WEBER STATE UNIVERSITY

2007-2008 PROGRAM REVIEW

DEPARTMENT OF MATHEMATICS

December, 2007

II. Description of the Review Process

The Program Review Evaluation Team members are: Dr. Peter Alfeld, Professor of Mathematics at the University of Utah, Dr. Robert Heal, Professor of Mathematics at Utah State University, Dr. Eric Swedin, Assistant Professor in the Information Systems and Technology Department at Weber State University, and Dr. Sue Harley, Professor of Botany at Weber State University.

This self study was completed by the Program Faculty consisting of Kent Kidman, Department Chair; and the rest of the Mathematics Department faculty: Dixilee Blackinton, Instructor Specialist, Mihail Cocos, Assistant Professor, James Foster, Professor, Afshin Ghoreishi, Professor, George Kvernadze, Professor, Matthew Ondrus, Assistant Professor, James Peters, Associate Professor, Diane Pugmire, Instructor Specialist, T.H. Steele, Professor, Paul Talaga, Professor, Michael Wills, Assistant Professor. The document was completed November 2007. The visit to campus will take place in February or March 2008.

III. Program Description

A. Program Mission Statement

Mission Statement for the Mathematics Department

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.

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.

This was approved in 2001.

General Education - Quantitative Literacy

Mission Statement for Quantitative Literacy

April 2005

Weber State University is a Utah System of Higher Education institution. In Regents' directive R470 the state establishes core areas for general education. In the core area of quantitative literacy they write,

3.1.2. Quantitative Literacy - Students may satisfy this requirement by completing Mathematics 1030, Quantitative Literacy (3 credits), or Mathematics 1040, Statistics (3 credits), which have prerequisites of high school intermediate algebra or 2 years of high school algebra. Students may also satisfy the requirement by completing at least one institutionally approved mathematics course at the level of college algebra or which requires college algebra as a prerequisite.)

Much has been opined about what quantitative literacy ought to be, but because credit in general education transfers freely between member institutions of USHE Weber State University chooses not to vary from the definition of quantitative literacy implicit in the above R465-3.3.2 policy statement.

Accordingly, at Weber State University the Department of Mathematics offers courses whose completion satisfies quantitative literacy and with content consistent with the courses mentioned in the USHE policy:

- Math QL1030, Contemporary Mathematics
- Math QL1040, Introduction to Statistics
- Math QL1050, College Algebra
- Math QL1080, Pre-calculus

These courses have different content and all build upon a basis of intermediate algebra.

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

B. Curriculum

From the 2007-08 University Catalog:

Mathematics Major

BACHELOR'S DEGREE (BS or BA)

» 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 for the departmental 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. Mathematics Teaching majors must achieve an overall GPA of 3.00 for admission to the Teacher Education program.

» 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 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 General Requirements for either Bachelor of Science or Bachelor of Arts requirements. PHYS PS/SI2210 will fulfill requirements for both the major and general education. PSY SS1010 (3) in the Social Sciences area is recommended for the Mathematics Teaching Emphasis.

Course Requirements for Mathematics BS or BA Degree

Mathematics Courses Required (30 credit hours)

- MATH SI1210 Calculus I (4)
- MATH SI1220 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 4210/4220 Intro Real Analysis (6)

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.

Support Courses Required (10 credit hours)

- PHYS PS/SI2210 Physics for Scientists & Engineers I (5)
- PHYS SI2220 Physics for Scientists & Engineers II (5)

Graduate School Preparation

It is highly recommended that students planning on graduate work in Mathematics take Linear Algebra (MATH 3350) and Topology (MATH 4320) in addition to the above. See the Mathematics Department for counseling.

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 tracks below, 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 SI1210 Calculus I (4)
- MATH SI1220 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 (3)
- MATH 3550 Introduction to Mathematical Modeling (3)
- MATH 3710 Boundary Value Problems (3)
  or MATH 3750 Dynamical Systems (3)
- MATH 4610 Numerical Analysis (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 PS/SI2210 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 4210/4220 Introductory Real Analysis 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 SI1400 Fundamentals of Programming (4)
- CS SI1410 Object-Oriented Programming (4)
- CS SI2420 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 (3)
- MATH 3550 Introduction to Mathematical Modeling (3)
- MATH 3610 Graph Theory (3)
- MATH 4610 Numerical Analysis (3)
- MATH 4620 Numerical Analysis (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 3410 Probability and Statistics (3)
- MATH 3550 Introduction to Mathematical Modeling (3)
- MATH 3710 Boundary Value Problems (3)
- MATH 3730 Partial Differential Equations (3)
- MATH 3750 Dynamical Systems (3)
- MATH 3810 Complex Variables (3)
- MATH 4610 Numerical Analysis (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 3410 Probability and Statistics (3)
- MATH 3550 Introduction to Mathematical Modeling (3)
- MATH 3710 Boundary Value Problems (3)
- MATH 3730 Partial Differential Equations (3)
- MATH 3750 Dynamical Systems (3)
- MATH 3810 Complex Variables (3)
- MATH 4610 Numerical Analysis (3)
- MATH 4620 Numerical Analysis (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 (3)
- MATH 3420 Probability and Statistics (3)

and three of the following courses

- MATH 3550 Introduction to Mathematical Modeling (3)
- MATH 3710 Boundary Value Problems (3)
- MATH 3730 Partial Differential Equations (3)
- MATH 4610 Numerical Analysis (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 SI3610 Business Statistics II (3)

6. Natural/Life Sciences Track

Required Upper Division Mathematics Courses (12 credit hours)

- MATH 3410 Probability and Statistics (3)
- MATH 3550 Introduction to Mathematical Modeling (3)
- MATH 3710 Boundary Value Problems (3)
  or MATH 3750 Dynamical Systems (3)

- MATH 4610 Numerical Analysis (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.

Course Requirements for Mathematics Teaching BS or BA Degree

Mathematics Courses Required (48 credit hours)

- MATH SI1210 Calculus I (4)
- MATH SI1220 Calculus II (4)
- MATH 2110 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 2410 Foundations of Probability and Statistics (3)
  or MATH 3410 Probability and Statistics (3)
- MATH 3050 History of Mathematics (3)
  (or any other upper division course that is not otherwise required)
- MATH 3120 Foundations of Euclidean & non-Euclidean Geometry (3)
- MATH 3160 Number Theory (3)
- MATH 4210 Intro Real Analysis (3)
- MTHE 3010 Methods & Technology for Teaching Secondary Mathematics (3)
- MTHE 4010 Capstone Mathematics for High School Teachers I (3)
- MTHE 4020 Capstone Mathematics for High School Teachers II (3)

Support Courses Required (5-10 credit hours)

Complete either

- PHYS PS/SI2210 Physics for Scientists & Engineers (5)

or

- CHEM PS/SI1210 Principles of Chemistry (5)
  & CHEM SI1220 Principles of Chemistry (5)

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

Mathematics

DEPARTMENTAL HONORS

» Program Prerequisite: Enroll in General Honors Program and complete at least 6 hours of General Honors courses (see the Honors Program).

