

CWU Department Assessment Plan

Department: Mathematics

These are currently very sketchy with no assessment plan except those found in the programmatic assessment plans. It is the intent of the department to review the Department Goals during the upcoming year.

Department Goals	Related College Goals	Related University Goals	Method(s) of Assessment	What Assessed	When Assessed	Criterion of Achievement
1. To serve, through appropriate courses, students in three undergraduate programs and one graduate program.	I, II & III	I, II & III	Program Assessment	Programs	Annually	All programs meet Programmatic Criteria of Achievement.
2. To serve, through appropriate courses, students in the General Education program.	I & II	I & II				
3. To recruit as mathematics majors, minors, or faculty, persons who reflect the cultural, racial, ethnic, and gender diversity of our region, nation, and world.						
4. To continue and increase, as appropriate, the utilization of technology in our classrooms and offices.						
5. To exemplify and foster in our students those consistent, diligent, and cooperative work patterns that will serve them well in their careers, especially in the areas of problem solving and technology.						

CWU Course Assessment Plans

Department: Mathematics

Some basic knowledge and skills are assessed within the traditional framework of student coursework and are assessed through “Course Assessment.” To insure the student learning outcomes for these courses match the needs of each program and that the courses are meeting their goals, these courses are reviewed every other year.

The Course Assessment consists of comparing Program Student Learning Outcomes with Course Student Learning Outcomes and comparing the Course Student Learning Outcomes with the primary evaluative materials used in the course that year. This review occurs during the Spring Faculty Development Day. The following is a list of all courses involved in these reviews and their position in the review cycle (even-year or odd-year).

Course	Year Reviewed	Programs				
		General Education	Service	BA Teaching Secondary	BS	BS Actuarial Science
MATH 101: Math in the Modern World	Odd	X				
MATH 102: Mathematical Decision Making	Odd	X				
MATH 130: Finite Mathematics	Odd	X	X			
MATH 153, 154: Pre-Calculus Mathematics	Odd		X			
MATH 164: Foundations of Arithmetic	Odd		X			
MATH 170, 172, 173, 272, 273: Intuitive Calculus, Calculus & Multivariable Calculus	Even		X	X	X	X
MATH 260: Sets and Logic	Even		X	X	X	
MATH 265: Linear Algebra	Even		X	X	X	X
MATH 311: Statistical Concepts and Methods	Even		X	X	X	X

CWU Program Assessment Plan

Department: Mathematics

Program: General Education

Mathematics courses can be used to satisfy two Basic requirements for the General Education Program at CWU: the Quantitative & Symbolic Reasoning (QSR) requirement (satisfied by MATH 101, 153, 154, 164, 172, 173) and the Critical Thinking (CT) Requirement (satisfied by MATH 130).

At this time, these courses are assessed through Course Assessment using the General Education QSR and CT Goals and Student Learner Outcomes. A more comprehensive assessment plan for these courses needs to be developed in the context of General Education at CWU.

CWU Program Assessment Plan

Department: Mathematics

Program: Service

Many mathematics courses are used as part of majors in other departments. The following is a (partial) list of which programs require that mathematics courses. Where possible, indirect mathematics requirements (most commonly through PHYS 111, 181 and CHEM 181) have been indicated. It seems that the only way to find this information is to go through a hard copy of the CWU Catalog and so programs may have been missed due to this clumsy means of finding them.

Department	Program	Courses Required
Douglas Honors College	Douglas Honors College	MATH 153, 154
Accounting Department	All	MATH 153, 170, 172 (pre-admission requirements)
Aviation Department	BS: Aviation Management Specialization	MATH 311
	BS: Airway Science, Aircraft Systems Management Specialization	MATH 170, 172, 311
	BS: Airway Science, Aviation Maintenance Specialization	MATH 130, 311
Biological Sciences	BA	MATH 153, 154, 172, 173, 272 (through PHYS and CHEM courses)
	BS	MATH 153, 154, 172, 173, 272 (through CHEM courses) MATH 311
	BS: Ecology Specialization	MATH 153, 154, 172, 173, 272 (through CHEM courses) MATH 170, 311
Chemistry	BA	MATH 172, 173, 272, 273
	BA: Teaching	MATH 172, 173, 272, 273
	BS	MATH 172, 173, 272, 273
	BS: Biochemistry	MATH 172, 173, 272, 273
Computer Science	BS	MATH 172 (pre-admission requirements) MATH 173, 260, 265, 272, 273, 311 MATH 330, 376, 412

