

Reasoning with Mathematics

The University of Toledo
Mathematics & Statistics Department, College of Natural Sciences and Mathematics
MATH 1180-xxx, CRN xxxxx

Instructor: xxxx	Class Location: xxxx
Email: xxxx	
Office Hours: xxxx	Class Day/Time: xxxx
Office: xxxx	
Office Phone: xxxx	Credit Hours: 3
Term: xxxx	

CATALOG DESCRIPTION

[3 credit hours] Reasoning with Mathematics will prepare students for an increasingly information-based society in which the ability to use and critically evaluate information, especially numerical information, is central to becoming an informed citizen. Students will acquire the skills necessary to make rational decisions based on real data. They will be exposed to general methods of inquiry that apply in a wide variety of settings. They will be able to assess arguments and make rational decisions. Finally, students will develop the ability to judge the strengths and limitations of quantitative approaches in topics such as percentages, managing money, statistical literacy, variation, linear vs exponential growth, exponential modeling, proportion, and voting methods.

PREREQUISITES

Satisfactory ACT or SAT Math score or satisfactory placement test score. To be successful in this class, you should be comfortable adding, subtracting, multiplying and dividing signed numbers and fractions, and familiar with the use of variables.

REQUIRED MATERIALS

- You do not need to purchase anything for this course. The text/course materials will be provided and the cost is included in your course fees. This course includes an e-text of *Using and Understanding Mathematics, 6/E*, Bennett/Briggs, Pearson/Prentice Hall.
- Scientific or Graphing calculator.
- Laptop or Smart Device

COURSE SYLLABUS & SCHEDULE

Along with this syllabus, a course schedule is posted within your Blackboard course and/or MyMathLabs at: [Course Tools > Document Sharing > Syllabus and Schedule..](#)

GRADING POLICY & GRADING SCALE

Assignment Type	Overall % Value
Participation	15%
Group Projects (1-3)	24%
Group Presentation	9%
Homework MML	15%
Quizzes (1-9)	27%
Final Exam	10%

Grade	-	A-F	+
A	90-92	93-96	97-100
B	80-82	83-86	87-89
C	70-72	73-76	77-79
D	60-62	63-66	67-69
F		0-59	

PARTICIPATION POLICY (15%)

You are expected to be in class, on time, every day. Due to the amount of group activity, your promptness and participation is absolutely critical. Participation is worth 15% of your overall grade.

Project Participation 1-3 (15%): Each project will have two milestones before the final due date, worth 2.5% of the participation grade. For each milestone, a MML quiz will be taken to rate group member progress and provide evidence of participation. If you are rated 3 or less by at least half of your current project group, your credit for the corresponding milestone may be stripped from you. Any late or incomplete milestone quiz will receive zero credit.

GROUP PROJECTS (1-3) (24%)

Every 3-4 weeks, a group project will be due. Your groups will be randomly determined before each group project. Groups will vary throughout the semester. For each project, there will be 7-8 groups with 3-5 students in each. If you are absent the day that groups are assigned, it is your responsibility to speak to your instructor immediately to be placed into a group.

Only one representative paper per group will be accepted, and the group grade for this one paper will go towards ALL members of the group. However, collaboration between individual group members goes towards the project participation grade. You are responsible for keeping your group members on task, and you should be as collaborative as possible because individual projects will not be accepted!

If there is a serious issue within your group, consult your instructor immediately and not after a project is due.

GROUP PRESENTATION (9%)

On each Project Due date, two corresponding groups will present its conclusions to the rest of the class. The presentation will be graded upon the following criteria:

- Groups visual aids. 25%
- Groups interaction with the class. 25%
- Individual presents correct information. 25%
- Individual presents professionally. 25%

HOMEWORK (15%)

There will be homework given in MyMathLab for each day we meet. Homework is always due one week after it is discussed in class. Due dates for these assignments correspond to the attached schedule and are not subject to change. You are responsible for keeping track of test, project, quiz, and homework due dates. Last minute technology failures are not excuses for late online homework. It is assumed you will start your work early and finish at least one day before the due date! Late homework is not accepted. Much of the homework on MyMathLab consists of the math skills needed for completing your projects.