» Grade Requirements: Maintain an overall GPA of 3.3 and a mathematics GPA of 3.3.

» Credit Hour Requirements: Fulfill the requirements for the departmental Mathematics major (regular emphasis) and some extras, including MATH 4910 and 9 hours of upper division Mathematics courses taken for Honors credit, i.e.:
Complete

- MATH SI1210, 1220, 2210, 2270, 2280, 4110, 4120, 4210, 4220 plus 15 more hours of upper division mathematics courses (grades of "C" or better required). Nine of the upper division hours must be for Honors credit.*

and

- Complete MATH 4910 Senior Research Project

and

- Complete Physics PS/SI2210 and SI2220

and

- Complete a minor

and

- Complete general education requirements

**To take a mathematics course for Honors credit, do the following: Enroll in the course, fill out an Agreement for Departmental Honors Component Credit form with the instructor which both the instructor and student should sign, and turn the form in to the Honors Program by the second week of the semester. Then abide by the contract. The requirements will be the regular course assignments plus some extra work which will vary with the course and the instructor, but it could include writing a paper, doing an extra project, doing extra readings and reporting on them, and/or giving a talk to the class (or in some other forum). The extra part of the course will be a significant assignment.*

Mathematics

MINOR and TEACHING 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 (Regular Emphasis)

Mathematics Courses Required (11 credit hours)

- MATH SI1210 Calculus I (4)
- MATH SI1220 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 Mathematics Teaching Minor

Mathematics Courses Required (26 credit hours)

- MATH SI1210 Calculus I (4)
- MATH SI1220 Calculus II (4)
- MATH 2110 Foundations of Algebra (3)
  or MATH 4110 Modern Algebra I (3)
- MATH 2120 Euclidean Geometry (3)

- MATH 2270 Elementary Linear Algebra (3)
- MATH 2410 Foundations of Probability and Statistics (3)
  or MATH 3410 Probability and Statistics (3)
- MATH 3120 Foundations of Euclidean & non-Euclidean Geometry (3)
- MTHE 3010 Methods & Technology for Teaching Secondary Mathematics (3)

Elementary Education Mathematics

All elementary education majors must take:

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

In addition, they can do the following.

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 mathematics as an 18-hour content concentration.

Courses Required for Endorsement

Mathematics Courses Required (18 hours)

- MATH 1060 Trigonometry (3)
- MTHE SI3060 Probability & Statistics for Elementary Teachers (3)
- MTHE SI3070 Geometry for Elementary Teachers (3)
- MTHE SI3080 Number Theory for Elementary Teachers (3)
- MTHE SI4040 Mathematical Problem Solving for Elementary Teachers (3)
- MTHE 4700 Senior Project in Elementary Math Teach (3)
  or other approved courses numbered above 3000

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.

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.

QUANTITATIVE LITERACY (3-5 credit hours) - one of the following: *

a. Completion of one three-credit mathematics course (with a grade of C or above): **MATH QL1030, Contemporary Mathematics,** or **MATH QL1040, Intro to Statistics,** or **MATH QL1050, College Algebra,** or **MATH QL1080, Pre-calculus,** or any math course with either **MATH QL1050** or **MATH QL1080** as a prerequisite.
b. Completion of the three-credit **PHIL QL2200 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.

** Weber State University students earning an associate's degree in General Studies or 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.*

Courses offered over the past three years:

Math 0950	Pre-algebra
Math 0955	Integrated Arithmetic and Beginning Algebra
Math 0960	First Course in Algebra
Math 1010	Intermediate Algebra
Math 1020	Fundamentals of Geometry
Math 1030	Contemporary Mathematics
Math 1040	Introduction to Statistics
Math 1050	College Algebra
Math 1060	Trigonometry
Math 1080	Pre-calculus
Math 1100	Mathematics Computer Laboratory
Math 1200	Mathematics Computer Laboratory
Math 1140	Discrete Mathematics Applied to Computing
Math 1630	Discrete Mathematics Applied to Computing
Math 1210	Calculus I
Math 1220	Calculus II
Math 2210	Calculus III
Math 2110	Foundations of Algebra
Math 2410	Foundations of Probability and Statistics
Math 2250	Linear Algebra and Differential Equations
Math 2270	Elementary Linear Algebra
Math 2280	Ordinary Differential Equations

Math 3050 History of Mathematics
Math 3120 Euclidean and non-Euclidean Geometry
Math 3160 Number Theory
Math 3350 Linear Algebra
Math 3410 Probability and Statistics
Math 3420 Probability and Statistics
Math 3550 Introduction to Mathematical Modeling
Math 3610 Graph Theory
Math 3620 Enumeration
Math 3710 Boundary Value Problems
Math 3730 Partial Differential Equations
Math 3750 Dynamical Systems
Math 3810 Complex Variables
Math 4110 Modern Algebra I
Math 4120 Modern Algebra II
Math 4210 Introductory Real Analysis
Math 4220 Introductory Real Analysis
Math 4320 Topology
Math 4610 Numerical Analysis
Math 4620 Numerical Analysis
Math 4750 Topics in Mathematics
MathEd 2310 Mathematics for Elementary Teachers
MathEd 2320 Mathematics for Elementary Teachers
Math 2010 Mathematics for Elementary Teachers
Math 2020 Mathematics for Elementary Teachers
MathEd 3010 Methods and Technology (Intermediate secondary)
MathEd 3020 Methods and Technology (Advanced secondary)
MathEd 4010 Capstone Mathematics for High School Teach. I
MathEd 4020 Capstone Mathematics for High School Teach. II
Mthe 3060 Probability and Statistics for Elementary Teachers
Mthe 3070 Geometry for Elementary Teachers
Mthe 3080 Number Theory for Elementary Teachers
Mthe 4040 Mathematical Problem Solving for Elementary Tea.
Mthe 4700 Senior Project in Elementary Math Teaching
Mthe 4920/6920 Short courses in elementary math education

Some course numbers have changed because of the Regents requirement for statewide articulation. Some of the prefixes have changed because of WSU's change to the Banner system.

