MTH 160 (CT) Sec 101   **Syllabus**   **CRN 3243**   **Fall 2014**

Course: **Applied Mathematical Reasoning**

Domains: Integrative Thinking; Quantitative Thinking; Information and Technical Literacy; Communication Fluency; Inquiry Based Thinking

Meetings: Mondays and Wednesdays from 11:00 until 11:50 in SH 113 and
                         Tuesdays and Thursdays from 11:00 until 12:15 in SH 532

Prerequisite: Math ACT 19 or Math SAT 460 or higher

Text: Custom text prepared by Cengage ISBN 978-1-305-01187-8 and
                    Intermediate Algebra, 2nd Edition, by Ray Steege ISBN 978-0-07-162998-0

Description: 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.
This is a 5 credit course.

Instructor: Evelyn Pupplo-Cody, Ph.D.

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Office Hours: Monday, Tuesday, Wednesday, Thursday from 12:30 until 2:30 p.m.

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.

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 9 (Johnson)	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 Chapter 1 (Johnson)	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 Chapter 4 (Steege)	Quizzes, exams, and projects
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 Chapter 9 (Steege)	Quizzes, exams, and projects

Attendance: 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, please go to the Dean of Students' Office in the MSC. 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.

Grading: Each examination (two in-class exams and a final exam) will be worth 60% of the semester grade. Homework and/or quizzes will be worth 15% of the semester grade. Projects will count as 25% of the grade.

$$90.00 - 100 \quad A$$
$$80.00 - 89.99 \quad B$$
$$70.00 - 79.99 \quad C$$
$$60.00 - 69.99 \quad D$$
$$\text{Below} \quad 60.00 \quad F$$

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.

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

Class Policies:
- Cell phones and computers should be off during class.
- All assignments must be submitted by the stated due dates.

University Policies: By enrolling in this course, you agree to the University Policies listed below.

Please read the full text of each policy be going to www.marshall.edu/academic-affairs and clicking on "Marshall University Policies." Or, you can access the policies directly by going to http://www.marshall.edu/academic-affairs/?page_id=802
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

Schedule

Week	Topics
1	Monday: Introduction; Logic Defined (1.1) Tuesday: Informal Fallacies (9.1 – 9.6) Wednesday: Informal Fallacies (9.7 – 9.12) Thursday: Informal Fallacies (9.13 – 9.18)
2	Monday: No class Tuesday: Arguments Defined (1.2), Diagramming Arguments (1.3) Wednesday: Supplying Missing Parts: Enthymemes (1.4); Recognizing Real Arguments (1.5) Thursday: Good Arguments (2.1); Does the Conclusion Follow? (2.2)
3	Monday: Deductive Validity Defined (2.3); Validity and Logical Form (2.4) Tuesday: Are the Premises True? (2.5); Truth, Validity, and Good Argument (2.6) Wednesday: Introduction (3.1); Categories and Reasoning (3.2); The Four Categorical Forms (3.3) Thursday: Venn Diagrams (3.4); Recognizing Simple Inferences (3.5)
4	Monday: The Squares of Oppositions (3.6) Tuesday: The Operations (3.7) Wednesday: Translating into Categorical Form (4.1) Thursday: **Exam 1 on Logic (9/18)**
5	Monday: Fundamental Concepts (Chapter 1) (1.1, 1.2, 1.3) Tuesday: Fundamental Concepts (Chapter 1) (1.4, 1.5, 1.6) Wednesday: Translating Phrases and Statements into Algebraic Form (1.7) Thursday: Solving First-Degree Equations (4.1)
6	Monday: Graphs of First-Degree Equations (4.2) Tuesday: Applications of First-Degree Equations (4.4) Wednesday: Linear Systems in Two Variables (7.1) Thursday: Quadratic Formula for Second-Degree Equations (6.2)

7	Monday: Graphs of Second-Degree Equations (6.6) Tuesday: Applications of Second-Degree Equations (6.5) Wednesday: Functions – Basic Concepts (8.1), Function Notation (8.2) Thursday: Types of Functions (8.5)
8	Monday: Inverse Relations and Functions (8.7) Tuesday: Exponential Functions (9.1) Wednesday: Logarithmic Functions (9.2) Thursday: Properties of Logarithms (9.3)
9	Monday: Exponential and Logarithmic Equations (9.4) Tuesday: Applications of Exponential and Logarithmic Functions (9.5) Wednesday: Applications of Exponential and Logarithmic Functions (9.5) Thursday: **Exam 2 on Algebra (10/23)**
10	Monday: What Is Statistics? (1.1) Tuesday: What Is Statistics? (1.1) Wednesday: Random Samples (1.2) Thursday: Introduction to Experimental Design (1.3)
11	Monday: Frequency Distributions, Histograms, and Related Topics (2.1) Tuesday: Bar Graphs, Circle Graphs, and Time-Series Graphs (2.2); Stem-and-Leaf Display (2.3) Wednesday: Measures of Central Tendency: Mode, Median, and Mean (3.1) Thursday: Measure of Variation (3.2)
12	Monday: Percentiles and Box-and-Whisker Plots (3.3) Tuesday: What Is Probability? (4.1) Wednesday: Some Probability Rules – Compound Events (4.2) Thursday: Binomial Distributions
13	Monday: Random Variables Tuesday: Random Variables Wednesday: Graphs of Normal Probability Distributions (6.1) Thursday: Standard Units and Areas Under the Standard Normal Distribution (6.2)
14	Monday: Areas Under Any Normal Curve (6.3) Tuesday: Sampling Distributions (6.4) Wednesday: The Central Limit Theorem (6.5) Thursday**:** Finish Statistics
12/11	Thursday: **Exam 3 on Statistics** from 10:15 a.m. to 12:15 p.m.