

DePaul University School for New Learning
Course Syllabus
LL 205: Quantitative Reasoning -- Credit Hours: 4

Term and Campus: Fall 2018, DePaul Loop Campus

Dates: Thursdays, Sep. 6 through Nov. 15, 2018. Note: Eleven class meetings, includes Exam Week.

Class Time: 5:45 – 9:00 p.m. **Room:** Lewis 1411

Faculty: Eric Thor, 5504 N. Sawyer Ave., Chicago, Illinois 60625

Phone: Home 773-588-0482. Telephone is the best way to contact me. Cell # to be given in class.

E-mail: ethor@depaul.edu

Office Hours: Class days before or after class, also via phone or appointment or Study Group.

Competence Offered (4 credit hours):

L-6: “Can use mathematical symbols, concepts, and methods to describe and solve problems.

1. Understands how variables are expressed and transformed through symbolic representations.
2. Interprets complex relationships of variables expressed verbally or symbolically.
3. Employs a mathematical process to explain or solve a problem.”

We are mandated, not just to solve math problems that someone else presents to us, but also to consider and discuss life situations, sometimes asking, then solving, our own questions. We seek to communicate clearly while using math to understand (and possibly influence) our world.

Text and Materials: Prices approximate.

REQUIRED:

1. “Using & Understanding Mathematics” softcover text **Custom Edition for DePaul Univ.**

2. A new “MyLabsPlus Student Access Kit,” giving you a Pearson website access code.

These TWO items are sold new, packed together in a shrink-wrapped set, \$155.

NOTE: BUY THIS SET, ISBN 978-1-3238-1938-8, NOT INDIVIDUAL ITEMS:

a. **Save money; buy the shrink-wrapped set.**

b. **Buy at DePaul Barnes & Noble bookstore**, 1 E. Jackson in Loop. Not found elsewhere.

c. **If in doubt**, contact Eric Thor before buying, or call Loop bookstore at 312-362-8795.

3. **Scientific calculator.** A two-line display is best, such as the TI-30XIIS, \$20.

SUGGESTED:

“**Barron’s Mathematics Study Dictionary.**” Barron’s Educational Series, 1998, author Frank Tapson, softcover book, ISBN 978-0-7641-0303-2. Out of print, probably used, price varies.

Course Requirements:

- **Attend and participate** actively every week. We get together to **do** math, not just to watch. Missing any classes is strongly discouraged.
- **Stay current** on assignments, and submit work every week, even if it’s incomplete. You can always improve your work later and submit it again for a better grade.
- Follow DePaul University guidelines on academic integrity, as found in the Student Handbook. Summarized in three words: “**Tell the truth!**” In our math class, this means: “Get all the help you may need, but don’t turn in somebody else’s work as your own. Do the problems yourself.”
- **Show lots of work**, both to clarify your own thought processes and to inform your readers.
- **Goal:** Be able to explain a situation, what you did with it, and why you believe in your result.

Work and Assessment: What to expect.

Eleven class meetings. Weekly assignments on Pearson's MyLabsPlus. Weekly class 'WorkSheet' activities. Midterm test and cumulative final exam. Build your own 'Open Notes Help Sheet.'

Your term grade will be based on the following weighted factors:

30% Class attendance and participation. Be there, and be active.

50% Assigned problems & other resources on Pearson's MyLabsPlus. Goal: Use website every day!

10% 'Worksheets,' 'Show & Tell,' & Midterm. Participation outweighs scores on these activities.

10% Final Exam score. Use your 'Open Notes Help Sheet.'

The grading scale will be:	90-100% = A	60-69% = D
	80-89% = B	0-59% = F
	70-79% = C	

By default, course is graded A, B, C, D, or F. You may request Pass/Fail grading, deadline 10-18-2018. In Pass/Fail grading, "C" or better (70% or better) is needed to pass and earn a "PA" grade, which would not affect your GPA. However, a Pass/Fail "F" would affect GPA, just as any other "F" would.

To be eligible for an Incomplete ("IN") grade, you must already be passing the course at "C" or above.

For Extra Help:

- Communicate with other students using our voluntary phone & email contact list.
- Organize or join a 'Study Group.'
- Join us 30 minutes early on class days for voluntary tutoring and problem-solving.
- Call me or send text any day, 10 a.m. til 10 p.m. I am a good telephone tutor; try me and see.
- Work with a tutor. Look or ask, and you'll find there are many options at DePaul or elsewhere.
- Use Pearson MML+, DePaul D2L, Khan Academy, Physics4Kids, and other websites for help.
- Acquire auxiliary math books or laminates. Start with your public library and DePaul's libraries.
- Be kind to yourself: take a break; take a walk; take a nap. Good things can happen when you relax and let your mind get a fresh start on a problem. And, as I will repeat many times, "Don't worry." Fear *can* motivate for a while, but mostly it interferes with learning and performance.