Course Rotation for past three (plus) years:

Course numbers are listed along with the **number of sections** offered each semester.

	2004-05			2005-06			2006-07			2007-08	
Course	Sum	Aut	Spr	Sum	Aut	Spr	Sum	Aut	Spr	Sum	Aut
Math 0950	2	15	15	3	15	13	4	14	13	3	23
Math 0955		5	7		5	7	2	6	5	1	5
Math 0960	6	16	18	6	18	18	8	17	17	7	19
Math 1010	8	21	21	10	25	22	10	29	29	11	30
Math 1020									1		
Math 1030	4	7	7	3	9	7	4	9	8	4	9
Math 1040	1	2	2	1	2	2	1	2	2	1	2
Math 1050	7	19	20	8	24	25	8	22	24	8	23
Math 1060	2	5	4	2	4	5	2	4	4	2	5
Math 1080	2	4	6	2	5	6	1	5	5	1	5
Math 1100		2	2								
Math 1200					1	2		2	2		2
Math 1140		3	2								
Math 1630					1	3		2	3		2
Math 1210	2	7	6	1	6	4	1	7	5	1	7
Math 1220	1	3	6	1	3	5	1	3	5	1	3
Math 2210	1	1	1	2	1	2	1	1	1	1	1
Math 2110		1		1	1			2			1
Math 2410		1	1			1	1		1		1
Math 2250									1		
Math 2270	1	1	1	1	1	1	1	1	1	1	1
Math 2280		1	1	1	2	1	1	1	1		1
Math 3050										1	
Math 3120		1	1		1		1	1		1	1
Math 3160			1			1		1	1		
Math 3350		1				1					
Math 3410		1			1		1	1			1
Math 3420			1			1			1		
Math 3550		1	1						1		
Math 3610			1		1			1			1
Math 3620						1					
Math 3710		1			1			1			1
Math 3730			1				1		1		
Math 3750						1					
Math 3810					1						1
Math 4110					1				1		1
Math 4120						1					
Math 4210		1		1			1	1			1
Math 4220			1						1		
Math 4320											

	2004-05			2005-06			2006-07			2007-08	
Course	Sum	Aut	Spr	Sum	Aut	Spr	Sum	Aut	Spr	Sum	Aut
Math 4610		1						1			
Math 4620			1								
Math 4750		1	1								
Mathed 2310	1	4	2	1							
Mathed 2320	1	1	4	1	1						
Math 2010					4	2	1	3	1	1	3
Math 2020						4	1	1	3	1	1
Mthe 3010		1	1		1		1	1	1		1
Mthe 3020											
Mthe 4010					1		1				1
Mthe 4020			1			1			1		
Mthe 3060			1			1			1		
Mthe 3070		1			1			1			1
Mthe 3080		1			1			1			1
Mthe 4040			1			1			1		
Mthe 4700		1	1		1	1	1	1	1		1
Math 2920					1						
Mthe 4920/ 6920									2		2

Program Maintenance:

We have many more students in the Quantitative Literacy Courses than in our major/minor courses. 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) have been administered by the Mathematics Department up to summer semester 2007. On July 1, 2007, the Developmental Mathematics Program was created in the College of Science, hopefully to better help students be successful and give them more opportunities, and responsibility for those courses now lie with Developmental Mathematics. During fall semester 2007, duties were in the process of being shifted from Mathematics to Developmental Mathematics. There still will be much cooperation between the two. This report will include developmental mathematics.

Some of the courses listed above were taught in the Bridging the Gap program. This allowed in-service teachers to raise their certification levels by completing our courses in the evening. The state has stopped funding this program. In the future we may consider running courses in the evening for in-service teachers.

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. The courses listed as reading courses 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.

There are department committees (Major Programs (non-teaching), Math Education) that look at and 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 through the Faculty Senate. The Developmental Mathematics Program will now be handling all changes to developmental courses (Math 1010 and below).

Changes were recently made to both the Applied Mathematics Major and the Mathematics Teaching Major. The Applied Mathematics Major now gives students a direction to go based on their interests, and lists required and elective courses appropriate to their interests. All students come in for advising, and the exact program they do is worked out with the Chair of the department.

C. Student Learning Outcomes and Assessment

The following outlines the current state of assessment for the programs in the Mathematics Department. The mission statement (see the first part of this document), the student learning outcomes, the curriculum grid, and the assessment plan were created in 2001, and the results of assessment have been reported almost yearly.

Student Learning Outcomes (Mathematics Programs)

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 learning outcomes 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.

    - Pure 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 Grid

In a review of the courses required for Mathematics majors it was determined that each required course contributes to each of the following student learning outcomes:

- 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.

Assessment Plan

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 regular 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 on an irregular but frequent basis.

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
- Standardized Test Results (GRE, etc.)
- Employment Rates (immediate and in the future)
- Graduate School Acceptance Rate
- Graduate Degrees Earned
- Classroom Observations of Student Teachers
- Profile of Entering Students

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 (the fourth bullet is still being considered, and some data was collected by a person working in the Mathematics Department who has now retired):

- Establish an address file of graduates.
- Put together and then administer, over time, one or more questionnaires that could be used in classroom surveys, exit interviews, post-graduate surveys, etc. These questionnaires will inquire 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.
- Study the results of general education assessment and then respond in appropriate ways.
- Ask the administration to frequently provide all departments the following information.
    - Grade distributions in all classes.
    - Summaries of employer comments on WSU's perceived strengths and weaknesses.
    - Profiles of entering students.

Assessment Grid

The following grid states how and at what level of effectiveness (High, Medium, or Low) the data can be used in assessment of the following student learning outcomes:

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	
Standardized Test Results	H	H	H	M	L	L	L	
Employment Rates	M	M	H			L	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	
Profile of Entering Students								H

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

Results of Assessment

2006-2007 (submitted 12/04/07)

Assessment is an ongoing process in the Mathematics Department. It is carried out across the various programs and on several levels. We are monitoring how our programs are serving our majors, client schools, quantitative literacy and developmental students. The curriculum is continually evaluated to see if changes are needed.

Developmental Mathematics

The greatest change in the last few years in the Mathematics Department is that of Developmental Mathematics (DM), which incorporates courses (Math 1010 and below) that are prerequisite to quantitative literacy. It has become a separate program, The Developmental Mathematics Program, and has its own director (this year the director is acting and there is a national search going on for a permanent director). All of the lecturers (full time, non-tenured) are in this program, but each will teach one course per semester at the quantitative literacy level. Once in a while a regular mathematics faculty member will also teach a developmental course.

