

**Core Curriculum Course Submission
Criteria: Mathematics**

1. General Information

a. Originating Person	b. Contact Person's E-mail	c. Contact Phone	d. Date
Melissa Hardeman	mahardeman@ualr.edu	(501)569-8113	03/29/2014
e. College/School	f. Department/Program		
College of Arts, Letters, & Sciences	Mathematics & Statistics		

Submission Statement

By submitting this form, we acknowledge our understanding that the Core Council has the authority to review approved courses to ensure they continue to meet the established goals and outcomes of that category of the core; that the Council has authority to develop a core assessment program; and that the Council will be developing review and assessment policies by the end of 2014. Further, we agree that if this course is approved, we will participate in the university-wide assessment of the core.

Chair and Dean Awareness

Your department chairperson and college dean must be made aware of your submission for core. By submitting this form, you are acknowledging that this has occurred.

2. Course Information

a. Course ID	b. Current Title
MATH 1321	Quantitative and Mathematical Reasoning

c. Catalog Description

Prerequisite: A grade of C or greater in Intermediate Algebra or an equivalent transfer course, or a grade of AQ, BQ, CQ, in any of UALR's Pre-Core Mathematics courses (MATH 0321, MATH 0322, MATH 0323, MATH 0324), or a MATH ACT score of 21 or greater, or an SAT Mathematics score of 500 or greater. The overarching goal of Quantitative and Mathematical Reasoning is to provide students with mathematical understandings and skills to be productive workers, discerning consumers, and informed citizens. Students will solve problems using mathematical reasoning involving logic, proportions, algebra, and relations. In keeping with the tenets of student performance in a general education course, this course is designed to deliver instruction that focuses on process, conceptual understanding, communication and problem solving found in the following strands: (a) Personal, state and national finance (b) Statistics and probability (c) Mathematical modeling (d) Quantities and measurement. Students seeking a degree in a Non-STEM major are advised to take this course. Note: This course satisfies the state mandated requirement for the baccalaureate degree. Three hours lecture. Three credit hours. (ACTS Course Number MATH 1003)

d. How will your department ensure a level of consistency among sections of this course? Who will be responsible for this?

All sections of Quantitative and Mathematical Reasoning (QMR) use a mandatory online homework/quiz delivery system. The Core Assessment Coordinator creates the online materials that all instructors use for their classes; therefore, all students are working on the same homework and quiz assignments throughout the semester. The same text book is used for all sections and there is a common syllabus. All QMR students take a common final exam on the same day at the same time. This final exam is created by a group of instructors from the Department of Mathematics and Statistics. All students are given the same final exam review/practice materials. For all sections of QMR, the final exam must count for at least 20% of a student's final grade in the course. At the end of the semester and after finals are over, teachers report their percentage of students who made a C or better in the course AND ALSO scored at least 70% on the final exam to the Assessment Coordinator. The coordinator keeps the records and reviews them periodically to see if any changes to the course are warranted. All teaching assistants, as well as current and new faculty members teaching QMR, must attend a mandatory orientation meeting with the coordinator before the start of the semester. In this meeting, these GA's learn how to set up their particular online course, modify the course to fit their needs and are given a copy of the common syllabus that they must adapt to their particular course. The Assessment Coordinator meets with the GA's throughout the semester, handling any questions or concerns they may have regarding their teaching assignment. Each GA is assigned a mentor (full time instructor) to work with the semester before their teaching appointment, as well as during their teaching appointment. The Assessment Coordinator communicates with the Graduate Coordinator regarding the performance of these GA's. GA's performance evaluation and course evaluations are reviewed by the Graduate Coordinator. The Core Assessment Coordinator is responsible for ensuring this level of consistency among all sections of QMR.

Educational Goals	Learning Outcomes students will ...	Learning Objectives: At the end of the course students will be able to...	Assignments	Explanation
<p>Knowledge 1 – Concepts, methodologies, findings, and applications of mathematics and the social and natural sciences, engineering and technology.</p>	<p>1. understand mathematical relationships among quantities;</p>	<p>Learning Objectives 1.1</p> <p>Students will be able to</p> <ul style="list-style-type: none"> • Analyze very large and very small numbers and put these in perspective. • Analyze different savings plans and investments. • Interpret credit scores. • Analyze an amortization table for loan repayment. • Analyze different loans. • Determine under what conditions one can use the Normal Distribution to analyze a set of data. • Create and Interpret statistical graphs. • Analyze statistical graphs in the media. • Understand the difference between a population and a sample. • Identify different sampling techniques. • Understand the difference between subsidized and unsubsidized student loans. • Understand the difference between qualitative and quantitative data and how they are represented. 	<p>Assignments 1.1</p> <p>Class discussions, homework, group work, projects, quizzes, and exams.</p>	<p>Explanation 1.1</p> <p>The learning objectives will be accomplished via in-class problem solving, group work and discussions and will be assessed via online homework assignments, projects, tests, quizzes and the final exam.</p>

