

# LL 205 Quantitative Reasoning

**Faculty:** Angie Ross

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<b>Competence Offered</b>	
L-6	Can use mathematical symbols, concepts and methods to describe and solve problems.

**Credit Hours:** 4 Quarter Hours

## Course Description

This course will cover basic algebraic and statistical concepts. Students will learn computational skills ranging from basic variable representation and use of formulas to data organization and graphing. The basic skills needed for comprehension will be reviewed as each new concept is introduced. Scientific calculators and the Excel spreadsheet program will be used as tools for exploring algebraic and statistical concepts. Quantitative reasoning will be a large part of the class discussion.

## Specific Learning Outcomes:

1. Understands the symbolic system presented in algebraic equations so that indicated relationships have an attainable meaning.
2. Can perform basic algebraic operations including manipulating algebraic formulas and equations.
3. Can organize data and perform basic statistical calculations.
4. Has ability and confidence to think deductively and numerically about relationships among operations, numbers and variables.

By the end of this class, students will be able to:

- Use the basic algebraic properties.
- Use problem-solving techniques.
- Use and manipulate percentages.
- Solve linear equations.
- Use and manipulate formulas.
- Use a calculator to evaluate formulas.
- Create and organize data sets.
- Interpret and produce meaningful graphs and charts.

**Evaluation & Grade Policy:** Grades are based on quizzes, homework and class participation.

Quizzes	Homework Sets	Other
5 @ 20 pts each	3 @ 40 pts each	Class Participation @ 20 points
Total Points: 100	Total Points: 120	1 paper @ 30 pts. Total Points: 50

Total Points Possible: 270 (Also see 10 Week Plan)

Grading Scale	
90% - 100 %	A
80% - 89 %	B
70% - 79 %	C
60% - 69%	D
Less than 60%	F

Any grade lower than C- is unacceptable for the SNL program.

**Attendance:** Attendance is important and mandatory. Missing more than two classes (or 6 hours of class time) will adversely affect a student's grade and can result in a Failing Grade for the quarter.

**Textbook:** There is a required text for this class (see below). Additional notes and worksheets for each unit may be available on the class website on Blackboard.

Essentials of: Using and Understanding Mathematics: a Quantitative Reasoning Approach  
 Jeffrey O. Bennett & William L. Briggs, Addison Wesley, 2003  
 ISBN 0-321-20559-6

This should be purchased with Web Support:  
 My Math Lab Student Access Kit (MML SAK)

**Extra Help:** Will be discussed during the first class session.

Essentials of  
 Using and Understanding Mathematics  
 A Quantitative Reasoning Approach  
 Bennett & Briggs 2003  
**10 WEEK PLAN**

**Week 1**

- ◆ Go through Syllabus & run through QR 10 week Schedule  
 Sharing  
 Grades posted on Blackboard  
 Website support and quiz info  
 Tutoring
- ◆ Hand out Autobiography Guidelines for paper (30 points) – due Week 3

**Chapter 2: Approaches to Problem Solving**

Unit 2A: The Problem-Solving Power of Units  
 Pgs. 72-73 Review Working with Fractions

- Chinese Tower to reduce fractions

\* Changing Fractions to Decimals and Decimals to Fractions  
 In class groups do: Pg. 83 (1, 3, 5 a, f, c, h)

Pg. 70-72 Units- You can't add apples and oranges  
 Pg. 73-74 Unit Conversions  
 Pg. 74 Conversion Factors  
 Pgs. 75-76 Conversions with Units Raised to Powers  
 In class groups do: Pgs. 84 (9, 11, 13)

No HW due next week – start on assignments for week 3 and always work on practice problems from text that we did, did not finish, and did not do

## Week 2

### Review

Pgs. 76-78 Currency Conversions

Pgs. 79-80 Problem Solving with Units

Pgs. 80-82 Using Units to Check Answers & Using Units to Help You Solve Problems

In class groups do: Pgs. 84-85 (15-29 odds)

Unit 2B: Standardized Units: More Problem Solving Power

Pgs. 87-90 Standardized Unit Systems U.S. and Metric & The U.S. Customary System

Pg. 89 Practical Matters: Gems and Gold Jewelry- concentrate on % of gold karat- fraction to decimal /24, x grams,  $\div 0.2$  = weight in carats of gold

Pg. 91 Review Powers of 10 (+, -, x,  $\div$ )

In class groups do: Exercises Pg. 97 (1-3 odds)