This new program will be in charge of all courses, experiments, transfers, and other issues related to developmental mathematics. NADE certification will be worked on by this program. The reason for the split is so more attention can be given to students at this level, and their special needs, without taking time from regular mathematics programs and courses. Assessment of this program in the future will be done by DM faculty and staff.

Graduate Exit survey

We continue to give graduate exit surveys to 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 attempted to be recorded, 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 in industry. Even more are now high school teachers. Our teaching program was changed again last year to try increase the level of knowledge of our teachers in geometry. We have also increased our major requirements by an extra course, which for most graduates, will be math history. It is hoped that the history will give a perspective that will enhance teaching in the high schools. Our graduates seem satisfied with the education that they have been given.

We are trying to increase our numbers of majors, and we now 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.

Quantitative Literacy

One of our faculty members (Dixie Blackinton) is on a committee to assess general education at Weber State University, and on the subcommittee looking at quantitative literacy. She replaces Lee Badger, who recently retired. More will be done in the future. See the section following on assessment of quantitative literacy.

Adjunct Faculty and Lecturers

Adjuncts and Lecturers in developmental math courses are being dealt with by the new program. Assessment will be underway.

Plans are still being considered of how to better train adjuncts, and how to better mentor and assess them. We currently have a meeting with them at the beginning of each semester to talk about standards, policies, and questions that they might have. There are places for them to get questions answered as they come up during the semester. Their student evaluations are studied after each semester to get a feel for how they are doing. Statistics on course grades are kept. More planning is underway.

The Solution Space

The Solution Space (tutoring lab in Building 4) is now being run by the Developmental Mathematics Program. 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 here. Within the scope of this study area, many things are being done to help DM students pass their courses. Some help is also being given to quantitative literacy level students. Assessment will be ongoing, and mostly done by the Developmental Mathematics Program.

Updates: Below is our data collected on our questionnaire

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: 5.9 Cnt: 42

2. The mathematics faculty displayed a thorough knowledge of mathematics.

Disagree 1 2 3 4 5 6 7 Agree
Mean: 6.5 Cnt: 42

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 Cnt: 42

4. I was positively challenged by the mathematics curriculum.

Disagree 1 2 3 4 5 6 7 Agree
Mean: 6.5 Cnt: 42

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: 5.8 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 Cnt: 42

7. I received effective academic advising from the mathematics department.

Disagree 1 2 3 4 5 6 7 Agree
Mean: 5.7 Cnt: 42

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: 5.1 Cnt: 42

9. In mathematics courses I was expected to engage in problem solving.

Disagree 1 2 3 4 5 6 7 Agree
Mean: 6.5 Cnt: 42

10. In mathematics courses I was expected to engage in independent learning.

Disagree 1 2 3 4 5 6 7 Agree

Mean: 6.2 Cnt: 42

11 In mathematics courses I was expected to appropriately communicate my results.

Disagree 1 2 3 4 5 6 7 Agree
Mean: 5.9 Cnt: 42

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: 6.2 Count: 19

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

Disagree 1 2 3 4 5 6 7 Agree __ Does not apply to me
Mean: 5.8 Count: 38

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: 41

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: 6.0 Count: 23

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: 6.4 Count: 14

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: 1

Another document is filled out by students, the first part getting contact information for future data, and the second with the following questions:

Written Responses (confidential)

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.

Results of this will be provided if desired.

Assessment of Quantitative Literacy:

Below describes the latest effort to assess quantitative literacy. More will happen in the future. There is a university committee looking over assessment of general education, and we have a representative on the subcommittee looking at QL.

Student Learning Outcomes in QL

April 2005

Geometry:	Euclidean geometry, measurement, scaling
Probability:	Quantifying likelihood of uncertain events
Statistics:	Collection and display of data; inferences from data
Data collection:	Methods of data collection including convenience, completely random, stratified and systematic sampling; uses and limitations
Data analysis:	Organizing and displaying data; descriptive statistics
Regression:	Scatter plots, linear model, regression line,

	coefficient of determination
Estimation:	Point estimates and confidence intervals
Hypothesis testing:	Testing, errors, level of significance
Inequalities:	Solving linear, non-linear and absolute value inequalities
Functions:	A function as a rule, a correspondence and a graph; inverses
Polynomials:	Linear, quadratic and higher degree; graphs, roots, monotonicity
Asymptotics:	Simplified description of large scale behavior of functions, rational functions, graphs
Exponentials:	Geometric growth and decay; population, compound interest, radio activity
Logarithms:	Properties from exponents, algebraic uses, computational uses
Linear systems:	Simultaneous linear equations and their solutions, matrices, determinants
Discrete math:	Sequences, induction, counting, permutations, combinations
Math of finance:	Compound interest, annuities, present and future value
Logic:	Conditional statements, quantifiers, generalization, counter-examples

Curriculum Grid for QL

April 2005

OUTCOMES	**COURSES/TESTS**						
	1030	1040	1050	1080	COMPASS	AP Calculus	AP Statistics
Geometry	X			X		X	
Probability	X	X	X				X
Statistics	X	X					X
Data Collection		X					X

Data Analysis		X					X
Regression		X					X
Estimation		X					X
Hypothesis Testing		X					X
Inequalities			X	X	X	X	
Functions			X	X	X	X	
Polynomials			X	X	X	X	
Asymptotics			X	X		X	
Exponentials	X		X	X	X	X	
Logarithms			X	X	X	X	
Linear Systems			X	X	X	X	
Discrete Math			X				
Finance Math			X				
Logic	X	X	X	X	X	X	X

Assessment Plan for QL

1. Informal feedback from Weber State University students, teachers, departments and administrators that indicate the success of students, who have been granted quantitative literacy, in quantitative aspects of courses that require quantitative literacy

2. A periodic survey of chairs of Weber State University departments that measures the perceived success of students, who have been granted quantitative literacy, in quantitative aspects of courses that require quantitative literacy, and the alignment of content of quantitative literacy courses with perceived student needs.

3. University exit interviews of graduates

4. University polling of alumni and employers

Results of QL Assessment: A survey of department chairs and program heads was conducted during Spring semester 2005. The following was asked and responses are listed.

RESULTS OF ASSESSMENT (17 Feb 06)

In April 2005, a survey was sent to all department chairpersons and deans. Fifty-nine surveys were distributed and 27 were returned and completed. This is the survey and its results, in italics.

Quantitative Literacy (QL) Survey
of Academic Departments at
Weber State University
Spring 2005

1. In our department we teach at least one course for which the students need mathematical competence as acquired in QL courses.

