway to recruit or train tutors capable of helping students in Math 1030 and 1040, Contemporary Math and Statistics, respectively.

The administration also operates other tutoring areas and the Student Success Center. The latter is primarily responsible for advising students declared for associates degrees, but they have been very helpful with implementing and maintaining placement policies and procedures.

The Dean supports the Mathematics Department very well with needed money for computers additional sections instructed by adjuncts. The Provost has supported new sections of courses when needed. The

problem is just that there is not enough money from the state to support everything that is needed in the Department and Program.

The department receives a large number of transfer course articulations (over 1000 new ones each year). Many students want those re-evaluated. Some current students search for online courses with no prerequisites and substandard proctoring. Some sort of advising or staff to help with these courses is needed.

The administration does an excellent job of maintaining records and course schedules. What is needed though are programs to check for prerequisite expirations. It is up to the department to do this. Without it our students are not adequately prepared for courses. It makes the courses more difficult to instruct and the pass rates lower.

Adequacy of Facilities and Equipment

The facilities are barely adequate in most cases, and very inadequate in some, but upgrades have been made. The building the Mathematics Department is housed in is very old. The heating system was replaced in about 2008; the cooling system is older. The main problem has been automation; the thermostats are in continual dysfunction. This has affected student learning; during certain times of the year part of the classroom is too hot while another part is too cold. In addition there are sometimes insects flying around during class.

Over the past 10 years or so funding by the Dean and Provost has been provided to upgrade the classroom furniture, replace white and chalk boards, and install computers, projectors, and document readers. We have also applied for and received internal grant funds for electronic equipment. About 80% of the rooms math uses (including the tutoring lab and the math major study room) now have mostly new furniture and about 90% are electronic rooms. There is still the problem that the classrooms are not very well suited for modern classes. For example, in order to meet student enrollments the first row of tables is too close to the boards and screens.

During spring of 2011 the Math Ed lab/classroom was remodeled with one time funds from the provost and a small gift from a donor. It now has all new electronics, white boards, and a smart board. Other rooms are in need of remodeling.

Prior to 2010-2011 a computer lab was operated by student support services in the math area. They turned it over to math due to budget cuts. It now must be funded by Math. We replaced all the computers using internal (WSU) grant money. We have used one time funding to acquire software licenses.

Faculty members get computer upgrades every four years, paid for by the Dean. This is very helpful. The IT Division has provided the license funds and maintains the programs Mathematica, Minitab, and SPSS which are available on and off campus to faculty, staff, and students. The College of Science has one IT support staff to maintain all the IT equipment and computer programs of the college. This support has been adequate but just barely. We need more funds for licenses and support for specialized computer programs for math. Response and repair are sometimes quick and sometimes lengthy.

Adequacy of Library Resources

Library resources are mostly adequate with access to databases, journals, reviews, and new book acquisitions. Appendix K contains a spreadsheet showing the journal and database access relative to Math.

H. Relationships with External Communities

There is no official liaison mechanism between the Mathematics Department and external communities of interest. Informally we have several former students and a couple of adjuncts who work regionally. They keep us informed about how our students fair in the workplace and they let us know of upcoming needs in their companies so that we can make certain our future students will have good employment prospects. The department is working on improving this with plans for an advisory committee. Three of our regular adjuncts are high school teachers. Our Math Education people work closely with teachers in the school districts and math supervisors. Currently one of our faculty is overseeing the courses for In-service Elementary Teachers. The administration has formed a K-16 Alliance to work with the local public school districts. Two of our faculty have been involved in meetings to discuss various issues. See a list of these liaisons in Appendix E.

The department has several scholarship funds that were made possible by donations. We also have one endowed fund that pays for a Biannual Lecture by a nationally recognized speaker on a mathematics topic. The lecture is accessible to a very general audience. We also received a $5000 donation for math ed which purchased a smart board for the Math Ed classroom/lab and also helped with renovation.

I. SWOT Analysis

Program review provides an opportunity for a department faculty to think strategically and objectively. A SWOT analysis – the identification of strengths, weaknesses, opportunities, and threats – is one perspective from which to approach this endeavor. A SWOT analysis is best conducted as a department-wide exercise facilitated by someone from outside of the department/college. The exercise should help participants develop a better understanding of the environments, both internal and external, that will impact the program in the near-term.

SWOT Analysis – Strengths, Weaknesses, Opportunities and Threats			
Date:	Department/Program:		
Internal Factors			
Strengths: 1. Programs- Applied Math has 6 tracks are cross discipline Math- graduates are well placed in grad schools and getting advanced degrees Math Teaching-Lots of interest, almost all grads get jobs locally; one or two a year get jobs during their final semester. 2. Faculty are excellent 3. Low Cost 4. Tutoring Space 5. Computer Lab 6. Electronic Classrooms 7. Math Majors Room 8. Active Math Club 9. Increased number of undergrad research projects 10. IT support	Ways to leverage: 1. Advertise Design joint programs Continue yearly seminar on research topics for undergrads	Weaknesses: 1. Building- Heat/cooling is always in need of repair, automation is always in need of adjustment Insects 2. Classrooms- Poorly designed Over Crowded 3. Limited Faculty Areas Math Ed Statistics 4. Math Teaching Program only has 2 methods courses 5. Heavy reliance on Adjuncts 6. some courses only offered every other year	Ways to Reduce: Repair and Remodel Building Request Hire more faculty Hire more faculty More and better training for adjuncts but no current faculty want to do this even with reassigned time Recruit more majors and hire more faculty
SWOT Analysis – Strengths, Weaknesses, Opportunities and Threats			
Date:	Department/Program:		
External Factors			
Opportunities: 1. Outside Requests for	Ways to leverage: Survey to show need	Threats: 1. University has no	Ways to Reduce:

