Marshall University
MTH 160 (CT) Syllabus

Course Title/Number	Applied Mathematical Reasoning (CT) / MTH 160 (CT) Sec 101 (CRN 3036)
Semester/Year	Fall 2016
Days/Time	Monday, Wednesday 9:00-9:50 and Tuesday, Thursday 9:00-10:15
Location	M, W in SH 516; T, R in SH 532
Instructor	Dr. Evelyn Pupplo-Cody
Office	Morrow Library 106
Phone	(304) 696-3047
E-Mail	pupploco@marshall.edu
Office Hours	M, T, W 12:30 – 2:30 and by appointment
University Policies	By enrolling in this course, you agree to the University Policies listed below. Please read the full text of each policy by going to www.marshall.edu/academic-affairs and clicking on "Marshall University Policies." Or, you can access the policies directly by going to www.marshall.edu/academic-affairs/policies/. Academic Dishonesty/Excused Absence Policy for Undergraduates/Computing Services Acceptable Use/Inclement Weather/Dead Week/Students with Disabilities/Academic Forgiveness/Academic Probation and Suspension/Academic Rights and Responsibilities of Students/Affirmative Action/Sexual Harassment

Course Description: From Catalog

Applied Mathematics Reasoning (CT). 5 hrs.
A critical thinking course in applied mathematical reasoning. Topics include logic, problem solving, linear modeling, beginning statistics and probability, exponential and logarithmic modeling, formula use. (PR: Math ACT 19, Math SAT 460, MTH 099, or equivalent)

The table below shows the following relationships: How each student learning outcome will be practiced and assessed in the course.

Student Learning Outcomes	How students will practice each outcome in MTH 160	How student achievement of each outcome will be assessed in MTH 160
Students will demonstrate an ability to analyze arguments and identify fallacies.	Discussions, group work, board work, low-stakes writing, homework Chapters 1 and 2 (Hurley)	Quizzes, exams, and projects
Students will demonstrate an ability to translate natural language arguments into propositional and syllogistic forms.	Discussions, group work, board work, low-stakes writing, homework Chapters 1 and 3 (Hurley)	Quizzes, exams, and projects
Students will demonstrate a proficiency in utilizing formulas, solving equations and inequalities, and graphing the solutions.	Discussions, group work, board work, low-stakes writing, homework	Quizzes, exams, and projects

	Chapter 1 (Timmons et al)	
Students will create tables and graphs from statistical data.	Discussions, group work, board work, low-stakes writing, homework Chapter 2 (Brase)	Quizzes, exams, and projects
Students will analyze and interpret statistical concepts such as measures of central tendency, measures of variation, and normal distributions.	Discussions, group work, board work, low-stakes writing, homework Chapters 3 and 6 (Brase)	Quizzes, exams, and projects
Students will demonstrate a proficiency in the fundamentals of probability including expected value.	Discussions, group work, board work, low-stakes writing, homework Chapter 4 (Brase)	Quizzes, exams, and projects
Students will analyze statistical data and report results.	Discussions, group work, board work, low-stakes writing, homework Chapters 2, 3, 6 (Brase)	Quizzes, exams, and projects
Students will compare linear growth and exponential growth rates and their real-world applications.	Discussions, group work, board work, low-stakes writing, homework Chapters 2 and 5 (Timmons et al)	Quizzes, exams, and projects

Course Objectives

This course will focus on the use of **critical thinking** to understand and interpret mathematical topics that will enable students to develop the quantitative reasoning skills they will need for a career in applied science or criminal justice.

Students will apply the **quantitative thinking** skills that they learn to analyze problems dealing with exponential growth and decay, logarithmic models, and other real-world scenarios.

Students will apply the **inquiry based thinking** skills that they learn to formulate focused questions and hypotheses, and collect and analyze data to draw justifiable conclusions.

Students will apply the **integrative thinking** skills that they learn to make connections and transfer skills and learning across mathematical disciplines and the social sciences.

Students will evaluate the effectiveness of their project plans or strategies to determine the degree of their improvement in knowledge and skills using **metacognitive thinking**.

Students will use their **communication fluency** skills to present their research. Each student will work on short projects on a variety of topics to be determined by the instructor.

