**1. COURSE TITLE\*:** Quantitative Reasoning

**2. CATALOG – PREFIX/COURSE NUMBER/COURSE SECTION\*:** MATH 1125

**3. PREREQUISITE\*:**

A student must meet *one* of the following criteria to register for this course:

* Math 1116 with a grade of C or higher.
* Math 1118

-          Three High school STEM or Core Math courses with grades of B or higher

-      ACT Math score of 22 or higher

-      SAT Math score of 530 or higher

-          Accuplacer QAS with a score of 263 or higher

**COREQUISITE(S)\*:**

* Math 1025

**4. COURSE TIME/LOCATION/MODALITY: (Course Syllabus – Individual Instructor Specific)**

**5. CREDIT HOURS\*:** 4 **LECTURE HOURS\*:** 4

**LABORATORY HOURS\*:** 0 **OBSERVATION HOURS\*:** 0

**6. FACULTY CONTACT INFORMATION: (Course Syllabus – Individual Instructor Specific)**

**7. COURSE DESCRIPTION\*:**

This college level mathematics course is designed for students seeking non-STEM degrees. It is a quantitative reasoning course focusing on thought processes involved when investigating situations described by measurements. Three threads define the curriculum: 1) Numeracy. Students will develop and use concepts of numeracy to investigate and explain quantitative relationships and solve problems in a variety of real world contexts. 2) Mathematical Modeling. Students will make decisions by analyzing mathematical models, including situations in which the student must recognize and/or make assumptions. 3) Probability and Statistics. Students will use the language and structure of statistics and probability to investigate, represent, make decisions, and draw conclusions from real-world contexts. The classroom is designed to be an active learning experience supported by student communication.

**8. LEARNING OUTCOMES\*:**

At the completion of this course the student will be able to:

1.1 Solve real-world problems requiring the use and interpretation of ratios in a variety of contexts: Parts to whole comparisons, converting decimals to percentages and vice versa, quantifying risks by calculating and interpreting probabilities, rates of change, and margins of error.

1.2 Solve real-world problems relating to rates of change, distinguishing between and utilizing models that describe absolute change and relative change including growth and decay.

1.3 Compare and contrast statements which are proportional and those that are not by applying proportional reasoning appropriately to real-world situations such as scaling, dimensional analysis and modeling.

1.4 Demonstrate numerical reasoning orally and/or by writing coherent statements and paragraphs.

2.1 Create and use tables, graphs, and equations to model real-world situations including: using variables to represent quantities or attributes, estimating solutions to real-world problems using equations with variables, identifying five pattern behaviors, identifying how changing parameters can affect results, and identifying limitations in proposed models.

2.2 Model financial applications such as credit card debt, installment savings, loans, etc. and calculate income taxes.

2.3 Create basic linear and exponential models for real-world problems and be able to choose which one is most appropriate for a given context and describe the limitations of the proposed models.

2.4 Use basic logarithm properties to address questions (regarding time periods etc.) arising in real-world situations modeled exponentially.

2.5 Explain and critique models orally and/or by writing coherent statements and paragraphs.

3.1 Critically evaluate statistics being presented in the media, journals, and other publications including evaluating the research methodology, critiquing how the author(s) came to their conclusions, identifying sources of bias, and identifying confounding variables. Students will be able to critically evaluate sampling strategy, the impact of sample size, correlation versus causation, and any inferences made.

3.2 Summarize and interpret datasets regarding shape, center, and spread. Use both graphical and numerical information. Use statistics appropriate to the shape. Students will be able to compare two or more datasets considering this type of information.

3.3 Create visual representations of real-world data sets such as charts, tables, and graphs and be able to describe their strengths, limitations, and deceptiveness.

3.4 Calculate probabilities and conditional probabilities in real-world settings and employ them to draw conclusions.

3.5 Justify decisions based on basic statistical (probabilistic) modeling orally and/or by writing coherent statements and paragraphs.

**9.       ADOPTED TEXT(S):**

Quantitative Reasoning

4th Edition

Wayand, Shew, Crawford-Eyen

The textbook along with any other materials needed for the course will be provided. The textbook will be in a pdf format uploaded to your canvas course.

"Quantitative Reasoning" by Wayand, Shew, Crawford-Eyen is licensed under [CC BY-NC-SA 4.0](http://creativecommons.org/licenses/by-nc-sa/4.0)

**10. OTHER REQUIRED MATERIALS: (SEE APPENDIX C FOR TECHNOLOGY REQUEST FORM.)\*\***

A basic scientific or graphing calculator is REQUIRED as long as it does not have CAS capability.