Description of Quantitative Reasoning Course:

Our course can help you prepare for other college courses, function effectively in a career, and use 'critical thinking' to handle issues of daily life. Our text authors say, "...look at mathematics in three ways: as the sum of its branches, as a way to model the world, and as a language." I see math as a big collection of useful multi-purpose tools, and a great way to think and communicate clearly. "But," you ask, "why choose these particular chapters and topics for our brief DePaul SNL course?" I reply:

Arithmetic and its abstracted cousin, algebra, provide basic ground rules and common language for quantitative discussions. Arising from nature itself, they have been organized and extended by human effort over thousands of years. They give us the words and grammar we need to move beyond English and become functionally literate in 'Math-Speak.'

It's a wild world out there. Logic, critical thinking, and financial management skills help us choose and sail our own life courses, instead of being buffeted by storms of confusion or deception.

Statistics and data analysis are crucial in our society and its technologies. Collecting, processing, and using information affects our lives, more often than we may realize. Each of us has the right and the responsibility to be engaged -- we really can't afford to just leave decisions up to the 'experts.'

My goal is that each student be ready for life-long use and learning of mathematics at some personally appropriate level. I expect you to participate and improve, not to be, or become, perfect.

Your Learning Experience: Hints for success with math:

You already have a foundation. We'll build on it. Many math words are also used in everyday English, usually with related meanings. You probably know more about math and use it more often than you realize. Watch for connections between previous knowledge and the curriculum of this course. While moving ahead, **use your past; don't leave it behind.**

Be an efficient learner. Find and remember the general essence of material, and apply it when appropriate. For example, I'll teach you a simple algorithm (set of instructions) to calculate an approximate square root of any number. Focus on the process and the context, not just the numbers, to get the most value from the activity. With a 'big-picture' understanding of all situations that involve roots, and all such algorithms, you'll have new power to open many doors.

Do you experience math anxiety? Ever suffer like the man in "Hell's library"? (Ask me about the cartoon.) If so, **don't give up.** Even more important, don't stagger under unreasonable self-imposed expectations, labeling yourself as incompetent or incapable. Surprise! You're not supposed to move directly and confidently to every problem's solution! **Let yourself enjoy a good puzzle.**

Slow down, relax, and think. See yourself as a lucky person – a thinker with a challenging puzzle in hand and plenty of time to spend on it. You needn't rush to an answer. First, make sure you **understand the story.** Realize that unstated assumptions, deliberate or unintended ambiguities, even outright errors, could all misdirect you. A chosen road may lead you to a dead-end. If so, don't quit. Turn around, backtrack, and re-examine the context while you ponder a new start.

Look for options to break down or skip around barriers. Often, you can **translate** the same material between different formats (e.g. numerical, symbolic, physical, geometric, pictorial, chart, or word problem versions). Skills or insights from one format may help you understand and function in other formats. Finding your own path through the wilderness can make math fun and exciting!

Experiment with these **problem-solving strategies** for more success and less grief: Look at the big picture. Categorize and organize. Make drawings/charts/graphs/physical manipulatives. State the obvious. Carry to extremes. Guess-check-adjust. Doodle. Engage in wishful thinking. Work backwards. 'Mask' your troubles (postpone the difficult). Pause for a quick reality check ('QRC'). Proof-read! And always confirm proposed answers by checking back to the original situation.

Use memory aids, because memory fades. Don't pretend to have the proverbial photographic memory. Do build, and use, a tool kit of mnemonics (memory aids). Take notes, use acronyms or other reminder cues, and learn how to re-create that which was known but has been forgotten. We'll share study and memory aids, always aware that the best aid is the one that works well for you.

Your Action Plan: Establish the habit of thinking quantitatively every day. Some suggestions:

Sit down and work on this course for at least one hour every day. Think about math during other times, such as while taking a walk, riding the bus, reading a newspaper, watching TV, eating, washing dishes, or preparing to sleep. Mull over a problem you are stuck on, think up new questions, or review old material. Plan and do 'Show & Tell.' Keep your scratch papers and **create a useful note-book.**

Focus on the **stories**, more than on the numbers. As one poet said, "The universe is made of stories, not atoms." **Don't start doing arithmetic too soon.** First, be sure that you really understand the story. What is known? What are the constraints? What is sought? Second, devise a plan. Third, carry out your plan. Fourth, look back and check. (See George Polya, "How To Solve It.")

