**Marshall University**

**MTH 160 (CT) Syllabus**

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| **Course Title/Number** | Applied Mathematical Reasoning (CT) / MTH 160 (CT) Sec 101 (CRN 3028) |
| **Semester/Year** | Fall 2018 |
| **Days/Time** | Monday, Wednesday 11:00-11:50 and Tuesday, Thursday 11:00-12:15 |
| **Location** | M, W in SH 433; T, R in SH 532 |
| **Instructor** | Dr. Evelyn Pupplo-Cody |
| **Office** | Science 270 |
| **Phone** | (304) 696-3638 |
| **E-Mail** | pupploco@marshall.edu |
| **Office Hours** | 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](http://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/](http://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**

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

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| **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  Chapter 1 (Timmons et al) | 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  Chapters 2 and 5 (Timmons et al) | Quizzes, exams, and projects |

**Course Objectives**

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| 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**

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| * 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**

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| Logic Project due on Monday, September 17, 2018   * Exam 1 (Logic) on Thursday, September 20, 2018   Algebra Project due on Monday, October 22, 2018   * Exam 2 (Algebra) on Thursday, October 25, 2018   Statistics Project due on Thursday, November 29, 2018   * Exam 3 (Statistics) on Tuesday, December 11, 2018 from 10:15 a.m. until 12:15 p.m. |

**Grading Policy**

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| 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**

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| 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**

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| 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**