Pgs. 90 & 92 International Metric System

Pgs. 92-93 Metric-USCS Conversions

Pgs. 93-94 Temperature Units: Fahrenheit, Celsius, and Kelvin

In class groups do: Pg. 98 (5-7, 9 a,c,e, 11 a,c odds)

Pgs. 94-97 Units of Energy and Power

In class groups do: Pg. 99 (25, 27, 29, & 33)

Unit 2C: Problem Solving Guidelines and Hints

Pg. 102 Read through 4-step Problem-Solving Process

Math Autobiography HW due next week will share and then turn in– and always work on practice problems from text that we did, did not finish, and did not do

Next Week Open Book and note Quiz on 2A&B (20 points)

## Week 3

Share Math Autobiography and then collect all (worth 30 points)

### Review

## Chapter 3: Numbers in the Real World

Unit 3A: Uses and Abuses of Percentages

Pg. 119 Review Percentages (%-fraction-decimal)

Pgs. 118 - 124 Three Ways of Using Percentages (Fractions, Describe Change, Comparisons)

In class groups do: Pg. 132 (1-19 odds)

Pgs. 124-126 Of Versus More Than

Pg. 125 Review What is a Ratio?

Pgs. 126-127 Percentages of Percentages

In class groups do: Pgs. 133 (21-27 odds)

### ◆ Units 2A & B Quiz Open Book

Pgs. 127-129 Solving Percentage Problems

Pgs. 129-131 Abuses of Percentages

In class groups do: Pg. 134 (29-41 odds)

Unit 3B: Putting Numbers in Perspective

Pg. 136&138 Writing Large and Small Numbers-Scientific Notation

Pg. 137 Review of Scientific Notation

In class groups do: Exercises Pg. 148 (1-5 a, c, & e odds and 9-13 odds)

Pgs. 138-140 Giving Meaning to Numbers  
Pgs. 140- 144 Perspective Through Estimation, Comparisons, Scaling  
In class groups do: Pgs. 148-149 (1 a&f, 3 d&f, 5c, 9, 13, 17, 23, 29, 35, 37, 45)

Next Week Open Book and note Quiz on 3A&B (20 points) & always work on practice problems from text that we did, did not finish, and did not do

#### Week 4

Review

Unit 3C: Dealing with Uncertainty

Pgs. 151-153 Significant Digits (Important: Pg. 153 Ex. Rounding with Significant Digits)

Pg. 153 Review Rounding

In class groups do: Pg. 161 (1-15 odds)

Pgs. 153- 157 Understanding Errors (Random, Systematic, and Absolute Versus Relative)

#### ◆ Units 3A & B Quiz Open Book

Pgs. 157- 159 Describing Results: Accuracy and Precision

Pgs. 159-160 Combining Measured Numbers

In class groups do: Pgs. 162-163 (17-43 odds)

Unit 3D: How Numbers Deceive: Polygraphs, Mammograms, and More

Pgs. 164-166 Better in Each Case..., & Is it Discrimination?...

Pgs. 167-168 Does a Positive Mammogram Mean Cancer?

In class groups do: Exercises Pgs. 171-172 (1-3 odds)

Pgs. 168-170 Polygraphs and Drug Tests

Pgs. 170-171 Political Math

In class groups do: Pgs. 173-174 (5-11 odds)

Next Week Open Book and note Quiz on 3C&D (20 points)

#### Week 5

Review

#### Chapter 4: Financial Management

Review

Look at Pg. 222 – all formulas for you!

- ◆ Hand out Review WS and practice problems with Exponents  
In class groups do: Practice problems with Exponents (definitely do #s 7&8)

- ◆ Units 3C & D Quiz Open Book

- ◆ Hand out Review WS and practice problems with Substitution  
In class groups do: Practice problems with Substitution

Pg. 189 Review - Three Basic Rules of Algebra

- ◆ Hand out Review WS and practice problems with Solving 1- and 2-step equations  
In class groups do: Practice problems with Solving Equations

Unit 4A: The Power of Compounding.