Department	Program	Courses Required
Economics	BS	MATH 153, 170, 172 (pre-admission requirements)
Education	BA: Elementary Education	MATH 164 (through EDEL 323)
Finance and Operations, and Supply Chain Management	BS: Business Administration	MATH 153, 170, 172 (pre-admission requirements)
Geological Sciences	BA: Allied Science Requirements	MATH 154, 172, 173, 311
	BS: Allied Science Requirements	MATH 172, 173, 265, 272, 311
	BS: Environmental Geological Science	MATH 172, 173, 311
	BA: Earth Science Teaching	MATH 153
Health, Human Performance and Nutrition	BS: Exercise Science, Exercise Science Clinical Physiology Specialization	MATH 130 (pre-admission requirements)
Health Education	BS: Public Health Major, Pre-Nursing in Public Health Specialization	MATH 311
Food Science and Nutrition	BS: Food Science and Nutrition, Nutrition Science Specialization	MATH 153 (pre-admission requirement) MATH 154, 172 (recommended for pre-medical students)
Industrial and Engineering Technology	BS: Construction Management Major	MATH 172, 173
	BS: Electronic Engineering Technology	MATH 172, 173, 260, 265, 272, 311 MATH 330, 376
	BS: Industrial Technology	MATH 154
	BAS: Industrial Technology	MATH 153 (pre-admission requirement)
	BS: Mechanical Engineering Technology	MATH 172, 173
Management	BS: Business Administration	MATH 153, 170, 172 (pre-admission requirement) MATH 130 (through BUS 221)
Physics	BA	MATH 172, 173, 265, 272, 273

Department	Program	Courses Required
	BS	MATH 172, 173, 265, 272, 273 MATH 376
Political Science	BS: Public Policy	MATH 311
Pre-Professional Programs	Pre-Dentistry	MATH 153, 154 (recommended)
	Pre-Engineering	MATH 172, 173, 272 (recommended)
	Pre-Nursing in Public Health	MATH 311 (recommended)
	Pre-Pharmacy	MATH 170, 172 (recommended)
	Pre-Veterinary	MATH 153, 154 (recommended)

Service courses that are not used by any of the Mathematics programs are assessed through Course Assessment that compares the Course Student Learning Outcomes with the course content. Service courses that are used by any Mathematics program are also indirectly assessed as part of the program assessment.

CWU Program Assessment Plan
 Department: Mathematics
 Program: Bachelor of Arts: Teaching Secondary

The Goals and Outcomes of the Bachelor of Arts: Teaching Secondary program are developed using the guidelines established by the **NCATE/NCTM Standards (2003): Programs for Initial Preparation of Mathematics Teachers**, *Standards for Secondary Mathematics Teachers*.

This Assessment Plan is adapted from the NCATE assessment plan used for accreditation of this program.

Course Assessment refers to the biannual review of syllabi and significant graded works in the course. The Criterion of Achievement for these assessments is that the course content matches program requirements and that the syllabus refers to Course Student Learner Outcomes. This is referred to as “Content Criterion” in the table below.

Portfolios are generated for *MATH 299E: Orientation Seminar* (Fall); *MATH 324: Methods and Materials in Mathematics-Secondary* (Winter); and *MATH 499E: Senior Seminar* (Fall). Each artifact is rated as either ‘Exemplary,’ ‘Proficient,’ ‘Partially Proficient,’ or ‘Incomplete.’ The Criterion of Achievement for these Portfolios is that 75% of Portfolio artifacts achieve a rating of Exemplary or Proficient. This is referred to as “Portfolio Criterion” in the table below.

Students complete a *Portfolio Reflection* and a *Final Thoughts* Survey prior to graduation. These surveys are short-answer surveys. The Criterion of Achievement for these Surveys is that 80% of student responses indicate that students are comfortable with their achievement of the given goal. This is referred to as “Survey Criterion” in the table below.

The *Washington Educator Skills Test – Endorsement* (WEST-E) is required for certification to teach secondary mathematics in the state of Washington.

Program Goals	Related College Goals	Related University Goals	Method(s) of Assessment	What Assessed	When Assessed	Criterion of Achievement
1. Graduates will be able to demonstrate an understanding of the ideas, methods, and applications in six broad content areas: Mathematics of the Continuous, Mathematics of the Discrete, Algebra, Geometry, History of Mathematics, Pedagogy	I & II	I & II	Course Assessment for MATH 172, 173, 260, 265, 272, 273, 311	Course Content	Biannually	Content Criterion
			299E Portfolio 499E Portfolio	Student Performance Student Knowledge Student Attitude	Entry Exit	Portfolio Criterion
			WEST-E Exam	Student Performance Student Knowledge	Exit	80% of students pass the WEST-E on 1 st attempt.
			Final Thoughts Survey	Student Attitude	Exit	Survey Criterion