	2. understand fundamental mathematical/algebraic operations;	Learning Objectives 1.2 <ul style="list-style-type: none"> • Calculate currency exchanges. • Apply dimensional analysis to convert units (metric and U.S. customary). This also includes units of area and volume. • Calculate percentages. • Calculate population densities. • Calculate and Apply percent increase/decrease. • Use the Normal Distribution to Find percentages and answer questions. • Use Proportions to solve application problems. 	Assignments 1.2 Class discussions, homework, group work, projects, quizzes, and exams.	Explanation 1.2 The learning objectives will be accomplished via in-class problem solving, group work and discussions and will be assessed via online homework assignments, projects, written papers, tests, quizzes and the final exam.
Educational Goals	Learning Outcomes students will...	Learning Objectives. At the end of the course students will be able to...	Assignments	Explanation
Skills 1 - Communication	1. develop oral and/or written skills while communicating about social science theories, methods, and applications;	Learning Objectives 1.1 <ul style="list-style-type: none"> • Identify and Use the formulas for compound interest. • Identify and Use the formula for calculating loan payments. • Solve problems using the formulas for perimeter, area, and volume. • Identify the formulas for mean, median, mode, range, variation, z-score, and standard deviation and Calculate these basic statistical values. • Represent answers using scientific notation. • Understand when one can use the relative change formula to compare values. 	Assignments 1.1 Class discussions, homework, group work, projects, quizzes, and exams.	Explanation 1.1 The learning objectives will be accomplished via in-class problem solving, group work and discussions and will be assessed via online homework assignments, projects, tests, written papers, quizzes and the final exam.

	<p>2. explain orally and in writing the mathematical “reasonableness” of a statement that is presented as being implied by data;</p>	<p>Learning Objectives 1.2</p> <ul style="list-style-type: none"> • Explain why an obtained answer may not make sense in a given application problem. • Use estimation skills to determine the reasonableness of an answer when solving problems. 	<p>Assignments 1.2</p> <p>Class discussions, homework, group work, project presentations, quizzes, and exams.</p>	<p>Explanation 1.2</p> <p>The learning objectives will be accomplished via in-class problem solving, group work and discussions and will be assessed via online homework assignments, project presentations, written papers, tests, quizzes and the final exam.</p>
	<p>3. communicate about math precisely orally and in writing;</p>	<p>Learning Objectives 1.3</p> <ul style="list-style-type: none"> • Communicate, orally and in writing, their findings for their project and solutions to various application problems. 	<p>Assignments 1.3</p> <p>Class discussions, homework, group work, projects, quizzes, and exams.</p>	<p>Explanation 1.3</p> <p>The learning objectives will be accomplished via in-class problem solving, group work and discussions and will be assessed via online homework assignments, project presentations, written papers, tests, quizzes and the final exam.</p>

Educational Goals	Learning Outcomes students will...	Learning Objectives: At the end of the course students will be able to...	Assignments	Explanation
Skills 2 - Critical Thinking, Quantitative Reasoning, and Solving Problems Individually and Collaboratively	1. interpret, analyze, and identify appropriate applied math models, data and graphs;	Learning Objectives 2.1 <ul style="list-style-type: none"> • Interpret and Analyze statistical graphs in the media. • Determine which financial math models apply to a given situation. Determine if data is qualitative or quantitative and correctly represent that data using statistical graphs. • Analyze current stock market quotes. • Explain exponential and linear growth. • Identify appropriate methods for putting numbers in perspective. • Use statistical methods to analyze a data set. • Analyze consumer advertisements to determine the best deal. 	Assignments 2.1 Class discussions, homework, group work, projects, quizzes, and exams.	Explanation 2.1 The learning objectives will be accomplished via in-class problem solving, group work and discussions and will be assessed via online homework assignments, projects, tests, quizzes and the final exam.
	2. develop abstract and quantitative reasoning ability;	Learning Objectives 2.2 <ul style="list-style-type: none"> • Use the 4-Step Problem Solving process to help solve any problem and to become better organized at solving problems. • Estimate and check answers to the mathematical problems encountered in the course in order to determine reasonableness, identify alternatives, and select optimal results. 	Assignments 2.2 Class discussions, homework, group work, projects, quizzes, and exams.	Explanation 2.2 The learning objectives will be accomplished via in-class problem solving, group work and discussions and will be assessed via online homework assignments, projects, tests, quizzes and the final exam.