   Yes *20* No *7* (If no, please skip to question 3.)

2. Students who have succeeded in QL courses demonstrate sufficient mathematical competence in our courses that require QL.

disagree		1	2	3	4	5 agree
frequency	*0*	*1*	*5*	*10*	*5*	*median: 4*

List any areas in which your students seem less than competent.

Algebra (two such responses)
Applying the math

3. There should be no university-wide QL requirement. Individual departments should set the level of quantitative skill required of their students.

disagree		1	2	3	4	5 agree
frequency	*13*	*3*	*1*	*0*	*10*	*median: 2*

4. Assuming there is a university-wide QL requirement, its level should be raised in some areas.

disagree		1	2	3	4	5 agree
frequency	*14*	*2*	*8*	*2*	*1*	*median: 1*

Suggest any topics that should be added or enhanced and suggest the level of sophistication needed (e.g. at the level of elementary, intermediate or college algebra).

College Algebra

Content of 1030

5. Assuming there is a university-wide QL requirement, its level should be lowered in some areas.

disagree		1	2	3	4	5	agree
frequency	*10*	*3*	*7*	*1*	*6*	*median: 3*	

Suggest those topics that should be dropped or required only at a lower level of sophistication and suggest what level is sufficient.

Pace of 1010 should be slowed
1010 is sufficient for undergraduate QL

Department _____
(Write any additional comments on the back; return to the Kent Kidman, MC 1702. Thank you.)

Comments:
1. Some 1050 students also need statistics.
2. 1010 is sufficient for QL.
3. Perhaps require different skills (E.g. no logs) but don't lower level.
4. Social Science stats (with Math 1010) should suffice for QL.
5. Low level courses are often taught by adjuncts who often aren't good teachers.
6. 1050 is good for us, but not sure it's needed for all majors.
7. We use algebra, data analysis and graphing, but generally, math is artificial. QL should focus on the creative aspects of math and its application to the real world.
8. Need two tracks - one for those who'll take more math and one for those that won't.

Conclusions:

From these results, we conclude the following,

Question 2: Students who achieve quantitative literacy are prepared for the quantitative aspects of courses that require quantitative literacy.

Question 3: Opinion is polarized as to whether individual departments should be allowed set their own QL requirements.

Question 4: There is general agreement that the level of QL should not be raised.

Question 5: Opinion is divided as to whether the level of QL should be lowered.

The Department of Mathematics sees no mandate to advocate a change in the Utah Board of Regents directive on quantitative literacy.

Actions that we can take, consistent with the Utah Board of Regents directive, are

A. Better supervision of adjunct teachers: We have an on-going program of adjunct supervision and we are enhancing it.

B. Changing the content of Math 1030, Contemporary Mathematics, to include more *numeracy* and the *creative aspects of math* and its *applications to the real world* as suggested in Comments 3 and 7.

C. Add to the syllabi of all our QL courses the abilities listed in the regents 1999 "Educated Person" document. They are

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.

6. [Optional] Understand basic concepts describing time-varying systems, and how prediction follows from the formulation of basic laws of change, both analytically and numerically.

A university committee is working on further assessment of QL (and other general education areas). Developmental Mathematics is to be assessed by the new Developmental Mathematics Program.

During the 2006-07 school year, the faculty senate passed PHIL 2200, Deductive Logic (Math 0960 Beginning Algebra pre-requisite) to count for the Quantitative Literacy requirement, over our strong objections. This course is not accepted by the other institutions in the state system.

Mandatory Assessment and Placement

A new program was put into place by the administration, based on a university wide committee's recommendation, that forces a student to take placement exams in Mathematics and English. The following paragraph is from the Policy and Procedures Manual (PPM), section 6-2, IIId:

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. These students are then required to enroll in developmental course(s) and make progress 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 only be removed by the Academic Advisement Center.

This policy was put into place for new freshman, beginning Spring 2006, and for everyone Spring 2007. 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. Some sections of Math 960 and 1010 had to be added for Fall semester 2007, and it is thought by the administration that this policy was part of the reason. Assessment on this policy is ongoing, and is being done by the administration. The Developmental Mathematics program may play a role in this assessment. Studies are ongoing.

D. Academic Advising

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 are always eventually sent to see the chair. Typically a student will call or come in and make an appointment to talk to the chair. The students are declared as majors or minors in the university computer and they are given information to help them plan their schedules and potential careers. Other questions are answered as they arise. The chair will also give 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 would also get advice from the College of Education.

The director of the new Developmental Mathematics Program will do future advising of students in developmental courses.

Data is being collected to assess the quality of advising in the Mathematics Department (see above questionnaire, question 7).

Evaluation of Academic Advising:

Academic advising for mathematics majors and minors is sufficient for their needs. Individual programs are planned with the advisor so students can graduate in a timely manner. Career

opportunities are also discussed. Sometimes help in advising is done by other faculty members that give students a well rounded opinion.

E. Faculty

Currently the mathematics faculty consists of 11 full-time people and one three-quarter time person. The Developmental Program has one full time director (acting as of now) and ten full time lecturers, although one lecturer has resigned after fall semester 2007. Over the current school semester, both in mathematics and developmental mathematics, we have employed 45 different people as adjunct instructors, with several teaching more than one section for the year (some more than one in a semester). For the 2006-2007 academic year mathematics and developmental mathematics taught almost 34,000 student credit hours, which translated to 18.27 FTE (full time equivalent) for contract faculty and 14.08 FTE for adjuncts (counting both math and developmental math). See appendices 3 and 4. Adjunct FTE was calculated based on money paid for them assuming a 12 hour per semester load. The number of majors reported in the appendix is lower than department records, but is very close. The program graduates data looks accurate. About half our graduates are teaching majors.

As of the 2007-2008 academic year the Mathematics Department has five full-time tenured full professors, one three-quarter-time tenured full professor, one full-time tenured associate professor, three full-time assistant professors (tenure-track), and two full-time instructor specialists (tenured). The Developmental Mathematics Program has one full time tenured associate professor (acting director), nine full-time lecturers (non-tenure-track), one of which resigned effective spring 2008, and one full-time instructor (one year appointment). Of the Mathematics faculty, ten have Ph.D.'s, and two have masters degrees. Of the Developmental Mathematics faculty, one has a doctorate, seven have masters, one has two bachelors degrees, and two have bachelors. In the Mathematics Department, two of the faculty are female, ten are male. There are no minorities, although three are from foreign countries. In the Developmental Mathematics Program, four are female, seven are male, with no minorities. Areas of faculty expertise include Functional Analysis, Real Analysis, Algebra, Differential Equations, Linear Algebra, Approximation Theory, and Mathematics Education. Years of teaching experience varies from one year to over thirty years. See appendix 4.