Program Goals	Related College Goals	Related University Goals	Method(s) of Assessment	What Assessed	When Assessed	Criterion of Achievement
2. Graduates should be able to use graphing calculators, computer algebra systems, and spreadsheets as tools to explore mathematical ideas and mathematical representations of information, and in solving problems.	I & II	I & II	299E Portfolio 324 Portfolio	Student Performance Student Knowledge Student Attitude	Entry Coeval	Portfolio Criterion
			Final Thoughts Survey	Student Attitude	Exit	Survey Criterion
3. Graduates will understand and practice broadly applicable habits of mathematical thinking.	I & II	I & II	Course Assessment for MATH 172, 173, 260, 265, 272, 273, 311	Course Content	Biannually	Content Criterion
			299E Portfolio 499E Portfolios	Student Performance Student Knowledge Student Attitude	Entry Exit	Portfolio Criterion
			WEST-E Exam	Student Performance Student Knowledge	Exit	80% of students pass the WEST-E on 1 st attempt.
			Final Thoughts Survey	Student Attitude	Exit	Survey Criterion
4. Graduates will develop their knowledge of the rich historical and cultural roots of mathematical ideas and practices.	I & II	I & II	324 Portfolio	Student Performance Student Knowledge Student Attitude	Coeval	Portfolio Criterion
			Final Thoughts Survey	Student Attitude	Exit	Survey Criterion

CWU Student Learning Outcome Assessment Plan

Department: Mathematics

Program: Bachelor of Arts: Teaching Secondary

Many Student Learning Outcomes for this program are assessed either through Portfolios or the WEST-E Examination.

For all Portfolio based assessment, the Criterion of Achievement is “75% of applicable Portfolio artifacts achieve a rating of Exemplary or Proficient” referred to as “Portfolio Criterion” in the table below.

For all WEST-E based assessment, the Criterion of Achievement is “60% of responses correct on applicable WEST-E category” referred to as WEST-E Criterion” in the table below.

Student Learning Outcomes	Related Program Goals	Related College Goals	Related University Goals	Method(s) of Assessment	Who Assessed	When Assessed	Criterion of Achievement
1. Graduates will be able to explain the concepts and applications of elementary functions.	1	I & II	I & II	499E Portfolios	Students in MATH 499E	Fall	Portfolio Criterion
				WEST-E “Functions and Calculus” Exam	Students taking WEST-E Exam	Spring	WEST-E Criterion
2. Graduates will be able to explain the concepts of calculus to model dynamic change.	1	I & II	I & II	499E Portfolio	Students in MATH 499E	Fall	Portfolio Criterion
				WEST-E “Functions and Calculus” Exam	Students taking WEST-E Exam	Spring	WEST-E Criterion
3. Graduates will be able to explain the concepts, methods, and applications of logic and discrete models.	1	I & II	I & II	499E Portfolio	Students in MATH 499E	Fall	Portfolio Criterion
				WEST-E “Matrix Algebra and Discrete Mathematics” Exam	Students taking WEST-E Exam	Spring	WEST-E Criterion
4. Graduates will be able to apply and explain the concepts, methods, and applications of algebra systems.	1	I & II	I & II	499E Portfolio	Students in MATH 499E	Fall	Portfolio Criterion

Student Learning Outcomes	Related Program Goals	Related College Goals	Related University Goals	Method(s) of Assessment	Who Assessed	When Assessed	Criterion of Achievement
				WEST-E “Algebra and Number Theory” Exam	Students taking WEST-E Exam	Spring	WEST-E Criterion
5. Graduates will be able to apply and explain the concepts, methods, and applications of Euclidean and Non-Euclidean geometry using inductive and deductive approaches.	1	I & II	I & II	499E Portfolio	Students in MATH 499E	Fall	Portfolio Criterion
				WEST-E “Measurement, Geometry, and Trigonometry” Exam	Students taking WEST-E Exam	Spring	WEST-E Criterion
6. Graduates can plan, teach, and assess lessons concerning topics presented in Student Learning Outcomes 1–5 using their understanding of mathematics, learning theory, and pedagogy.	1	I & II	I & II	324 Portfolio	Students in MATH 324	Winter	Portfolio Criterion
7. Graduates can use appropriate technology to investigate and represent concepts, methods, and applications of mathematical problems. Graduates can use appropriate technology to teach and assess student understanding of mathematical concepts.	2	I & II	I & II	299E Portfolio 324 Portfolio	Students in MATH 299E and 324	Fall and Winter	Portfolio Criterion
8. Graduates will be able to use the principles of mathematical thinking to solve and prove mathematical problems.	3	I & II	I & II	299E Portfolio	Students in MATH 299E	Fall	Portfolio Criterion
9. Graduates will be able to plan, teach, and assess lessons involving mathematical thinking using their understanding of mathematics, learning theory, and pedagogy.	3	I & II	I & II	324 Portfolio	Students in MATH 324	Winter	Portfolio Criterion
10. Graduates will be able to apply and explain the historical and cultural development of each branch of mathematics to the discovery of important mathematical ideas.	4	I & II	I & II	324 Portfolio	Students in MATH 324	Winter	Portfolio Criterion

CWU Program Assessment Plan
Department: Mathematics
Program: Bachelor of Arts: Teaching Secondary

The following calendar establishes the timeline for various assessment activities and reporting within the Department. As external reporting schedules are finalized, they will be added to this calendar.