QUIZZES (1-9) (27%)

At the end of each week, a quiz will be given. Some will be an individual task while others will be group oriented. These quizzes combine skills from the online homework and in-class group work. No make-ups will be allowed without prior consent.

FINAL (10%)

The final exam will be an individual task and will consist of a mixture of online homework, reasoning questions and similar challenges that are within our projects, quizzes, and activities. Make up exams will not be granted without prior consent or an excuse that meets university guidelines given below.

CO-REQUISITE

Our class is split up into two parts, the parent course (MW) and the co-requisite (TR). In the co-requisite we will be working on assignments pertaining towards the parent course. We will be working on activities, homework, and quiz prep. There will be no additional homework assignments, but participation during class is essential. After project 1 and project 2 grades are in, each student has the opportunity to place out of the co-requisite. To place out of the co-requisite you must have a grade of 80% and set up an appointment with your instructor to discuss your options.

ATTENDANCE POLICY

You are expected to be in class on time, every day. Due to the amount of group activity, your promptness and participation is absolutely critical. Attendance will be earned each day by participation and/or submitting of that day's assignment at the end of class. A student coming tardy, leaving early, or absent for an extended period during the class will receive a zero attendance score. **If you earn more than four days' worth of zero attendance scores, that do not follow university guidelines, you will continue to lose 5% of your overall grade for everyday beyond the fourth zero attendance score, unless approved by the chair of the Mathematics and Statistics department.**

CLASSROOM RULES AND ETIQUETTE

- The classroom is to be used only for work on Math1180.
- No text messaging, facebooking, googling, emailing, game playing, or working on assignments for other classes. If you are caught texting, you can be forced to leave the classroom
- Be considerate of your classmates and instructor in asking and answering questions, entering, leaving or moving around the classroom.
- Students arriving early for class should wait in the hallway until the previous class has left the room.
- If you fail to comply with any of these rules, you may be asked to leave the classroom.

SOME ADVICE FOR SUCCEEDING IN THIS CLASS

- Attend class regularly and **complete your assignments by the due dates**.
- Schedule sufficient time to devote to this course outside of class.
- Don't hesitate to ask questions, either in class or during your instructor's office hours. If you can't make it during those office hours, make an appointment or make contact by email.
- Get help at the first sign of confusion. Don't wait.
- Become familiar with your group. Get each other's contact information. Take turns explaining the material to each other. Teaching someone else is the best way of learning.

LEARNING RESOURCES

- Your instructor is available for extra help during office hours.
- Study Tables are also specifically created for this class. Use them!!!
- Free math tutoring on a walk-in basis is available in the **Math Learning and Resources Center** in the lower level of Carlson Library. Tentative Hours: MR 10am-8pm, TW 10am-9pm, F 10am-2pm.

THE UNIVERSITY OF TOLEDO'S POLICIES

- **ACADEMIC DISHONESTY**

Any act of academic dishonesty as defined by the University of Toledo policy on academic dishonesty (found at <http://www.utoledo.edu/dl/students/dishonesty.html>) will result in an F in the course or an F on the item in question, subject to the determination of the instructor. Please note that any use of, or visibility of, a cell phone or smart watch (or any other device capable of connecting to the internet or storing information, or anything not approved by the instructor) during a test, quiz or exam will be considered academic dishonesty.

- **POLICY STATEMENT ON NON-DISCRIMINATION ON THE BASIS OF DISABILITY (ADA)**
The University is an equal opportunity educational institution. Please read The University's Policy Statement on Nondiscrimination on the Basis of Disability Americans with Disability Act Compliance.
- **ACADEMIC ACCOMODATIONS**
The University of Toledo is committed to providing equal access to education for all students. If you have a documented disability or you believe you have a disability and would like information regarding academic accommodations/adjustments in this course please contact the Student Disability Services Office (Rocket Hall 1820; 419.530.4981; studentdisabilitysvs@utoledo.edu) as soon as possible for more information and/or to initiate the process for accessing academic accommodations. For the full policy see: <http://www.utoledo.edu/offices/student-disability-services/sam/index.html>
- Academic Dishonesty Policy, Reference: <http://www.utoledo.edu/policies/academic/undergraduate>
- Missed Class Policy, Reference: <http://www.utoledo.edu/policies/academic/undergraduate>
- Grades and Grading Policy, Reference: <http://www.utoledo.edu/policies/academic/undergraduate>