**11. GRADING: \*\*\***

Grading will follow the policy in the catalog. The scale is as follows:

A: 90 – 100

B: 80 – 89

C: 70 – 79

D: 60 – 69

F: Below 60

**12. GRADING PROCEDURES OR ASSESSMENT:(Course Syllabus – Individual Instructor Specific)**

**EXAMPLES BELOW:**

|  |
| --- |
| *Example 1 - By Percent* |
| Homework 10%  Quizzes/Tests 90%  Total 100% |

|  |  |  |
| --- | --- | --- |
| *Example 2* | | |
| *Category* | *By Total Points* | *% of Grade* |
| Homework (20x10) | 200 | 10% |
| Quizzes/Tests  (5x360) | 1800 | 90% |
| Total | 2000 | 100% |

|  |  |  |
| --- | --- | --- |
| *Example 3* | | |
| *Category* | *By Total Points* | *% of Grade* |
| Online Quizzes | 400 | 10% |
| Online Tests  (6x100) | 600 | 15% |
| Notebook  (2x500) | 1000 | 25% |
| Midterm | 1000 | 25% |
| Final | 1000 | 25% |
| Total | 4000 | 100% |

**13. COURSE METHODOLOGY: *(Course Syllabus – Individual Instructor Specific)***

The course design provides instruction and materials to support the course objectives.  Classes may consist of a variety of means to accomplish this including but not limiting to: lectures, class discussions, group projects, supplemental materials, and outside assignments.  Practice is an important part of the learning process.  For every one hour of class time, two additional hours of study time should be expected.