Quarter	Author	Product	Recipient
Fall	MATH 299E Instructor	Portfolio Assessment Report	Program Director
Fall	MATH 499E Instructor	Portfolio Assessment Report	Program Director
Winter	MATH 324 Instructor	Portfolio Assessment Report	Program Director
Spring	Program Director	Program Assessment Report	Department Chair
Summer	Department Chair	Department Assessment Report	Dean & Associate Vice President for Undergraduate Affairs

CWU Program Assessment Plan

Department: Mathematics

Program: Bachelor of Science

The Goals and Outcomes of the Bachelor of Science program are developed using the guidelines established by the **CUPM Curriculum Guide (2004): Undergraduate Programs and Courses in the Mathematical Sciences.**

This Assessment Plan was developed in 2007 for implementation starting during Academic Year 2008–2009. Portions of this Assessment Plan are being piloted during Winter 2008 and Spring 2008.

Course Assessment refers to the biannual review of syllabi and significant graded works in the course. The Criterion of Achievement for these assessments is that the course content matches program requirements and that the syllabus refers to Course Student Learner Outcomes. This is referred to as “Content Criterion” in the table below.

Embedded Assessment refers to the evaluation of student work in the context of a course. The Criterion of Achievement for these assessments is that that 80% of the students pass the course with a grade of B or better on either the 1st or 2nd attempt. This is referred to as “Embedded Criterion” in the table below.

Portfolios are generated for *MATH 499S: Senior Seminar* (Winter). Each artifact is rated as either ‘Exemplary,’ ‘Proficient,’ ‘Partially Proficient,’ or ‘Incomplete.’ The Criterion of Achievement for these Portfolios is that 75% of Portfolio artifacts achieve a rating of Exemplary or Proficient. This is referred to as “Portfolio Criterion” in the table below.

Students complete a Senior Survey as part of MATH 499S. The survey consists of responses to statements using a 5-point Likert scale with options of “Strongly Agree,” “Agree,” “Have No Opinion,” “Disagree,” “Strongly Disagree.” The Criterion of Achievement for these Surveys is 80% response rate and that 80% of student responses are either Strongly Agree or Agree with the statements in the survey. This is referred to as “Survey Criterion” in the table below.

Program Goals	Related College Goals	Related University Goals	Method(s) of Assessment	What Assessed	When Assessed	Criterion of Achievement
1. Graduates will be able to apply the techniques of calculus, linear algebra and statistics to solve pure and applied problems in mathematics.	I	I	Course Assessment for MATH 172, 173, 265, 272, 273	Course Content	Biannually	Content Criterion
			Embedded in MATH 172, 173, 265, 272, 273	Student Performance Student Knowledge	Coeval	Embedded Criterion
			499S Portfolio	Student Performance Student Knowledge	Exit	Portfolio Criterion
			Senior Survey	Student Attitude	Exit	Survey Criterion

Program Goals	Related College Goals	Related University Goals	Method(s) of Assessment	What Assessed	When Assessed	Criterion of Achievement
2. Graduates will be able to write complete and correct within an axiomatic system.	I	I	Embedded in MATH 260, 364, 365, 371, 451–453, 461–463, 471–473	Student Performance Student Knowledge	Coeval	Embedded Criterion
			499S Portfolio	Student Performance Student Knowledge	Exit	Portfolio Criterion
			Senior Survey	Student Attitude	Exit	Survey Criterion
3. Graduates will be able to apply the tools of mathematics to other fields.	I	I	Course Assessment for MATH 172, 173, 265, 272, 273	Course Content	Biannually	Content Criterion
			499S Portfolio	Student Performance Student Knowledge	Exit	Portfolio Criterion
			Senior Survey	Student Attitude	Exit	Survey Criterion
4. Graduates will be able to describe the breadth of mathematical topics.	I	I	499S Portfolio	Student Knowledge	Exit	Portfolio Criterion
			Senior Survey	Student Attitude	Exit	Survey Criterion
5. Graduates will be able to read and assimilate mathematical information, allowing them to express these ideas in writing and orally in an articulate, sound, and well-organized fashion.	I	I	499S Portfolio	Student Performance Student Knowledge	Exit	Portfolio Criterion
			Senior Survey	Student Attitude	Exit	Survey Criterion

CWU Student Learning Outcome Assessment Plan

Department: Mathematics

Program: Bachelor of Science

Many Student Learning Outcomes for this program are assessed through Course Grades and Portfolios.