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 development, the chair meets with each faculty member once a year in the annual faculty review, and goals are agreed to by the faculty member with the chair. Plans and opportunities are discussed. Adjunct instructors attend an orientation meeting at the beginning of every semester. They can also ask questions of the chair (and others) at any time.

Evidence of effectiveness: Contract faculty are reviewed once a year in the annual faculty review by the chair of the department. 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 contract and adjunct faculty have

student evaluations done on each course they teach. All of these are seen by the chair, and a sample of these become part of the annual faculty review for the contract faculty. These reviews show that a subset of the faculty is very active in research and has published several articles in refereed journals. Conferences have been attended, talks have been given, and other scholarly activities have been performed. 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. Advising is done by the chair, with help from other faculty members

Evaluation of the Faculty:

Better quality will result if there are more full time faculty members and fewer adjuncts. 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. The core faculty is large enough to provide stability, but just barely. There is a search going on this year for up to three full time Ph.D. faculty to replace retirees and resignations, and one new position to help with extra courses for a new engineering program (with Utah State University). More full time tenure track faculty would still be desirable, given the number of adjunct instructors we have.

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. In the recent past, we have made job offers to women, and these have been turned down. New efforts will be made to enhance departmental diversity, especially this year in which we have potentially three new hires. Each contract faculty and adjuncts have minimum qualifications, which are mostly adequate. Orientation for contract faculty is adequate, but more personnel are needed to help train adjuncts.

Teaching and departmental committee assignments are made by the chair, as prescribed by the University Policy and Procedures manual. The chair solicits teaching desires every year before assignments are made, and sometimes adjustments are made. This seems adequate.

Each year every contract faculty goes through an annual faculty review with the chair, ensuring quality and helping solve problems. Adjunct instructors in non-developmental courses turn in copies of their exams, and their graded finals to the chair for review. Adjuncts are also evaluated from the student evaluations, which occur in every course they teach. The Developmental Mathematics Program will be evaluating adjuncts in developmental courses. Most of these courses have departmental exams, including the finals.

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

We have one classified staff person, the department secretary. She has been at Weber State for one and a half years. She is very adept at using the computer, deals nicely with students, and is very helpful. The Developmental Mathematics Program hired a secretary that started fall semester 2007. She is doing well. We have students working as tutors in the Solution Space (our tutoring laboratory), and two of them run off developmental exams. A few students have been hired as graders. The support is mostly adequate, especially since Developmental

Mathematics came into being, with the extra secretary. It will take some time to determine if the situation is totally adequate.

The Department of Mathematics receives support mostly from the legislature. Some student fees are used to help upgrade the student computer lab, although the computers were purchased by money from the Dean, which originally was legislative. We have several scholarship funds that were made possible by donations. Occasionally faculty members receive 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.

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, and needs a new heating/cooling system. This problem has affected student learning in some cases. Most of the rooms we use have new tables and chairs which the students really like. Funding for this was supplied by the Dean and Provost. Some chalk boards or white boards have been replaced, but more need upgrading. Every room has an overhead projector, and most work properly. We have computer projection systems in four of our Building 4 classrooms and one in our classroom in the Engineering Technology Building (used by Developmental Math). These were purchased with internal (WSU) grant money, with some match from the department and college. More are desired. We would like all of our rooms fully equipped with modern technology, including Elmo's. Faculty members get computer upgrades every four years, paid for by the Dean. This is very helpful. New carpet was put in our faculty lounge, paid for by the Dean. Library resources are mostly adequate, but some active researchers in the department need better access to journals and/or reviews.

Evaluation of Support:

The Dean supports the Mathematics Department and the Developmental Mathematics Program very well with needed money for computers, new courses, and lecturers. 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. There is one room left that needs new tables, and one other that could use new chairs. New chalk boards or white boards are still needed in many of the classrooms. More classrooms are needed, and once the new humanities building if finished, it might free up more classroom space across campus. Library funding is adequate for most of the needs, but for researchers, more journal access is necessary.

G. Relationships with External Communities

There is no official liaison mechanism between the Mathematics Department and external communities of interest. Informally we have several former and current students who work for local companies. 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. Our Math Education people work closely with

teachers in the school districts and math supervisors. This forms our liaison with elementary and secondary schools in the area. See a list of these liaisons in Appendix 2.

Evaluation of the External Liaison Mechanism:

It would be desirable to have a more formal mechanism. The department is working on improving this. The education liaison is adequate.

H. Results of Previous Program Review and Future Directions

The last time the Mathematics Department was reviewed was in the fall of 2002, and many recommendations were made. These are summarized below.

The review team believes the Department deserves commendation in the following areas:

1. The Department appears to be addressing the problems in developmental math.
2. Some faculty are managing to keep active research programs going, even though teaching is the main focus of the Department.
3. There seems to be a collegial atmosphere in the Department, indicating that problems which existed at one point have largely been solved. The chair appears to be providing steady leadership.
4. The Department is making a serious effort to appropriately manage and supervise the teaching of adjuncts.
5. The teaching in the Department seems to be high quality. Faculty are very available to students. These impressions were reinforced in the visits with students.
6. The degree offerings look solid.
7. The service offerings to prospective elementary math teachers are more than are usually available.
8. The regular faculty members in the Department appear to be holding firm on grading standards.

However, there do appear to be significant differences between the standards applied by the regular faculty and those applied by adjuncts. This is evident in data provided by the department chair on the average GPA in the different sections of Math 1050 and Math 1210 taught in fall semester of 2001 and spring semester of 2002. In Math 1050 the class GPAs in sections taught by regular faculty average about 2.1 (and that included a 2.96 average in a special *Bridging the Gap* section taught to in-service teachers). Meanwhile, the average GPA in sections taught by adjuncts was around 2.6. In addition, there were several sections taught by adjuncts where the GPA was around 3.0 (and that is probably higher than should occur in sections of Math 1050). The average GPAs in sections of 1210, all taught by regular faculty and excluding a special section taught in the *Bridging the Gap* program, was about 2.2.