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

**Calculators**

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

**Course Schedule and Homework**

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| Date | Section | Topics | Homework |
| 8/20 | L 1.1 | Arguments, Premises, and Conclusions | 7-13/ I 3, 9, 15, 21; II 3, 7; III; IV |
| 8/21 | L 1.2 | Recognizing Arguments | 23-30/ I 3, 7, 19; II 3, 7; IV; V; VI |
| 8/22 | L 1.3 | Deduction and Induction | 37-41/ I 3, 13, 25; II; III |
| 8/23 | L 1.4 | Validity, Truth, Soundness, Strength, and Cogency | 50-54/ I 3, 13; II 7, 11; III 3, 7, 13, 19; IV; V |
| 8/27 | L 1.5 | Argument Forms: Proving Invalidity | 59-61/ I 3, 7, 13; II 1, 5, 9 |
| 8/28 | 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 |
| 8/29 | 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 |
| 8/30 | L 2.5 | Fallacies in Ordinary Language | 127-137/ 3, 13, 23, 33, 43, 53 |
| 9/3 |  | Labor Day – no class |  |
| 9/4 | L 3.1 | The Components of Categorical Propositions | 142/ 1,3,5,7 |
| 9/5 | L 3.2 | Quality, Quantity, and Distribution | 146-147/ I 3, 7; II 1, 3; III 1, 3; IV 1, 3; |
| 9/6 | L 3.3 | Venn Diagrams | 155-156/ I 1, 3, 7; II 3, 7, 11, 15 |
| 9/10 | L 3.4 | Conversion, Obversion, and Contraposition | 163-166/ I; II 1c, 2c, 3c; III 7, 11, 15, 19 |
| 9/11 | L 3.5 | The Traditional Square of Opposition | 171-175/ I 3, 7; II 1, 9; III 1, 5; IV; V 5, 9 |
| 9/12 | L 3.5 | The Traditional Square of Opposition | 171-175/ I 3, 7; II 1, 9; III 1, 5; IV; V 5, 9 |
| 9/13 | 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 |
| 9/17 |  | Translating certain categorical forms to conditional form | Complete handout |
| 9/17 |  | **Logic Project due** |  |
| 9/18 |  | Logic Problems from LSAT |  |
| 9/19 |  | Review |  |
| 9/20 | **Exam 1** | Exam on topics in logic |  |
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| 9/24 | A 1.1 | Mathematical Models; Microsoft Mathematics |  |
| 9/24 | A 1.2 | Formulas; Microsoft Mathematics | 33-34/ 5, 11, 15, 21, 25, 31, 35, 41 |
| 9/25 | A 1.3 | Ratio and Proportion | 38-40/ 7, 17, 21, 27, 37, 47, 51, 57 |
| 9/26 | A 1.4 | Word Problem Strategies | 44-47/ 1, 7, 13, 19, 25, 31, 37, 43, 49 |
| 9/27 | A 2.1 | Models and Patterns in Plane Geometry | 58-59/ 3, 7, 11, 15, 19, 23, 27 |
| 10/1 | A 2.2 | Models and Patterns in Triangles | 64-67/ 1, 5, 9, 13, 17, 21, 25, 29 |
| 10/2 | A 2.3 | Models and Patterns in Right Triangles | 70-72/ 3, 7, 11, 15, 19, 23, 27 |
| 10/3 | A 3.1 | Rectangular Coordinate System | 100/ 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 |
| 10/3 | A 3.2 | Graphing Linear Equations | 105/ 1, 4, 7, 13, 19, 21, 25, 31, 37 |
| 10/4 | A 3.3 | Slope | 115/ 1, 7, 11, 13, 19, 25, 27, 31, 37 |
| 10/8 | A 3.4 | Writing Equations of Lines | 120-121/ 1, 5, 11, 15, 21, 25, 31, 35, 39 |
| 10/9 | A 3.5 | Applications and Uses of Graphs | 125-128/ 1, 3, 5, 7, 9, 11, 15, 17 |
| 10/10 | A 4.1 | Functions | 144-146/ 1, 2, 3, 5, 7, 11, 15 – 20, 23 |
| 10/11 | A 4.2 | Using Function Notation | 150-153/ 3, 7, 13, 17, 23, 27, 29 |
| 10/15 | A 4.3 | Linear Functions as Models | 158-160/ 3, 5, 7, 11, 13, 17, 19 |
| 10/16 | A 4.4 | Direct and Inverse Variation | 165-166/ 5, 9, 11, 13, 17, 21, 27, 33, 39 |
| 10/17 | A 4.5 | Quadratic Functions and Power Functions as Models | 176-177/ 3, 5, 11, 13, 15, 21, 25, 31, 35 |
| 10/18 | A 4.6 | Exponential Functions as Models | 181-182/ 3, 5, 7, 11, 13, 17, 21, 25, 27 |
| 10/22 |  | **Algebra Project due** |  |
| 10/22 | A 4.6 | Exponential Functions as Models - Examples |  |
| 10/23 | A 5.2 | Mathematical Models in Banking | 209-210/ 3, 7, 13, 17, 23, 27 |
| 10/24 |  | Review |  |
| 10/25 | **Exam 2** | Exam on topics in algebra |  |
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| 10/29 | S 1.1 | What is Statistics? | 10-12/ 1-4, 5, 7, 9, 11, 13, 15 |
| 10/30 | S 1.2 | Random Samples | 18-21/ 1-3, 5, 6, 9, 15 |
| 10/31 | S 1.3 | Introduction to Experimental Design | 29-31/ 1, 2, 3, 4, 6, 7, 9 |
| 11/1 | S 2.1 | Frequency Distributions, Histograms, and Related Topics | 52-59/ 1-4, 6, 9, 12, 17 |
| 11/5 | S 2.2 | Bar Graphs, Circle Graphs, and Time Series Graphs | 65-69/ 3, 5, 9, 11, 14 |
| 11/6 | S 2.3 | Stem-and-Leaf Displays | 73-77/ 1, 4, 5, 6, 10 |
| 11/7 | S 3.1 | Measures of Central Tendency | 97-102/ 7, 9, 13, 17, 19, 21, 26 |
| 11/8 | S 3.2 | Measures of Variation | 113-121/ 5, 9, 13, 19 |
| 11/12 | S 3.3 | Percentiles and Box-and-Whisker Plots | 129-131/ 5, 7, 9, 11 |
| 11/13 | S 4.1 | What is Probability? | 152-155/ 1, 2, 3, 4, 5, 6, 9, 11, 12, 17, 21 |
| 11/14 | S 4.2 | Some Probability Rules – Compound Events | 169-176/ 3, 7, 11, 15, 19, 23, 25, 27, 28 |
| 11/15 | S 5.1 | Introduction to Random Variables and Probability Distributions | 205-212/ 7, 11, 14, 17 |
| 11/26 | S 5.2 | Binomial Probabilities | 222-229/ 9, 11, 13, 15, 28 |
| 11/27 |  | Review |  |
| 11/28 | S 6.1 | Graphs of Normal Probability Distributions | 281-288/ 5, 7, 12, 13 |
| 11/29 | S 6.2 | Standard Units and Areas Under the Standard Normal Distribution | 297-299/ 5, 7, 11, 17, 23, 29, 33, 39, 41, 47 |
| 11/29 |  | **Statistics Project due** |  |
| 12/3 | S 6.3 | Areas Under Any Normal Curve | 308-314/ 5, 9, 13, 15, 17, 19, 21, 23, 28 |
| 12/4 | S 6.4 | Sampling Distributions | 319/ 1-7 |
| 12/5 |  | Activity on probabilities |  |
| 12/6 |  | Review |  |
| 12/11 | **Exam 3** | Exam on topics in statistics (10:15 – 12:15) |  |