For Course Grade based assessment, the Criterion of Achievement is “80% of students pass course with a B or better on 1st or 2nd attempt” referred to as “Grade Criterion” in the table below.

For all Portfolio based assessment, the Criterion of Achievement is “75% of applicable Portfolio artifacts achieve a rating of Exemplary or Proficient” referred to as “Portfolio Criterion” in the table below.

Student Learning Outcomes	Related Program Goals	Related College Goals	Related University Goals	Method(s) of Assessment	Who Assessed	When Assessed	Criterion of Achievement
1. Graduates will be able to use differential and integral calculus as well as sequences and series to solve problems.	1	I	I	Course Grades	Students in MATH 172, 173, 272, 273	Quarterly	Grade Criterion
2. Graduates will be able to use concepts of vector subspaces of \mathbb{R}^n and $\mathbb{R}^{n \times m}$ to solve problems.	1	I	I	Course Grades	Students in MATH 265	Quarterly	Grade Criterion
3. Graduates will be to write proofs using contrapositive, contradiction, cases, and mathematical induction.	2	I	I	499S Portfolio	Students in MATH 499S	Winter	Portfolio Criterion
4. Graduates will know standard applications of calculus, linear algebra, and statistics.	3	I	I	499S Portfolio	Students in MATH 499S	Winter	Portfolio Criterion
5. Graduates will be able to apply their understanding of mathematics to fields outside of mathematics.	3	I	I	499S Portfolio	Students in MATH 499S	Winter	Portfolio Criterion
6. Graduates will be able to describe the differences between the following types of mathematics: discrete/continuous, algebraic/geometric, pure/applied, deterministic/stochastic.	4	I	I	499S Portfolio	Students in MATH 499S	Winter	Portfolio Criterion
7. Graduates will be able to communicate mathematical ideas through writing.	5	I	I	499S Portfolio	Students in MATH 499S	Winter	Portfolio Criterion
8. Graduates will be able to communicate mathematical ideas orally.	5	I	I	499S Portfolio	Students in MATH 499S	Winter	Portfolio Criterion

CWU Program Assessment Plan

Department: Mathematics

Program: Bachelor of Science

The following calendar establishes the timeline for various assessment activities and reporting within the Department. As external reporting schedules are finalized, they will be added to this calendar.

Quarter	Author	Product	Recipient
Winter	MATH 499S Instructor	Portfolio Report	Program Director
Winter	Seniors	Senior Survey	Program Director
Spring	Program Director	Program Assessment Report	Department Chair
Summer	Department Chair	Department Assessment Report	Dean & Associate Vice President for Undergraduate Affairs

CWU Program Assessment Plan
 Department: Mathematics
 Program: Bachelor of Science: Actuarial Science

The Goals and Outcomes of the Bachelor of Science program are developed using the guidelines established by the **Society of Actuaries (SOA)** and the **Casualty Actuarial Society (CAS)**.

This Assessment Plan was developed in 2007 for implementation starting during Academic Year 2008–2009. Portions of this Assessment Plan are being piloted during Winter 2008 and Spring 2008.

Course Assessment refers to the biannual review of syllabi and significant graded works in the course. The Criterion of Achievement for these assessments is that the course content matches program requirements and that the syllabus refers to Course Student Learner Outcomes. This is referred to as “Content Criterion” in the table below.

Embedded Assessment refers to the evaluation of student work in the context of a course. The Criterion of Achievement for these assessments is that that 80% of the students pass the course with a grade of B or better on either the 1st or 2nd attempt. This is referred to as “Embedded Criterion” in the table below.

Students complete an Internship Survey (if appropriate), a Senior Survey, and a Post-Graduation Survey. These surveys consists of responses to statements using a 5-point Likert scale with options of “Strongly Agree,” “Agree,” “Have No Opinion,” “Disagree,” “Strongly Disagree.” The Criterion of Achievement for these Surveys is a response rate of 80% and that 80% of student responses are either Strongly Agree or Agree with the statements in the survey. This is referred to as “Survey Criterion” in the table below.

The SOA/CAS Exams are the method by which actuaries are certified in their field. The four SOA Exams “P”, “FM”, “M”, “C” which correspond to the four CAS Exams “1,” “2,” “3,” “4”.

SOA provides three “Validation of Educational Experience” (VEE) in the fields of Mathematics, Finance, and Economics.