The review team sees the following as problem areas and challenges (comments in parentheses):

1. The low number of majors is causing problems. A corollary problem here is that some of the upper division courses are being offered as reading courses. This not only is not the best way to offer instruction, but it also places an added burden on faculty members. Furthermore, the low

number of majors makes it harder to justify the recruitment and retention of PhD faculty with the upper administration. (See actions taken below.)
2. There are too many teaching adjuncts. Efforts should be made to reduce this number. When it is necessary to hire adjuncts, the goal should be to require adjuncts to hold a master's degree in mathematics. (We are trying to rely less on adjuncts, but low budgets are making that difficult. If we require a masters in mathematics for adjuncts, we will have almost no one to teach the courses.)
3. Getting students through the QL requirement, given the math abilities of the incoming students, presents a serious challenge. (A department committee is looking into this area, as is a university wide committee.)
4. A few of the offerings in Math 1010 are in large sections (125 students or more). These should be avoided if at all possible, the goal being to limit all sections to no more than 40 to 50 students. (This has been done.)

The review team made the following recommendations, with our actions listed.

1. The Department should pursue avenues for increasing the number of majors. Some possibilities might be to follow through on previously discussed ideas for a program in computational mathematics, or to develop a joint major either with Computer Science or with Information Systems and Technology, or maybe with both. (Here, it is the opinion of the review team that a joint major with another department has more potential for developing into a significant asset than does the computational math major.) In the secondary teaching program, perhaps a joint program in mathematics and statistics might attract students.

Action taken: We have formed a Recruitment/Public Relations Committee in the department, which will look at various things to try to increase our number of majors. We have changed our applied mathematics major to include several tracks (one in computing), which will hopefully focus students with particular interests and get them to become majors. It is hoped also to entice students into earning double majors. This program has a lot of flexibility. We do not have expertise right now to enlarge our statistics offerings.

We also have a majors' room now, which is used mostly by upper level mathematics students. It has a refrigerator and microwave, computers that students can use, some books, and tables and chairs where students can study. It has chalkboards for student discussions.

2. Some space has recently become available for a math lab. The Department should follow through on this with the goal of providing a facility that could support instruction on all levels, including developmental mathematics.

Action taken: This facility is called the Solution Space, and has tutors available most of the day and into part of the evening. It is mostly intended for developmental students, but the quality of our tutors is such that students through calculus can get help. This has been popular with students. It is being assessed by the Developmental Mathematics Program.

3. The Department is at a critical juncture in hiring. Over the next five to ten years, there are going to be several retirements of PhD faculty. If these faculty are replaced with non-PhD

faculty, it will undoubtedly have a detrimental effect on both the scholarship opportunities in the Department and the ability of the Department to offer bona fide programs in the major emphases.

Action taken: The retirements have already started to take place. Two years ago we hired two new Ph.D. faculty (one has since left), and last year we hired two Ph.D. faculty. We have a search this year for up to three new Ph.D. faculty, depending on whether or not we get a budget cut. One of these is to support a new engineering program at the Davis campus that is run jointly with Utah State University. With the Developmental Mathematics program being split off into a separate entity, the fear that Ph.D. faculty will be replaced by non-Ph.D. faculty is largely gone. We need all retirements and resignations to be fully replaced with Ph.D. people. If our program size increases, then the desire is to hire more Ph.D. faculty. Less reliance upon adjuncts is a goal of the department as well.

Future Directions:

The Mathematics Department at Weber State University has goals in the coming years of (some of which are already achieved):

1. Hire new faculty as needed.

2. Build research groups as the opportunity arises.

3. 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.

4. Modify the curriculum as needed to best meet the needs of our students in ways suggested by both national trends and our own research.

5. Decrease the reliance on large lecture sections.

6. Increase salaries to maintain a productive faculty and to attract talented newcomers.

7. Reduce our reliance on adjuncts.

8. Improve facilities, which include the following items:

    a. A MathEd room equipped with large tables, computer stations, storage and projection facilities.
    b. Electronic classrooms.
    c. Adequate office facilities.
    d. Improved computer laboratories.
    e. Adequate tutorial facilities.
    f. Repair/replace broken or obsolete equipment.

9. Provide each faculty member with a computer in his/her office which will run all pertinent software.

10. Increase resources for items such as travel, library holdings, journal subscriptions, recruitment and advisement.

11. Work with local school districts to improve the mathematical preparation of incoming students.

12. Design and offer classes that integrate curriculum from other related fields with mathematics.

13. Streamline the campus committee-structure so that results obtained are more nearly commensurate with effort expended.

14. Better coordinate the mathematics taught on campus in order to avoid unnecessary duplication and maintain standards.

Some of the above apply to Developmental Mathematics as well. In the upcoming years, they will form their own goals.

APPENDIX C
Department of

Contract Faculty Profile

NAME	GENDER	ETHNICITY	RANK	TENURE STATUS	HIGHEST DEGREE	YEARS OF TEACHING WSU	Other	TOTAL	AREAS OF EXPERTISE
Blackinton, Dixilee	F		Instructor Specialist	Tenured	M.Ed.	21			Math Education
Cocos, Mihail	M		Assistant Professor	Tenure-track	Ph.D.	1	4	5	Geometric PDE's; Differential Geometry
Foster, James	M		Professor	Tenured	Ph.D.	33			Probability, Numerical Analysis, and Approximation theory
Ghoreishi, Afshin	M		Professor	Tenured	Ph.D.	16			Applied Mathematics
Kidman, Kent	M		Professor	Tenured	Ph.D.	18	2	20	Linear Algebra, Matrix Theory
Kvernadze, George	M		Professor	Tenured	Ph.D.	10			Approximation Theory
Ondrus, Matthew	M		Assistant Professor	Tenure-track	Ph.D.	1	3	4	Representation theory of quantum groups and related algebras
Peters, James	M		Associate Professor	Tenured	Ph.D.	20			PDE's and Numerical Analysis
Pugmire, Diane	F		Instructor Specialist	Tenured	M.Ed.	24			Math Education
Steele, T.H.	M		Professor	Tenured	Ph.D.	14			Real Analysis
Talaga, Paul	M		Professor	Tenured	Ph.D.	28			Applied Mathematics
Wills, Michael	M		Assistant Professor	Tenure-track	Ph.D.	2	1	3	Functional Analysis
Developmental Mathematics Program									