Required Texts, Additional Reading, and Other Materials

- Custom text prepared by Cengage ISBN 978-1-305-75805-6
- Notebook
- Calculator
- Microsoft Excel and Word
- Microsoft Mathematics
- Reliable internet access

Course Requirements/Due Dates

Logic Project due on Thursday, September 15, 2016
- Exam 1 (Logic) on Tuesday, September 20, 2016
Algebra Project due on Thursday, October 20, 2016
- Exam 2 (Algebra) on Thursday, October 27, 2016
Statistics Project due on Thursday, December 1, 2016
- Exam 3 (Statistics) on Friday, December 16, 2016 from 8:00 until 10:00

Grading Policy

Each examination (two in-class exams and a final exam) will be worth 20% of the semester grade. Homework and/or quizzes will be worth 15% of the semester grade. Projects will count as 25% of the grade.

90.00 – 100	A
80.00 – 89.99	B
70.00 – 79.99	C
60.00 – 69.99	D
Below 60.00	F

Attendance Policy

Students are expected to attend each class. Unexcused absences from **five** classes will result in a reduction of one letter grade for the semester; unexcused absences from **six or more** classes will result in an F. To obtain an excused absence, talk with Dr. Pupplo-Cody. Students **must** notify the instructor by phone or e-mail **prior to** an exam if they cannot take a scheduled exam. Students must present a serious reason for missing any exam. Makeup exams will be given to students outside of class time at the convenience of the instructor.

Plagiarism Policy

Plagiarism (stealing) will not be tolerated in any way, shape, or form. Students who plagiarize (including sharing files for assignments) will receive a zero for that assignment.

Computers

Students will be required to use Excel and Word. Microsoft Mathematics is optional. Students will need reliable internet access to take quizzes.

Calculators

Students are required to have a scientific or graphing calculator during the course.

Course Schedule and Homework

Date	Section	Topics	Homework
8/22	L 1.1	Arguments, Premises, and Conclusions	7-13/ I 3, 9, 15, 21; II 3, 7; III; IV
8/23	L 1.2	Recognizing Arguments	23-30/ I 3, 7, 19; II 3, 7; IV; V; VI
8/24	L 1.3	Deduction and Induction	37-41/ I 3, 13, 25; II; III
8/25	L 1.4	Validity, Truth, Soundness, Strength, and Cogency	50-54/ I 3, 13; II 7, 11; III 3, 7, 13, 19; IV; V
8/29	L 1.5	Argument Forms: Proving Invalidity	59-61/ I 3, 7, 13; II 1, 5, 9
8/30	L 2.1 L 2.2	Fallacies in General; Fallacies of Relevance	65-66/ 1, 3, 5, 7, 9 80-82/ I 3, 7, 11, 15, 19, 23; II; III
8/31	L 2.3 L 2.4	Fallacies of Weak Induction; Fallacies of Presumption, Ambiguity, and Illicit Transference	94-100/ I 3, 7, 13; II; III 1, 5, 21; IV 115-121/ I 5, 15, 25; II; III 3, 9, 19; IV
9/1	L 2.5	Fallacies in Ordinary Language	127-137/ 3, 13, 23, 33, 43, 53
9/5		Activity on LSAT Problems	
9/6	L 3.1	The Components of Categorical Propositions	142/ 1,3,5,7
9/7	L 3.2	Quality, Quantity, and Distribution	146-147/ I 3, 7; II 1, 3; III 1, 3; IV 1, 3;
9/8	L 3.3	Venn Diagrams	155-156/ I 1, 3, 7; II 3, 7, 11, 15
9/12	L 3.4	Conversion, Obversion, and Contraposition	163-166/ I; II 1c, 2c, 3c; III 7, 11, 15, 19
9/13	L 3.5	The Traditional Square of Opposition	171-175/ I 3, 7; II 1, 9; III 1, 5; IV; V 5, 9
9/14	L 3.6	Translating Ordinary Language Statements into Categorical Form	184-186/ I 3, 13, 23, 33, 43, 53; II 3, 7; III 5, 9
9/15		Translating certain categorical forms to conditional form	Complete handout
9/15		**Logic Project due**	
9/19		Review	
9/20	**Exam 1**	Exam on topics in logic	
9/21	A 1.1	Mathematical Models; Microsoft Mathematics	
9/22	A 1.2	Formulas; Microsoft Mathematics	33-34/ 5, 11, 15, 21, 25, 31, 35, 41
9/26	A 1.3	Ratio and Proportion	38-40/ 7, 17, 21, 27, 37, 47, 51, 57
9/27	A 1.4	Word Problem Strategies	44-47/ 1, 7, 13, 19, 25, 31, 37, 43, 49
9/28	A 2.1	Models and Patterns in Plane Geometry	58-59/ 3, 7, 11, 15, 19, 23, 27
9/29	A 2.2	Models and Patterns in Triangles	64-67/ 1, 5, 9, 13, 17, 21, 25, 29
10/3	A 2.3	Models and Patterns in Right Triangles	70-72/ 3, 7, 11, 15, 19, 23, 27
10/4	A 3.1	Rectangular Coordinate System	100/ 1, 5, 9, 13, 17, 21, 25, 29, 33, 37
10/5	A 3.2	Graphing Linear Equations	105/ 1, 4, 7, 13, 19, 21, 25, 31, 37
10/6	A 3.3	Slope	115/ 1, 7, 11, 13, 19, 25, 27, 31, 37
10/10	A 3.4	Writing Equations of Lines	120-121/ 1, 5, 11, 15, 21, 25, 31, 35, 39
10/11	A 3.5	Applications and Uses of Graphs	125-128/ 1, 3, 5, 7, 9, 11, 15, 17
10/12	A 4.1	Functions	144-146/ 1, 2, 3, 5, 7, 11, 15 – 20, 23
10/13	A 4.2	Using Function Notation	150-153/ 3, 7, 13, 17, 23, 27, 29