Program Goals	Related College Goals	Related University Goals	Method(s) of Assessment	What Assessed?	When Assessed?	Criterion of Achievement
1. Graduates will be able to apply probability, statistics, mathematics, and actuarial science in insurance and financial industries.	I	I	Course Assessment for MATH 172, 173, 272, 273, 311	Course Content	Biannually	Content Criterion
			Embedded in MATH 172, 173, 272, 273, 311	Student Performance Student Knowledge	Coeval	Embedded Criterion

Program Goals	Related College Goals	Related University Goals	Method(s) of Assessment	What Assessed?	When Assessed?	Criterion of Achievement
			SOA VEE Certification for MATH 410A, 414, FIN 370, 475, ECON 401, 402	Course Content	Coeval	Courses required satisfy all three areas of the Validation of Educational Experience.
			Embedded in MATH 410A, 414, FIN 370, 475, ECON 401, 402	Student Performance Student Knowledge	Coeval	Content Criterion
			SOA/CAS Exams	Student Performance Student Knowledge	Exit	50% of students pass SOA Exam P (CAS Exam 1) on first attempt.
			Internship Survey	Student Attitude	Coeval	Survey Criterion
			Senior Survey	Student Attitude	Exit	Survey Criterion
			Post-Graduation Survey	Student Attitude	Post-Exit	Survey Criterion
2. Graduates will have skills in employing computer software and languages to enhance their problem solving abilities.	I	I	Internship Survey	Student Attitude	Coeval	Survey Criterion
			Post-Graduation Survey	Student Attitude	Post-Exit	Survey Criterion
3. Graduates will have skills in problem solving and communicating their work in writing and speaking.	I	I	Internship Survey	Student Attitude	Coeval	Survey Criterion
			Post-Graduation Survey	Student Attitude	Post-Exit	Survey Criterion
4. Graduates will have self-confidence and a positive attitude toward their ability to do and apply probability, statistics, mathematics, and actuarial science in insurance and financial industries.	I	I	Post-Graduation Survey	Student Attitude	Post-Exit	Survey Criterion
5. Students in the Actuarial Science program will be able to enroll in courses important to complete their program.	I	I	Senior Survey	Course Availability Student Attitude	Exit	Survey Criterion

Program Goals	Related College Goals	Related University Goals	Method(s) of Assessment	What Assessed?	When Assessed?	Criterion of Achievement
6. Students in the Actuarial Science program will have the opportunity to collaborate with faculty and/or students on research projects appropriate to their ability.	I	I	Senior Survey	Course Availability Faculty Availability Student Attitude	Exit	Survey Criterion

CWU Student Learning Outcome Assessment Plan
 Department: Mathematics
 Program: Bachelor of Science: Actuarial Science

Many Student Learning Outcomes for this program are assessed through Course Grades and Surveys.

For Course Grade based assessment, the Criterion of Achievement is “80% of students pass course with a B or better on 1st or 2nd attempt” referred to as “Grade Criterion” in the table below.

For Survey based assessment, the Criterion of Achievement is a response rate of 80% and that 80% of student responses are either Strongly Agree or Agree with the statements in the survey. This is referred to as “Survey Criterion” in the table below.

Student Learning Outcomes	Related Program Goals	Related College Goals	Related University Goals	Method(s) of Assessment	Who Assessed?	When Assessed?	Criterion of Achievement
1. Graduates will be able to use statistical methods to analyze and model time-independent and time-series data.	1	I	I	Course Grade	Students in MATH 311, 410AB, 411BC	Quarterly	Grade Criterion
2. Graduates will be able to use statistical methods and credibility theory to analyze and model insurance loss data.	1	I	I	Course Grade	Students in MATH 417ABC	Quarterly	Grade Criterion
3. Graduates will be able to formulate actuarial problems in mathematics, probabilistic and statistical terms.	1	I	I	Course Grade	Students in MATH 417ABC, 418AB, 419ABC	Quarterly	Grade Criterion
4. Graduates will be able to apply common probability distributions to actuarial applications.	1	I	I	Course Grade	Students in MATH 411AB, 417ABC, 419ABC	Quarterly	Grade Criterion
5. Graduates will be able to apply concepts of differential and integral calculus to actuarial problems.	1	I	I	Course Grade	Students in 411AB, 418ABC, 417ABC, 419ABC	Quarterly	Grade Criterion
6. Graduates will be able to employ simulation techniques to analyze and solve dynamic and complex stochastic and mathematical models	2	I	I	Internship Survey and Post-Graduation Survey	Students on Internships and Graduates	Fall, Winter	Survey Criterion

Student Learning Outcomes	Related Program Goals	Related College Goals	Related University Goals	Method(s) of Assessment	Who Assessed?	When Assessed?	Criterion of Achievement
7. Graduates will be able to use programming languages such as C++, S, or Visual Basic	2	I	I	Internship Survey, Senior Survey and Post-Graduation Survey	Students on Internships, Seniors, and Graduates	Fall, Winter	Survey Criterion
8. Graduates will be able to communicate results and solutions of mathematical, statistical, and actuarial problems in writing using everyday and mathematical language.	3	I	I	Internship Survey, Senior Survey and Post-Graduation Survey	Students on Internships, Seniors, and Graduates	Fall, Winter	Survey Criterion
9. Graduates will be able to communicate mathematical and statistical solutions orally, using both everyday and mathematical language.	3.	I.	I.	Internship Survey, Senior Survey and Post-Graduation Survey	Students on Internships, Seniors, and Graduates	Fall, Winter	Survey Criterion

CWU Program Assessment Plan
Department: Mathematics
Program: Bachelor of Science: Actuarial Science

The following calendar establishes the timeline for various assessment activities and reporting within the Department. As external reporting schedules are finalized, they will be added to this calendar.