Exercise your mind using **multiple learning styles**, the academic equivalent of cross training in physical sports. Read each section of your text at least twice. Talk things out in groups; do and turn in homework weekly. Make brief presentations to class or to a small group. Start now on your '**Open Notes Help Sheet**' to use whenever in doubt. Reading, listening, or watching are all valuable. Sharing, talking, and doing are priceless. Give your mind a well-rounded workout in several venues every week. Your confidence and abilities will grow as you expand your 'circle of comfort.'

Think, don't worry. Worrying wastes energy. Use your valuable energy productively to build up understanding and skill. Think about solving problems, not about having problems.

Week-by-Week: See page 5 of this syllabus for “Schedule of Topics.” Don’t fall behind!

‘WorkSheet’ assignments will be given during the term. Turn in your papers.

Do Pearson MyLabsPlus online assignments, (“Thor...”), keyed to weekly Topics.
ALWAYS LOG ONTO PEARSON WITH THIS URL: <https://mylabsplus.depaul.edu>

How to get started in the course:

Read Custom Text Unit 1A “Working With Units” pages 2-24, also the “Chapter Summary” page 51. Do “Quick Quiz” questions 1-10 on pages 20-21. Explain your answers. Look in text pages 397 and 469 to find answers and solution methods for chapter exercises. Use them for checking and guidance, but please, don’t just copy them!

This introduces you to the layout of the text and to the material on problem-solving methods.

Browse in “Barron’s Mathematics Study Dictionary.” Page references (see syllabus page 5) are chosen to enhance understanding of each week’s topics. Please check those pages regularly, plus any others that interest you. There are no actual assignments from the dictionary.

Many excellent resource books could boost your mastery and enjoyment of quantitative material. Try a library or bookstore. One I love is “Adam Spencer’s Book of Numbers” by Adam Spencer.

Your Instructor: Eric Thor

I believe strongly in lifelong learning and teaching. Since 1975, I’ve taught mathematics in Chicago high schools and colleges. I’ve also taught sailing and other outdoor activities, environmental awareness, and computer applications to adults and to children. At various times I’ve worked in manufacturing, sales, and stock market investing.

I’m still learning. I enjoy reading, both fiction and non-fiction, especially on historical, psychological, and science topics. I enjoy television – favorites include Turner Classic Movies, Public Television, Book TV and American History TV (on C-SPAN2 and 3), and reruns on H&I-TV. I pay attention to ads and commercials, and often react to the faulty logic, as well as the fascinating facts, found therein. (Ask me about a good-sounding piano, or moving a ton of freight by railroad.)

Sailing, philately, physical activity, travel, friends, family, gardening, and food bring me great pleasure. Environmental degradation, climate change, over-population, abuse of scarce resources, and misuse of dangerous materials are my greatest concerns.

Guess what? Everywhere I look, I find applications of logic and math, which may help explain why my love for these fields has grown through the years, not diminished.

My degrees are B.A. History, and M.S. Teaching Mathematics, both from the University of Illinois at Chicago. “Thank you!” to professors Grant O. Gale, A. I. ‘Izzy’ Weinzweig, Irwin K. ‘Bud’ Feinstein, and others who educated and inspired me in so many ways.

Last Words:

Please feel free to call or write anytime to share experiences or ask questions. Hearing from former students is one of the great joys of being a teacher. But, I’m not on social media such as Twitter, Facebook, LinkedIn, etc., so please reach me in ‘old-fashioned’ ways (U.S. mail, phone, or email).

Call my home or cell phone, any day, from 10 a.m. to 10 p.m..

Text to my cell phone number, or email to ethor@depaul.edu, at any time.

Thanks for reading this far. Let’s have a worthwhile and fun course!