Masters in Math Teaching 2. Requests for In Service teacher training 3. Extended Campus, 2+2 program	Hire and train an instructor(s) to do these. Work with public schools for funding. Recruit someone or reassign someone to travel and advertise these.	admittance standards so math becomes the admittance standard 2. Housing when a new building starts 3. Increased workload- Reports Large class size 4. Online Transfer courses that have no prerequisites and/or poor test proctoring 5. Concurrent Enrollment courses- Utah State operated math 1050 courses that do not contain all the topics of ours Administrative push for department to operate these and work with the high school teachers 6. Poor Reputation- Math and Dev Math are often confused Some advisors talk down about the program to students and others or advise them to talk math elsewhere Rumors that our pass rates are less than 20% 7. Pressure to lower Standards 8. Budget cuts 9. Travel budget	Start Planning Now Articulate as Math Electives Only accept as elective courses that meet QL Use Majors Meetings to get uniform topic content Hire new faculty or adjuncts to work with teachers Offer as online courses Advertise Constantly Justify- we must develop our own majors with appropriate math skills

I. Results of Previous Program Reviews

Problem Identified	Action Taken	Progress
Issue 1 Recruitment of additional mathematics majors	Previous 5 Year Program Review: 2007-2008	
	Year 1 Action Taken: Introduced Applied math tracks	
	Year 2 Action Taken: reduced number of required courses in Math teaching major	
	Year 3 Action Taken: Posters	
	Year 4 Action taken: Brochures	
	Year 5 Action taken: Presentations in High Schools	Numbers have doubled over the last 5 years
Issue 2		
The faculty should be encouraged to provide greater participation in the local MAA chapter.	Chair has encouraged this. In year 3, Chair began providing travel support to attend local meetings	Attendance has gone up and down depending on available time.
	Former chair was web mater for a while	
Issue 3		
"Funds should be provided to offer grading services to faculty."	Chair has encouraged faculty to take use hourly wages to the extent that they are available to the department.	The numbers of graders have gone up from 2 to 6.
Issue 4		
"Consideration might be given to differentiating those loads in both directions to support scholarly activity, program development, independent study, research experiences by students, or perhaps a Math Club."	This is being done to certain extent as faculty recruit students for project courses.	
Issue 5: "Many of the Math faculty, from senior faculty to recent hires, expressed a desire to be physically closer to their colleagues in the other departments in the College of Science."	The Deans and administration have been working on this.	The college is now in the number1 or 2 spot to get state funds for this.
Issue 6: Many of the Math classrooms (including rooms that the department might acquire in Building 3) need to be equipped		This is in progress and is now about 85% complete.

with PCs with appropriate software and web access, ceiling mounted digital projectors, and digital visual presenters ("Elmo" units). Some of the chalkboards should be replaced with white boards, when appropriate."		
Issue 7: "It is important that the Mathematics Department remain engaged in current and future operation of the program by reviewing curriculum materials, examinations, standards, and other aspects of developmental math that impact the mathematics program."		We continue to do this.
Issue 8: : "We recommend that the status of all DM teachers and their pay should be fair and adequate."	We have recommended this.	It is up to that Dev math and the Dean.
Issue 9: "The Department's web site is out of date and does not match the level of design and quality of other departments in the College of Science. A major redesign effort is necessary. A few suggestions: the WSU-Math website could include recruitment material for potential students, scholarship information, course syllabi, links to current online course material, employment information, examples of student course schedules with a graph indicating course prerequisites, a schedule of events, links to nationally recognized essays on mathematics, links for math-ed majors."	We have slowly worked on this. In the past year though the Dean has provided support to do it.	It is fairly up to date, but more info is still needed. One department committee is helping.
Issue 10: "The Department operating budget needs to be increased in order to support the	Requests have been made over the years	It is about 85% complete.

outreach effort to recruit new students, to provide graders for faculty, to create a distinct peer tutoring service to students enrolled in courses at the 2000 level and above, to redesign the Department web site, and to obtain additional computing and technology resources for the classrooms.”		

J. Action Plan for Ongoing Assessment Based on Current Self Study Findings

1. Action Plan for Evidence of Learning Related Findings

Problem Identified	Action to Be Taken
Issue 1: Some instructors are not covering all the required topics in QL courses.	We are mentoring them and will redo the data collection at the end of Fall semester 2012. We are making sure instructors have the current syllabus.

2. Action Plan for Staff, Administration, or Budgetary Findings

Problem Identified	Action to Be Taken
Issue 1: Increase the number of majors	Advertise Obtain specialized outside grants Develop cross discipline programs
Issue 2: Need for Faculty	Make requests
Issue 3: Need for more Travel Budgets	Make requests

K. Summary of Artifact Collection Procedure

Artifact	Assessment	When/How Collected?	Where Stored?
Final Exams	Learning Outcomes	end of semester	Department files
Student Projects/Papers	Student success	end of semester	Department files
Chi Tester Outcome Report on teaching evaluations	Teaching	End of semester	a. electronic format (chi tester warehouse) b. Paper , in files