Quarter	Author	Product	Recipient
Fall	Students	Internship Survey	Program Director
Fall	Graduates from 2 years prior	Post-Graduation Survey	Program Director
Winter	Seniors	Senior Survey	Program Director
Spring	Program Director	Program Assessment Report	Department Chair
Summer	Department Chair	Department Assessment Report	Dean & Associate Vice President for Undergraduate Affairs

CWU Program Assessment Plan
 Department: Mathematics
 Program: Masters of Arts Teaching

The Goals and Outcomes of the Bachelor of Arts: Teaching Secondary program are developed using the guidelines established by the **NCATE/NCTM Standards (2003): Programs for Initial Preparation of Mathematics Teachers**, *Standards for Secondary Mathematics Teachers*.

This Assessment Plan was developed in 2007 for implementation starting during the Summer 2008. Portions of this Assessment Plan were piloted during Summer 2007.

Course Assessment refers to the annual review of syllabi and significant graded works in the course. The Criterion of Achievement for these assessments is that the course content matches program requirements and that the syllabus refers to Course Student Learner Outcomes. This is referred to as “Content Criterion” in the table below.

Embedded Assessment refers to the evaluation of student work in the context of a course. The Criterion of Achievement for these assessments is that that 90% of the students pass the course with a grade of B or better. This is referred to as “Embedded Criterion” in the table below.

Students complete a MAT Survey. This surveys consists of responses to statements using a 5-point Likert scale with options of “I do not know if my style has changed,” “My style has not changed,” “My style has changed a little,” “My style has changed a lot,” “My style has completely changed.” The Criterion of Achievement for these Surveys is a response rate of 80% and that 90% of student responses indicate the students style has changed a lot or completely. This is referred to as “Survey Criterion” in the table below.

Students complete either a Final Project or a Thesis that focuses either on action research or mathematical content. If the Final Project/Thesis is focused on action research, the Final Project/Thesis should address Goals 5, 6, or 7. If the Final Project/Thesis is focused on mathematical content, the Final Project/Thesis should address Goals 1, 2, 3. In all cases, the Final Project/Thesis should further Goal 4. The Members of the student’s Final Project/Thesis Committee establish the Criterion of Achievement for Final Projects/Theses. This is referred to as “Thesis Criterion” in the table below.

Program Goals	Related College Goals	Related University Goals	Method of Assessment	What is Assessed?	When Assessed?	Criterion of Achievement
1. Graduates will be able to demonstrate and teach substantial core mathematical content, the use of logical and mathematical evidence, conjecturing and solution strategies, and problem solving.	I, III & VI	I & IV	Course Assessment for MAT Courses	Course Content	Annually	Content Criterion
			Embedded in MAT Courses	Student Performance Student Knowledge	Coeval	Embedded Criterion
			Final Project/Thesis (content)	Student Performance Student Knowledge	Exit	Thesis Criterion

Program Goals	Related College Goals	Related University Goals	Method of Assessment	What is Assessed?	When Assessed?	Criterion of Achievement
			MAT Survey	Student Attitude	Exit	Survey Criterion
2. Graduates will be able to demonstrate and teach the connection of mathematics to science, social science, technology, and other areas of mathematics, its ideas, and its applications	I, III & VI	I & IV	Course Assessment for all courses in MAT program	Course Content	Annually	Content Criterion
			Embedded in all MAT courses	Student Performance Student Knowledge	Coeval	Embedded Criterion
			Final Project/Thesis (content)	Student Performance Student Knowledge	Exit	Thesis Criterion
			MAT Survey	Student Attitude	Exit	Survey Criterion
3. Graduates will be able to focus teaching on deeper mathematical notions	I, III & VI	I & IV	Course Assessment for all courses in MAT program	Course Content	Annually	Content Criterion
			Embedded in all MAT courses	Student Performance Student Knowledge	Coeval	Embedded Criterion
			Final Project/Thesis (content)	Student Performance Student Knowledge	Exit	Thesis Criterion
			MAT Survey	Student Attitude	Exit	Survey Criterion
4. Graduates will be able to take leadership roles in mathematics education	I, III & VI	I & IV	Course Assessment for MATH 522, 523, 524	Course Content	Annually	Content Criterion
			Embedded in MATH 522, 523, 524	Student Performance Student Knowledge	Coeval	Embedded Criterion
			Final Project/Thesis	Student Performance Student Knowledge	Exit	Thesis Criterion
			MAT Survey	Student Attitude	Exit	Survey Criterion