10/17	A 4.3	Linear Functions as Models	158-160/ 3, 5, 7, 11, 13, 17, 19
10/18	A 4.4	Direct and Inverse Variation	165-166/ 5, 9, 11, 13, 17, 21, 27, 33, 39
10/19	A 4.5	Quadratic Functions and Power Functions as Models	176-177/ 3, 5, 11, 13, 15, 21, 25, 31, 35
10/20	A 4.6	Exponential Functions as Models	181-182/ 3, 5, 7, 11, 13, 17, 21, 25, 27
10/20		**Algebra Project due**	
10/24	A 4.6	Exponential Functions as Models - Examples	
10/25	A 5.2	Mathematical Models in Banking	209-210/ 3, 7, 13, 17, 23, 27
10/26		Review	
10/27	**Exam 2**	Exam on topics in algebra	
10/31	S 1.1	What is Statistics?	10-12/ 1-4, 5, 7, 9, 11, 13, 15
11/1	S 1.2	Random Samples	18-21/ 1-3, 5, 6, 9, 15
11/2	S 1.3	Introduction to Experimental Design	29-31/ 1, 2, 3, 4, 6, 7, 9
11/3	S 2.1	Frequency Distributions, Histograms, and Related Topics	52-59/ 1-4, 6, 9, 12, 17
11/7	S 2.2	Bar Graphs, Circle Graphs, and Time Series Graphs	65-69/ 3, 5, 9, 11, 14
11/8	S 2.3	Stem-and-Leaf Displays	73-77/ 1, 4, 5, 6, 10
11/9	S 3.1	Measures of Central Tendency	97-102/ 7, 9, 13, 17, 19, 21, 26
11/10	S 3.2	Measures of Variation	113-121/ 5, 9, 13, 19
11/14	S 3.3	Percentiles and Box-and-Whisker Plots	129-131/ 5, 7, 9, 11
11/15	S 4.1	What is Probability?	152-155/ 1, 2, 3, 4, 5, 6, 9, 11, 12, 17, 21
11/16	S 4.2	Some Probability Rules – Compound Events	169-176/ 3, 7, 11, 15, 19, 23, 25, 27, 28
11/17	S 5.1	Introduction to Random Variables and Probability Distributions	205-212/ 7, 11, 14, 17
11/28	S 5.2	Binomial Probabilities	222-229/ 9, 11, 13, 15, 28
11/29		Review	
11/30	S 6.1	Graphs of Normal Probability Distributions	281-288/ 5, 7, 12, 13
12/1	S 6.2	Standard Units and Areas Under the Standard Normal Distribution	297-299/ 5, 7, 11, 17, 23, 29, 33, 39, 41, 47
12/1		**Statistics Project due**	
12/5	S 6.3	Areas Under Any Normal Curve	308-314/ 5, 9, 13, 15, 17, 19, 21, 23, 28
12/6	S 6.4	Sampling Distributions	319/ 1-7
12/7		Activity on probabilities	
12/8		Review	
12/16	**Exam 3**	Exam on topics in statistics (8:00 – 10:00)	