**14. COURSE OUTLINE: *(Course Syllabus Individual Instructor Specific)***

**Chapter 1 - QUANTITATIVE REASONING**

1.1 What is Reasoning?

1.2 What is Correct?

1.3 Critical Thinking

1.4 Making Decisions

1.5 How does “Quantitative” fit in?

1.6 Conclusions vs. Opinions

1.7 Assessment

1.8 What’s Being Asked of You?

1.9 Explanations

1.10 Student Advice

**Chapter 2 - AMOUNTS: BIG AND SMALL**

2.1 What is an Amount Measurement?

2.2 Measurement Arithmetic- A Model

2.3 Scientific Notation

2.4 Converting Units

2.5 Get to the Point

2.6 Measurements of Area

2.7 Measurements of Volume

2.8 Dimensions

**Chapter 3 - RATES**

3.1 What is Rate Measurement?

3.2 A Different Perspective: Fractions

3.3 Abbreviations

3.4 Proportions

3.5 Dimensional Analysis

**Chapter 4 - PIECES/PARTS**

4.1 Fractions

4.2 Decimals

4.3 Percentages

4.4 Working with Percentages

4.5 Proportional Thinking

4.6 Fractions Represent Numbers

**Chapter 5 - MODELING INFORMATION VISUALLY**

5.1 Algebraic Models

5.2 Visual Models

5.3 Cartesian Plane

5.4 Pictures

5.5 Games

5.6 Must and Must Not

**Chapter 6 - STATISTICS**

6.1 Statistics and Probability

6.2 The Middle

6.3 The Spread

6.4 The 5-Number Summary

6.5 Statistics

6.6 Normal Distribution

**Chapter 7 - PROBABILITY**

7.1 Statistics and Probability

7.2 Probability

**Chapter 8 - LINEAR MODELS**

8.1 What is Linear?

8.2 What is a Linear Model?

8.3 Lines and Linear Equations

8.4 Mechanics

8.5 Modeling Scatterplots

8.6 Restrictions

8.7 Correlations

8.8 Trend Lines

**Chapter 9 - EXPONENTIAL MODELS**

9.1 Exponential Situations

9.2 Exponential Models

9.3 e

|  |  |
| --- | --- |
| TOPICS IN TEXTBOOK | LEARNING OUTCOMES |
| Chapter 1 - QUANTITATIVE REASONING  1.1 What is Reasoning?  1.2 What is Correct?  1.3 Critical Thinking  1.4 Making Decisions  1.5 How does “Quantitative” fit in?  1.6 Conclusions vs. Opinions  1.7 Assessment  1.8 What’s Being Asked of You?  1.9 Explanations  1.10 Student Advice | 1.4  1.4, 2.5, 3.5  1.4, 2.5, 3.5 |
| Chapter 2 - AMOUNTS: BIG AND SMALL  2.1 What is an Amount Measurement?  2.2 Measurement Arithmetic- A Model  2.3 Scientific Notation  2.4 Converting Units  2.5 Get to the Point  2.6 Measurements of Area  2.7 Measurements of Volume  2.8 Dimensions | 1.1, 1.2  1.1, 1.3  1.1, 1.2  1.1, 1.2, 1.3, 1.4  1.1, 1.3, 1.4, 2.5  1.3, 2.5  1.3, 2.5  1.3, 2.5 |
| Chapter 3 - RATES  3.1 What is Rate Measurement?  3.2 A Different Perspective: Fractions  3.3 Abbreviations  3.4 Proportions  3.5 Dimensional Analysis | 1.1, 1.3  1.1, 1.3  1.1  1.1, 1.3  1.1, 1.3, 1.4 |
| Chapter 4 - PIECES/PARTS  4.1 Fractions  4.2 Decimals  4.3 Percentages  4.4 Working with Percentages  4.5 Proportional Thinking  4.6 Fractions Represent Numbers | 1.2, 1.3  1.1, 1.3  1.1, 1.2, 1.3  1.1, 1.2, 2.1, 2.2  1.1, 1.2, 1.4, 2.2  1.1, 1.4 |
| Chapter 5 - MODELING INFORMATION VISUALLY  5.1 Algebraic Models  5.2 Visual Models  5.3 Cartesian Plane  5.4 Pictures  5.5 Games  5.6 Must and Must Not | 2.1  2.1  2.1, 2.3, 3.3  2.1, 3.1, 3.3  2.5, 3.4, 3.5  2.5, 3.4, 3.5 |
| Chapter 6 - STATISTICS  6.1 Statistics and Probability  6.2 The Middle  6.3 The Spread  6.4 The 5-Number Summary  6.5 Statistics  6.6 Normal Distribution | 3.1  3.2, 3.3  3.2, 3.3  3.2, 3.3  3.1, 3.2, 3.3, 3.5  3.2, 3.3, 3.5 |
| Chapter 7 - PROBABILITY  7.1 Statistics and Probability  7.2 Probability | 3.2, 3.3, 3.4, 3.5  3.3, 3.4, 3.5 |
| Chapter 8 - LINEAR MODELS  8.1 What is Linear?  8.2 What is a Linear Model?  8.3 Lines and Linear Equations  8.4 Mechanics  8.5 Modeling Scatterplots  8.6 Restrictions  8.7Correlations  8.8 Trend Lines | 1.1, 1.2, 2.1,  1.2, 2.3, 2.5  1.1, 1.2, 2.3, 2.5  1.2, 2.3, 2.5  2.3, 3.2, 3.3  2.5  2.1, 2.3, 2.5, 3.3  2.3, 3.3, 3.5 |
| Chapter 9 - EXPONENTIAL MODELS  9.1 Exponential Situations  9.2 Exponential Models  9.3 e | 1.2, 2.1, 2.2, 2.3, 2.4, 2.5  1.2, 2.1, 2.2, 2.4, 2.5  1.2, 2.1, 2.2, 2.4, 2.5 |

Week 1: Chapter 1

Week 2: Chapter 2, 3

Week 3: Chapter 3

Week 4: Chapter 4

Week 5: Chapter 4

Week 6: Chapter 5

Week 7: Chapter 5

Week 8: Chapter 6

Week 9: Chapter 6, 7

Week 10: Chapter 7

Week 11: Chapter 8

Week 12: Chapter 9

Week 13: Chapter 9

Week 14: Credit Card

Week 15: Mortgage

Week 16: Finals

**15. SPECIFIC MANAGEMENT REQUIREMENTS\*\*\*:**

**16. FERPA: \***

Students need to understand that their work may be seen by others. Others may see your work when being distributed, during group project work, or if it is chosen for demonstration purposes. Students also need to know that there is a strong possibility that your work may be submitted to other entities for the purpose of plagiarism checks.

**17.** **ACCOMMODATIONS: \***

Students requesting accommodations may contact Ryan Hall, Accessibility Coordinator at [rhall21@sscc.edu](mailto:rhall21@sscc.edu) or 937-393-3431 X 2604.

Students seeking a religious accommodation for absences permitted under Ohio’s Testing Your Faith Act must provide the instructor and the Academic Affairs office with written notice of the specific dates for which the student requires accommodation and must do so no later than fourteen (14) days after the first day of instruction or fourteen (14) days before the dates of absence, whichever comes first. For more information about Religious Accommodations, contact Ryan Hall, Accessibility Coordinator at [rhall21@sscc.edu](mailto:rhall21@sscc.edu) or 937-393-3431 X 2604.

**18. OTHER INFORMATION\*\*\*:**

**SYLLABUS TEMPLATE KEY**

**\*** Item cannot be altered from that which is included in the master syllabus approved by the Curriculum Committee.

**\*\*** Any alteration or addition must be approved by the Curriculum Committee

**\*\*\*** Item should begin with language as approved in the master syllabus but may be added to at the discretion of the faculty member.