IMPORTANT DATES

- **FINAL EXAM:** All sections: Wednesday, Dec 12 2:45–4:45 p.m
- The last day to **ADD/DROP** classes is **Monday, September 10, 2018**
- The last day to **WITHDRAW** from Fall Semester is **Friday, November 2, 2018**

Note: Instructors cannot withdraw students from class. Any student who has not withdrawn from class by the **withdrawal deadline** will receive a letter grade for this **3 credit hour** course.

Podcast and Media Use Policy: Media produced by the course instructor are solely for class use by students currently registered for the course, and under no circumstances can they be posted, linked to, or made available for distribution or copying to any persons, institutions, or servers (for example, no portion of them may be downloaded and posted on YouTube or sent to friends). This includes media that appears on the course site and in VoiceThread. As the author of these teaching materials the instructor or university holds the copyright (though not to the commercial artworks contained within them), and the only authorized use by students is for the purposes of the course. Violating this policy constitutes a serious infraction of UT's computer use policy and may result in consequences up to and including expulsion from the University and legal action (both criminal and civil) from the various rights holders whose copyrights you may have infringed

Student Learning Outcomes:

- 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 5 pattern behavior, 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 with regard to 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 in light of 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.

Topics	Corresponding Learning Objectives	Co-Requisite Topics
3 Numbers in the Real World -Uses and Abuses of Percentages -Putting Numbers in perspective -Dealing with Uncertainty -Index Numbers: The CPI and Beyond -How Numbers can Deceive	1.1, 1.2, 1.4, 1.1,1.3 1.1 1.1, 2.1	Basic Study Skills Basic Arithmetic Numerical Ordering Proportions Decimal/Fraction Conversions
4 Managing Money -Taking Control of your Finances -The Power of Compounding -Loan Payments, Credit Cards, and Mortgages	1.1, 2.2 1.1, 2.1, 2.2 1.1, 2.1, 2.2	Order of Operations Exponents Evaluating Formulas
5 Statistical Reasoning -Fundamentals of Statistics -Should you Believe a Statistical Study -Statistical Tables and Graphs -Graphics in the Media -Correlation and Causality	3.2 3.1, 3.2, 3.3 3.1, 3.2, 3.3 3.1, 3.2, 3.3 3.1, 3.2, 3.3	Reading Comprehension Reading Graphs Basic Logical Reasoning Correlation
6 Putting Statistics to Work -Characterizing Data -Measures of Variation -The Normal Distribution -Statistical Inference	3.1, 3.2 3.2 3.3	Radicals, Averages Spreadsheet Programs Real World Normal Distributions
7 Probability: Living with the Odds -Fundamentals of Probability -The Law of Large Numbers -Assessing Risk	3.4 3.5 3.4, 3.5	Basic Probability Facts
8 Exponential Astonishment -Growth: Linear versus Exponential -Doubling Time and Half-Life -Real Population Growth	1.2, 2.3, 2.5 2.3, 2.4, 2.5 1.2, 2.3,2.5	Research Tools Calculating Logarithms Approximations
9 Modeling Our World -Functions: The Building Blocks of Math Models -Linear Modeling -Exponential Modeling	2.3, 2.5 1.2, 2.3, 2.5 1.2, 2.3, 2.5	Cartesian Coordinate System Function Notation Slope Modeling
10* Modeling with Geometry -Problem Solving with Geometry -Fractal Geometry	1.3, 2.5 2.3, 2.4	Review Basic Geometry Exponents and Logarithms
11* Mathematics and the Arts -Math and Music -Perspective and Symmetry -Proportion and the Golden Ratio	1.1, 1.3 1.1, 1.3	Review Proportions Sequences
12* Mathematics and Politics -Voting: Does the Majority Always Rule? -Theory of Voting	2.5, 3.3, 3.4 2.5	Review Data Comprehension Averages

*optional