Educational Goals	Learning Outcomes students will	Learning Objectives: At the end of the course students will be able to	Assignments	Explanation
Skills 3 – Information Technology	1. make appropriate decisions regarding the use of technology when solving problems, recognizing both the insight to be gained and the limitation;	Learning Objectives 3.1 <ul style="list-style-type: none"> • Use a graphing calculator as a tool to solve many problems, including statistical problems, and create statistical graphs. • Understand and interpret the output produced by using technology. • Determine when the use of the technology is appropriate and when it is not. 	Assignments 3.1 Class discussions, homework, group work, projects, quizzes, and exams.	Explanation 3.1 The learning objectives will be accomplished via in-class problem solving where instructors share their strategies and insights on proper use of the technology and will be assessed via online homework assignments, tests, projects, written papers, quizzes and the final exam.
	2. use information resources like the internet reflectively for inquiry, exploration, and communication;	Learning Objectives 3.2 <ul style="list-style-type: none"> • Use the internet to complete required online homework and quizzes, to communicate via email, complete media assignments, and as a resource for projects. 	Assignments 3.2 Online homework, quizzes, media assignments, projects.	Explanation 3.2 This learning objective will be accomplished via the internet. Students are required to use online calculators to analyze loans, find stock market quotes, determine credit scores and research information for their project. Students will complete online homework. Students will complete media assignments that are accessed via the internet. Instructors may communicate with students via email at any time during the semester.
Educational Goals	Learning Outcomes students will	Learning Objectives: At the end of the course students will be able to	Assignments	Explanation
Values 1 – Personal Responsibility and Ethical Behavior	1. take responsibility for completing assignments in an honest and ethical manner, working on their own when required and acknowledging resources when used;	Learning Objectives 1.1 Follow the UALR policies on academic dishonesty.	Assignments 1.1 Proctored exams.	Explanation 1.1 Use the UALR, Departmental and course (stated on the syllabus) policies of academic dishonesty to accomplish this objective.

	2. understand the duty to be precise and accurate with data;	Learning Objectives 1.2 Students will understand that precision and accuracy are critical components of interpreting data and solving problems correctly, and will be precise and accurate when communicating to others the conclusions of their results.	Assignments 1.2 Class discussions, homework, quizzes, group work, projects, and exams.	Explanation 1.2 The learning objectives will be accomplished via in-class problem solving where instructors share their strategies and insights on proper use of the technology and will be assessed via online homework assignments, tests, group work, projects, written papers, quizzes and the final exam.
Educational Goals	Learning Outcomes students will	Learning Objectives. At the end of the course students will be able to	Assignments	Explanation
Value 3-Global and cultural Understanding	1. analyze "real world" implications and develop mathematical models that aid in the understanding of current global issues.	Learning Objectives 3.1 <ul style="list-style-type: none"> Understand how real-world problems and social issues can be analyzed using the power of mathematical and statistical models. 	Assignments 3.1 Class discussions, homework, group work, projects, quizzes, and exams.	Explanation 3.1 The learning objectives will be accomplished via in-class problem solving, group work and discussions and will be assessed via online homework assignments, projects, written papers, tests, quizzes and the final exam.

Additional Comments:

Students in this course are required to complete a project that involves everyday usage of mathematics. Students are encouraged to find a topic related to their major, if possible. Students are required to show their "math" work, write a paper summarizing their results and present their results to the class using handouts, power point, Prezi, Movie Maker, or any other method of presentation. Students are given the grading rubric.

Some topics students have chosen for their projects are:

- Analyze the cost of living in another country.
- Determine the three richest people in Arkansas and put their riches in perspective.
- Is interstellar travel realistic?
- Analyze an offer from the T.V. show Shark Tank.
- Compare golf courses to determine which is the most challenging to play.
- Creating a Hugelkulture garden.
- Budget analysis.
- Investigating the Rule of 72.
- The Golden Ratio and how it is used in art.
- Analyzing Student Loans.
- Is it better to buy or lease a car?
- Determining costs related to a vacation including food, hotels, mileage, total gasoline consumption.

13. Using the metric system in everyday life.
14. Investigate graduate schools and determine the percentage of applicants that are accepted.
15. Investigate job opportunities for their chosen major and determine the salary options.
16. Coin toss experiment and investigating the Law of Large Numbers.
17. Analyzing crime rates in Little Rock and comparing these rates to other cities.
18. Problems encountered when trying to scale the solar system.
19. Analyzing a media report.
20. Analyzing graphics in the media.

In this course, we do group work, which can involve any of the following topics:

1. Analyzing a stock market quote.
2. Investigating area to determine the maximum gardening area that can be obtained given a specific amount of fencing.
3. Understanding credit cards.
4. Understanding the difference between quantitative and qualitative data and how these should be represented.
5. Analyzing statistical graphs from media.
6. Analyzing "shapes" of data.
7. Investigating volume to determine if you use more water taking a bath or taking a shower.
8. Putting a basketball player's salary in perspective.
9. Investigating whether you should keep your current vehicle or purchase a new one that gets better gas mileage.
10. Solving the "bottle-string" puzzle.
11. Analyzing the Mayflower oil spill.

Berinda Blevins-Knapp

Approved by Core Curriculum Committee

4.14.14

Date

[Signature]

Approved by Provost

4/26/14

Date

[Signature]

Approved by Chancellor

4-23-14

Date