Program Goals	Related College Goals	Related University Goals	Method of Assessment	What is Assessed?	When Assessed?	Criterion of Achievement
5. Graduates will be able to improve teaching by assessing teaching, student work, and curricula	I & III	I & IV	Course Assessment for MATH 522, 523, 524	Course Content	Annually	Content Criterion
			Embedded in MATH 522, 523, 524	Student Performance Student Knowledge	Coeval	Embedded Criterion
			Final Project/Thesis (research)	Student Performance Student Knowledge	Exit	Thesis Criterion
			MAT Survey	Student Attitude	Exit	Survey Criterion
6. Graduates will be able to promote equity within their professional domains	I, III, V, VI & VII	I, IV & VI	Course Assessment for MATH 522, 523, 524	Course Content	Annually	Content Criterion
			Final Project/Thesis (research)	Student Performance Student Knowledge	Exit	Thesis Criterion
			MAT Survey	Student Attitude	Exit	Survey Criterion
7. Graduates will be able to build learning communities within their professional domains	I, III, V, VI & VII	I, IV & VI	Course Assessment for MATH 522, 523, 524	Course Content	Annually	Content Criterion
			Final Project/Thesis (research)	Student Performance Student Knowledge	Exit	Thesis Criterion
			MAT Survey	Student Attitude	Exit	Survey Criterion

CWU Student Learning Outcome Assessment Plan

Department: Mathematics

Program: Masters of Arts Teaching

For Course Grade based assessment, the Criterion of Achievement is “90% of students pass course with a B or better.” This is referred to as “Grade Criterion” in the table below.

Student Learning Outcomes	Program Goals	Related College Goals	Related University Goals	Method of Assessment	Who is Assessed?	When are they Assessed?	Criterion of Achievement
1. Graduates will be able to demonstrate and teach substantial core mathematical content in analysis, geometry, algebra, and statistics	1	I, III & VI	I & IV	Grade Assessment	Students in MATH 550, 562, 566, 570, 572, and EDF 504	Summer	Grade Criterion
2. Graduates will be able to demonstrate and teach the use of logical and mathematical evidence	1	I, III & VI	I & IV	Grade Assessment	Students in all MAT courses	Summer	Grade Criterion
3. Graduates will be able to demonstrate and teach conjecturing and solution strategies	1	I, III & VI	I & IV	Grade Assessment	Students in all MAT courses	Summer	Grade Criterion
4. Graduates will be able to demonstrate and teach problem solving.	1	I, III & VI	I & IV	Grade Assessment	Students in all MAT courses	Summer	Grade Criterion

Student Learning Outcomes	Program Goals	Related College Goals	Related University Goals	Method of Assessment	Who is Assessed?	When are they Assessed?	Criterion of Achievement
5. Graduates will demonstrate and teach the connection of mathematics to science, social science, technology, and other areas of mathematics, its ideas, and its applications.	2	I, III & VI	I & IV	Grade Assessment	Students in all MAT courses	Summer	Grade Criterion
6. Graduates will be able to focus teaching on deeper mathematical notions.	3	I, III & VI	I & IV	Grade Assessment	Students in all MAT courses	Summer	Grade Criterion
7. Graduates will be able to take leadership roles in mathematics education.	4	I, III & VI	I & IV	Grade Assessment	Students in MATH 522, 523, 524	Summer	Grade Criterion
8. Graduates will be able to improve teaching by assessing teaching, student work, and curricula	5	I & III	I & IV	Grade Assessment	Students in MATH 522, 523, 524	Summer	Grade Criterion
9. Graduates will be able to promote equity within their professional domains	6	I, III, V, VI & VII	I, IV & VI	Grade Assessment	Students in MATH 522, 523, 524	Summer	Grade Criterion
10. Graduates will be able to build learning communities within their professional domains.	7	I, III, V, VI & VII	I, IV & VI	Grade Assessment	Students in MATH 522, 523, 524	Summer	Grade Criterion

CWU Program Assessment Plan

Department: Mathematics

Program: Master of Arts Teaching

The following calendar establishes the timeline for various assessment activities and reporting within the Department. As external reporting schedules are finalized, they will be added to this calendar.

Quarter	Author	Product	Recipient
Summer	Students	MAT Survey	Program Director
Spring	Program Director	Program Assessment Report	Department Chair
Summer	Department Chair	Department Assessment Report	Dean & Associate Vice President for Undergraduate Affairs