Pgs. 178-185 Simple Versus Compound Interest, Compound Interest Formula, Compound Interest as Exponential Growth, & Calculations for Different Compounding

In class groups do: Exercises Pg. 191 (1-19 odds)

Pgs. 185-188 APY

In class groups do: Pgs. 191-192 (21-35 odds)

Pgs.188&190 Planning Ahead with Compound Interest

In class groups do: Pg. 192 (37-45 odds)

Unit 4B: Savings Plans and Investments

Pgs. 200-201 Review- Algebra with Powers and Roots

- ◆ Hand out Review WS and practice problems with Radicals and Roots  
In class groups do: Practice problems with Radicals and Roots

## Week 6

Review

Pgs. 194-197 Savings Plans (The Savings Plan Formula)

Pgs. 197-199 Planning Ahead with Savings Plans

Pgs.199-202 Total and Annual Return

In class groups do: Exercises Pgs. 203-204 (1-29 odds)

Unit 4C: Loan Payments, Credit Cards, and Mortgages

Pgs. 205-210 Loan Basics, Installment Loans, Choices of Rate and Term

In class groups do: Exercises Pg. 218 (1-15 odds)

Pgs. 210-212 Credit Cards

In class groups do: Pg. 219 (17-23 odds)

Pgs. 212-217 Mortgages, Fixed Rate Mortgages, Prepayment Strategies, ARMs, & The Mortgage Interest Tax Deduction

In class groups do: Pg. 220 (25-37 odds)

- ◆ Hand out HW 4C WS

Next Week Open book and note Quiz on Units 4A& B (20 points)

## Week 7

Review

Collect HW 4C

- ◆ Units 4A& B Quiz Open Book

## Chapter 5: Statistical Reasoning

Unit 5A: Fundamentals of Statistics

Pgs. 224-230 How Statistics Works, The Process of Statistical Study, Choosing a Sample, & Watching Out for Bias

In class groups do: Exercises Pg. 236 (1-5 odds)

Pgs. 230-235 Types of Statistical Study, The Placebo Effect & Blinding, Case-Control Studies, & Surveys & Opinion Polls

In class groups do: Pgs. 236-237 (7-39 odds)

Unit 5B: Should You Believe a Statistical Study?

Pgs. 239-247 Guidelines 1-8

In class groups do: Exercises Pgs. 247-249 (1-17 odds)

Unit 5C: Statistical Tables and Graphs

Pgs. 249-257 Frequency Tables, Binning Data, Bar Graphs & Pie Charts, & Histograms & Line Charts

In class groups do: Exercises Pgs. 258-260 (1-21 odds)

## Week 8

Unit 5D: Graphics in the Media  
Pgs. 261-270 Graphics Beyond the Basics, & A Few Cautions About Graphics  
In class groups do: Exercises Pgs. 271-275 (1-19 odds)

Unit 5E: Correlation and Causality  
Pgs. 276- 281 Seeking Correlation  
Pgs. 281-285 The Search for Causality  
Pg. 286 Confidence in Causality  
In class groups do: Exercises Pgs. 287-289 (1-21 odds)

Unit 5F: Characterizing a Data Distribution  
Pgs. 290-298 What is Average?, & Shapes of Distributions  
In class groups do: Exercises Pgs. 298-300 (1-17 odds)

- ◆ Hand out HW 5A, B, E, & F WS

Next Week Open book and note Quiz on Units 5C& D (20 points)

## Week 9

Review  
Collect HW 5A, B, E, & F WS

- ◆ Units 5C& D Test 4 Quiz Open Book

- ◆ Course Evaluations

Review

## Chapter 6: Probability: Living with the Odds

Unit 6A: Fundamentals of Probability  
Pg. 307 A Brief Review - The Multiplication Principle  
Pgs. 304-312 Theoretical Probabilities, Empirical Probabilities, Subjective Probabilities,  
Probability of an Event Not Occurring, Probability Distributions, & Stating the Odds  
In class groups do: Exercises Pgs. 313-315 (1-35 odds)

Unit 6B: Combining Probabilities  
Pgs. 316-324 *And* Probabilities, *Either/Or* Probabilities, The *At Least Once* Rule, Return to the Chevalier  
In class groups do: Exercises Pgs. 324-325 (1-23 odds)

Unit 6C: The Law of Large Numbers  
Pgs. 326-333 Expected Value, & The Gambler's Fallacy  
In class groups do: Exercises Pgs. 333-335 (1-21 odds)

Unit 6D: Counting and Probability  
Pg. 340 A Brief Review - Factorials  
Pgs. 337-346 Arrangements with Repetition, Permutations and Combinations, & Probability and Coincidence  
In class groups do: Exercises Pgs. 346-348 (1-33 odds)

- ◆ Hand out HW 6C&D WS

Next week quiz on Units 6A& B (20 points)

## **Week 10**

- Review
- Collect HW 6C & D WS
- ◆ Units 6A& B Test 4 Quiz Open Book

△ Plan Subject to Change