One Corequisite Course for Both Statistics and Quantitative Reasoning

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Original Developmental Math Programming

- Beginning Algebra Course
- Intermediate Algebra Course
- Gateway Math Course

A First Attempt: Corequisite Pilot in Elementary Statistics

The Turning Point:
The University of Wisconsin System
Math Initiative 2017-2021

https://www.wisconsin.edu/math-initiative/
Our Model

Prerequisite Course
- Fundamentals of Mathematics (MATH 090)

Support Courses
- Fundamentals of Algebra for Stats and Quantitative Reasoning (MATH 097)
- Fundamentals of Mathematics for College Algebra (MATH 096)

Gateway Courses
- Elementary Statistics (MATH 130)
- Introduction to Contemporary Mathematics (MATH 112) Quantitative Reasoning
- Algebra with Applications (MATH 113)

Why Combined Support?
- Low Enrolling Courses
- Instructor Staffing
- Overlap of Course Content
- Schedule Flexibility
Corequisite Course Description

(2 credits) Review of elementary algebra: the real number system; functions; linear equations and their graphs; polynomials; rational expressions; rational exponents; combinations and permutations. Does not apply toward University Studies requirements or graduation requirements.

Quantitative Reasoning Course Description

(3 credits) A liberal arts mathematics course presenting mathematics as a tool used by a wide range of professionals in modern society. Real-life examples are used to promote understanding of mathematics and its relationship to other areas of study. Examples will be chosen from graph theory (Traveling Salesman Problem and Euler Circuits), voting theory (fairness criteria and Arrow’s impossibility theorem), elementary probability and statistics, logic, geometry, mathematics of growth, mathematics of finance, and mathematical modeling.

Statistics Course Description

(4 credits) Introductory course for students of all disciplines. Includes descriptive statistics, probability, the binomial and normal distributions, confidence intervals, correlation and linear regression, Central Limit Theorem, and one-sample (population mean and population proportion) and two-sample (population means) hypothesis testing. Problems are taken from various fields of study dependent on statistical decision making.
Purpose of Co-Requisite Math

Co-requisite math at UW-Superior is structured so that students needing or requesting additional support to succeed in your gateway math course can complete requirements in a single academic term.

Co-requisite Support will:
- Review foundational skills that will support the learning of the gateway course’s content.
- Implement study skills/habits that are needed to be successful in your gateway course.
- Empower you to fully engage in the gateway course.

Co-requisite Support will not be a complete reteaching/review of the credit-bearing class. It will be graded separately from the gateway course with its own homework, assessments, and final grade.
# Common Course Outline

<table>
<thead>
<tr>
<th>WEEK</th>
<th>MATH 130</th>
<th>MATH 097</th>
<th>MATH 112</th>
</tr>
</thead>
</table>
| 1    |          | Study Skill, such as:  
|      |          | • Math History  
|      |          | • Goal Setting  
|      |          | • Growth Mindset |
| 2    | Analyze sample data relative to context, source, and sampling method.  
|      | Understand the difference between statistical and practical significance.  
|      | Identify a voluntary response. | Study Skill, such as:  
|      |      | • Time Management  
|      |      | • Goal Setting  
|      | Prerequisite Knowledge Review  
|      |      | • I can apply operations to fractions and decimals.  
|      |      | • I can simplify a fraction. | Distinguish between a sample and a population. (Statistics Chapter 1, page 1)  
|      |      | • Distinguish between the following pairs: qualitative/quantitative, continuous/discrete, parameter/statistic. (Statistics Chapter 1, page 1, 2, 3, 12)  
|      |      | • Analyze studies to determine whether results are believable. (Statistics Chapter 1, page 13-17)  
|      |      | • Use capture-mark-recapture methods to estimate a population size. |
**Student Reflections**

**Initial Student Perceptions**
- Students typically worried about the combined class workload.
- Most students felt a support course could help them with reviewing forgotten math concepts as well as helping improve study habits like time management.

**Midterm Student Perceptions**
- Very few students surveyed reported being very overwhelmed with their combined classes.
- No students reported that the total workload was “far too much”.

**Final Student Perceptions**
- Most students surveyed viewed 097 positively; they mentioned it being "helpful," "essential," and/or a positive experience.
- Generally, students appreciated the more "active" and "supportive" nature of MATH 097. They frequently cited the in-class work and supportive instructor as reasons they valued the course.

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**Instructor Reflections**

Regular instructor reflection meetings
- Important to have consistent course schedule and instructor buy-in.
- Generally helps to have the same teacher for corequisite and credit course.
What does the data say?

Retention (Second % with Coreq)

One Semester Later
QR: 82% vs 83%
Statistics: 84% vs 79%

Two Semesters Later
QR: 72% vs 74%
Statistics: 69% vs 68%

Three Semesters Later
QR: 66% vs 69%
Statistics: 62% vs 58%

Prior: Fall 2017 – Spring 2020
Coreq: Fall 2020 – Spring 2023
What does the data say?

**GPA (Fall 2017 – Spring 2023)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Mean GPA</th>
<th>St Dev</th>
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</thead>
<tbody>
<tr>
<td>QR</td>
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<tr>
<td>No Coreq</td>
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<td>1.40</td>
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<tr>
<td>Coreq</td>
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<td>$p = 0.118$</td>
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<tr>
<td>Statistics</td>
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<tr>
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<td>2.68</td>
<td>1.40</td>
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<tr>
<td>Coreq</td>
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<td>$p = 0.175$</td>
<td>Not sig</td>
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</table>
What does the data say?

**Passing Rates**

**Prior (Fall 2017 – Spring 2020)**

**Coreq (Fall 2020 – Spring 2023)**

<table>
<thead>
<tr>
<th>Course</th>
<th>A to C-</th>
<th>Sample Size</th>
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<tbody>
<tr>
<td>QR</td>
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<tr>
<td>Prior to Coreq</td>
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<tr>
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<tr>
<td>Statistics</td>
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<tr>
<td>Prior to Coreq</td>
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<tr>
<td>Coreq</td>
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<td>293</td>
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Any Questions?

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