Schedule of Topics
Fall 2018, Loop Campus, Thursday nights
 DePaul SNL LL 205 Quantitative Reasoning

Day #	Class Date	Custom Text Units & Topics: Work Due on this date.	Barron's Math Study Dictionary: Helpful pages & topics for this week.
1	Sep. 6	Introductions Questions & Answers re: Course, etc. Some Basics of Math: "Use the Rules" Start working on assignments	6-9 Algebra: Basics, Equations 14-15 Arithmetic: Basics 38-41 Shapes, Formulas, Fractions, Percents 86-87 Sets, Venn Diagrams
2	Sep. 13	1 A Working with Units	2-3 Abbreviations, Mnemonics 50-51 Kinematics, Speed 62-67 Number: Forms, Systems, Sets 88-89 Space, Shapes, Area, Volume 106-107 Temperature 116-119 Units, Conversions, SI ('Metric Sys.')
3	Sep. 20	1 B Problem-Solving with Units 1 C Problem-Solving Guidelines & Hints	16-19 Arithmetic: Commercial, Four Rules 36-37 Factors, Multiples, Primes 98-101 Structures, Rules, Symbols 104-105 Techniques, Proportion, Exponents
4	Sep. 27	2 A Use vs. Abuse of Percentages 2 B Put Numbers in Perspective	4-5 Accuracy, Significant Digits 52-55 Logic 68-69 Pi, Approximations 110-111 Transformations, Scale Factors
5	Oct. 4	2 C Dealing with Uncertainty 2 D Index Numbers: CPI & beyond 2 E How Numbers Can Deceive Midterm Test: 1st two chapters plus...	16-17 Arithmetic: Commercial 34-35 Eponyms 122-127 Word: Confusions, Origins, Uses 128 x,y,z: Math Notation & History
6	Oct. 11	3 A Taking Control of Your Finances 3 B The Power of Compounding	76-77 Probability, Tree Diagrams 80-81 Quadrilaterals 112-113 Triangles
7	Oct. 18	3 C Savings Plans & Investments 3 D Loans, Credit Cards, Mortgages Last Date to Request Pass/Fail Grading	12-13 Angles 48-49 Information, Spreadsheets, Bytes 90-97 Statistics
8	Oct. 25	4 A Fundamentals of Statistics 4 B Believe a Statistical Study? 4 C Statistical Tables & Graphs Optional Syllabus Essay Deadline	22-27 Circles, Circle-Based Shapes 28-29 Coordinate Systems, Graphs 44-47 Circles, Pie Charts, Graphs
9	Nov. 1	4 D Graphics in the Media 4 E Correlation & Causality	30-31 Curves, Asymptotes 46-47 Graphs: Linear vs. Exponential
10	Nov. 8	6 A Growth: Linear vs. Exponential 6 B Doubling Time & Half-Life 6 C Real Population Growth 6 D Logarithmic Scales: Earthquakes, ...	10-11 Algebra: Functions 62-63 Exponents, Logarithms
11	Nov. 15	Final Exam: Cumulative on all topics. Review Final Exam and Course Lifelong Learning	60-61 Number Diversions 82-83 Recreational Math (Games) 102-103 Symmetry

Fall 2018 QR **Chapter & Page Numbers:** Softcover Custom Text vs. Online Text

Custom Text Chapter #	Online Text Chapter #	TITLE OF CHAPTER, with its units
1 page 2	2	APPROACHES TO PROBLEM SOLVING A. Working with Units B. Problem-Solving with Units C. Problem-Solving Guidelines & Hints
2 page 52	3	NUMBERS IN THE REAL WORLD A. Uses & Abuses of Percentages B. Putting Numbers in Perspective C. Dealing with Uncertainty D. Index Numbers: The CPI and Beyond E. How Numbers Can Deceive: Polygraphs, etc.
3 page 118	4	MANAGING MONEY A. Taking Control of Your Finances B. The Power of Compounding C. Savings Plans & Investments D. Loan Payments, Credit Cards, & Mortgages E. Income Taxes (Skip Unit E.) F. Understanding the Federal Budget (Skip Unit F.)
4 page 218	5	STATISTICAL REASONING A. Fundamentals of Statistics B. Should You Believe a Statistical Study? C. Statistical Tables & Graphs D. Graphics in the Media E. Correlation and Causality
5 (pg 292)	7	PROBABILITY: LIVING WITH THE ODDS (Skip this chapter.)
6 page 354	8	EXPONENTIAL ASTONISHMENT A. Growth: Linear versus Exponential B. Doubling Time and Half-Life C. Real Population Growth D. Logarithmic Scales: Earthquakes, Sounds, & Acids (We will look briefly at Unit D.)
--	1	THINKING CRITICALLY (Recommended.)
--	6	PUTTING STATISTICS TO WORK
--	9	MODELING OUR WORLD
--	10	MODELING WITH GEOMETRY
--	11	MATHEMATICS AND THE ARTS
--	12	MATHEMATICS AND POLITICS (Recommended.)