Alice Allred	Female	Caucasian	Lecturer	No	MEd	7 (lecturer)1 11 (adjunct)		18	Math Ed, Dev Math – PreCalculus
Brenda Acor	Female	Caucasian	Lecturer	No	MA	6	11	17	Dev Math – Calculus, Math Ed
Loyal Baker	Male	Caucasian	Lecturer	No	MS	5	12 (PT)	17	Dev Math, Statistics
David Imig	Male	Caucasian	Lecturer	No	MS	5	4	9	Engineering Math
Steve Hallin	Male	Caucasian	Instructor	No	MS	.5	2	2.5	Science, Math
Mary Jo Hansen	Female	Caucasian	Lecturer	No	MS	10	7	17	Statistics, Math
Darrell Poore	Male	Caucasian	Lecturer	No	BS	6	2 (PT)	8	Dev Math – Calculus
Carrie Quesnell	Female	Caucasian	Lecturer	No	BS	7	0	7	Dev Math, PreCalculus
John Spence	Male	Caucasian	Lecturer	No	MS	7	2	9	Freshman Level Math or Below
John Thaeler	Male	Caucasian	Asso Prof	Yes	PhD	25	10	35	Dev Math, Math Ed

Adjunct Faculty Profile 2002-2007

NAME	GENDER	ETHNICITY	JOB TITLE	YEARS OF EMPLOYMENT WSU	Other	Degree
Abercrombie, Elizabeth	F		Adjunct	1		Student
Adams, Kamarie	F		Adjunct	1		Student
Atwood, Melissa	F		Adjunct	1		Student
Baker, Stacie	F		Adjunct	8		BS
Barney, Corine	F		Adjunct	10		BS
Bateman, Jamie	F		Adjunct	5		BS
Bradshaw, Micah	F		Adjunct	4		BS
Bria, S.	M		Adjunct	1		Ph.D.
Brinkerhoff, M. Roxanne	F		Adjunct	3		BS

Chamberlain, Heather	F		Adjunct	2	Student
Charleson, Barbara	F		Adjunct	2	BS
Chase, K.	M		Adjunct	1	BS
Choi, Ken	M		Adjunct	3	BS
Cluff, Carol	F		Adjunct	2	BS
Crawford, S.	F		Adjunct	4	BS
Dawson, Fred	M		Adjunct	1	BS
DeLeeuw, William	M		Adjunct	2	BS
Dickson, Neil	M		Adjunct	5	Ed.D.
Dohrer, Linda	F		Adjunct	1	BS
Duering, Gail	F		Adjunct	2	BS
Dwyer, Brian	M		Adjunct	4	BS
Ellis, Maria	F		Adjunct	2	BS
Emami, Morteza	M		Adjunct	10	MBA
Emami, Robab	F		Adjunct	5	Ph.D.
Evans, Jerry	M		Adjunct	1	MS
Fawcett, Detton	M		Adjunct	1	Student
Fawson	M		Adjunct	15	BS
Fisher, Angie	F		Adjunct	5	BS
Floyd, M.	M		Adjunct	1	BS
Fronberg, Thomas	M		Adjunct	3	BS
Gabbitas, Allison	F		Adjunct	2	BS
Garcia, Janae (Howell)	F		Adjunct	2	BS
Gibbons, Glen	M		Adjunct	1	BS

Graham, Kimberly	F		Adjunct	1	BS
Green, Bill	M		Adjunct	3	BS
Hadlock, Amanda	F		Adjunct	2	Student
Hanson, Sharyce	F		Adjunct	1	BS
Haueter, Gordon	M		Adjunct	1	BS
Hellstrom, Todd	M		Adjunct	1	Student
Hill	F		Adjunct	1	BS
Hogan, Susan	F		Adjunct	12	BS
Hollopeter, W.	M		Adjunct	5	BS
Hunt, Corinne	F		Adjunct	10	BS
Hurst, B.	F		Adjunct	4	BS
Iacovelli, John	M		Adjunct	5	BS
Jee, Richard	M		Adjunct	15	M.Ed.
Kidd, Terry	M		Adjunct	1	BS
Kofoed, Russell	M		Adjunct	1	BS
Kohler, Eric	M		Adjunct	5	BS
Larson, M.	M		Adjunct	1	BS
Lee, Emma (Morrill)	F		Adjunct	2	BS
Lund, Julliana	F		Adjunct	1	BS
Marx, Christine	F		Adjunct	12	BS
McArthur, Teagan	F		Adjunct	1	BS
McCoppin, Robert	M		Adjunct	15	BS
McCulley, Julanne	F		Adjunct	1	MS
McKee, Deborah	F		Adjunct	5	BS

Miller, Tommie Troy	M		Adjunct	3	BS
Mills, Christian	M		Adjunct	1	BS
Montgomery, Ashley	F		Adjunct	1	Student
Morrill, Dana	M		Adjunct	2	BS
Murray, Catherine	F		Adjunct	1	BS
Murray, Shalee	F		Adjunct	2	BS
Ortega, Robert	M		Adjunct	15	BS
Osofsky, Barbara	F		Adjunct	1	BS
Pearson, Don	M		Adjunct	1	BS
Petrovich, Barbara	F		Adjunct	15	BS
Pitcher, Dan	M		Adjunct	14	BS
Quintrequeo, Jeree	F		Adjunct	6	BS
Rich, Stephen	M		Adjunct	20	BS
Rosine, Sondra	F		Adjunct	6	BS
Roybal, Roger	M		Adjunct	1	Student
Ruiz, Donna	F		Adjunct	10	MStat
Salt, Jeffrey	M		Adjunct	6	BS
Savage, Joy	F		Adjunct	1	BS
Smalley, Sandra	F		Adjunct	15	BS
Starling, Jason	M		Adjunct	1	BS
Syrett, Taunya	F		Adjunct	8	BS
Tate, Louise	F		Adjunct	10	BS
Tejada, Edwin	M		Adjunct	1	BS
Thompson, Erin	F		Adjunct	3	BS

Traver, Brian	M		Adjunct	1	BS
Walter, Christopher	M		Adjunct	1	Student
Walthers, Jeremy	M		Adjunct	2	MS
Walton, Taunya	F		Adjunct	1	BS
Wheeler, Nicole	F		Adjunct	5	BS
Wheeler, Randall	M		Adjunct	5	BS
Whitby, Dale	M		Adjunct	6	BS
Wilhelmsen, Diana	F		Adjunct	4	M.Ed.
Wilkinson, Susan	F		Adjunct	1	BS
Willie, Kent	M		Adjunct	1	BS
Yonkee, Mary Ellen	F		Adjunct	5	BS

Contract Staff Profile

NAME	GENDER	ETHNICITY	JOB TITLE	YEARS OF EMPLOYMENT WSU	Other	AREAS OF EXPERTISE
Lane, Susie	F		Secretary II (Mathematics)	1.5		
Ostermiller, Lisa	F		Secretary II (Developmental Math)	0.5		