**Marshall University Syllabus**

**MTH 127: College Algebra Expanded**

**Fall 2017**

**Instructor: Rob-Roy Mace**

**Section/CRN: 102/3122**

**Meeting Location/Times: Smith Hall 518 Smith Hall 624**

**MWF 9 – 9:50 am TR 9 – 9:50 am**

**Office Hours: MTW 11 – Noon and Tues. 1 – 4 pm in Smith Hall 743E**

**Instructor e-mail: mace22@marshall.edu**

**Textbook:** College Algebra with Integrated Review ISBN: 978-1-944894-97-9 (with textbook) or 978-1-944894-98-6 (with e-book only)

**Required Calculator:** TI-30 (any of the TI-30 family is acceptable, but TI-34 or 36 are not)

**University Policies:** <http://www.marshall.edu/academic-affairs/?page_id=802>

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| **Course Student Learning Outcomes** | **How students will practice this outcome** | **How students will be assessed on this outcome** |
| Identify and implement appropriate solution methods  for single-variable equations | Online homework, written assignments, in-class activities | Course exams and common final |
| Identify and graph standard  algebraic functions | Online homework, written assignments, in-class activities | Course exams and common final |
| Interpret graphs of functions | Online homework, written assignments, in-class activities | Course exams and common final |
| Construct functions to model applications | Online homework, written assignments, in-class activities | Course exams and common final |
| Communicate written mathematics using appropriate notation and explanation where appropriate | Online homework, written assignments, in-class activities | Course exams and common final |

# Courses that have MTH 127/130 as a prerequisite:

* Graduation Requirement for College of Business
* MTH 122 - Trigonometry, MTH 132 - Precalculus, MTH 140 - Applied calculus

CHM 111, CS 110, CI 248, ENGR 221, IST 420/421, PS 109, PHY 101, PHY 201

**Exams:** There will be three midterm exams as outlined in the course schedule. Exam dates are September 13, October 11, and November 8.

**Common Final Exam:** The common final exam for MTH 127 will take place on **Saturday December 9** from 2-4 pm. You may use the required calculator for the course (TI-30), but no other assistance (formula sheets, notebooks, phones, or other internet connected devices) will be permitted. **You must bring your own calculator or do without. There will be NO sharing of calculators permitted during the exam.**

**Attendance Policy: Attendance** **is required and will be recorded with the University**. Consult your handbook regarding university excused absences. You must be in class to take quizzes or exams, turn in homework, etc. If an excused absence results in missing quiz/exam/hw, then a make-up date (*within one week of absence*) must be scheduled with course instructor.

**Hawkes Mastery-based Homework and Webtests:** Each textbook section corresponds to at least one homework (Certify) section in the Hawkes learning system. To sign in, go to learn.hawkeslearning.com and follow the onscreen prompts to enter your code.

Many assignments have prerequisite sections that must be completed prior to attempting the assignment. These prerequisites are review and reinforcement of mathematical topics that support the material you are learning in class. They are listed on the course schedule as “Prep work” and you should read through the “Learn” screens and attempt the assignments prior to the lab day they are assigned for.

**All assignments must be completed this semester, even if you have some certifications from previous semesters.**

**Grading Policies:**

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| Hawkes (common homework) | 20% |
| Exam 1 | 15% |
| Exam 2 | 15% |
| Exam 3 | 15% |
| Common Final Exam | 20% |
| Other (Instructor’s choice) | 15% |

**Grade Scale**: A: 100-90%

B: 89-80%

C: 79-70%

D: 69-60%

F: 59-0%

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| **MTH 127 Fall 2017 Schedule (MWF Class, TR Labs)** | | |
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| Week 1 8/21-8/25 | 1 | Introduction to the course  **1.1 The Real Number System** 3: Inequalities 4: Set-builder and interval notation 5: Absolute value |
| 2 | **Introduction to Hawkes: Learn, Practice, Certify 1.1  Introduction to Desmos: Compound Inequalities** |
| 3 | **3.1 Cartesian Coordinate System** 1: Cartesian coordinate system 2: The graph of an equation 3: Distance and midpoint formulas |
| 4 | **Prep Work Due: 1.R.2** Reducing Fractions, **2.R.1** Multiplication and Division with Fractions, **2.R.2** Addition and Subtraction with Fractions **Lab: Practice and Certify 3.1 Desmos: Pool Border Problem** |
| 5 | **2.1a Linear Equations in One Variable** 1: Solutions to equations 2: Solving linear equations 4: Solving linear equations for one variable |
| Week 2 8/28-9/1 | 1 | **2.1b Applications of Linear Equations in One Variable** (Topic 5) |
| 2 | **Prep Work Due: 4.R.1** Order of Operations **Lab: Practice and Certify 2.1a,b Desmos: The Coordinate Plane** |
| 3 | **2.2 Linear Inequalities in One Variable** 1: Solving linear inequalities 2: Solving compound linear inequalities 4: Translating Inequality Phrases |
| 4 | **Prep Work Due: 4.R.2** Variables and Algebraic Expressions **Lab: Practice and Certify 2.2 Desmos: Expression Mash-Up** |
| 5 | **3.2 Linear Equations in Two Variables** 1: Recognizing linear equations in two variables 2: x and y intercepts 3: Horizontal and vertical lines |
| Week 3 9/4-9/8 | 1 | Labor Day |
| 2 | **Prep Work Due: 4.R.3**  Simplifying Expressions **Lab: Practice and Certify 3.2 Desmos: Connecting Graphs, Equations, and Tables** |
| 3 | **3.3 Forms of Linear Equations** 1: The slope of a line 2: Slope-intercept form of a line 3: Point-slope form of a line |
| 4 | **Practice with graphs of lines** **Lab: Practice and Certify 3.3 Desmos: Polygraph: Lines** |
| 5 | **3.4 Parallel and Perpendicular Lines** 1: Slopes of parallel lines 2: Slopes of perpendicular lines |
| Week 4 9/11-9/15 | 1 | Review for Test 1 |
| 2 | **Review Activities: Test 1 Desmos: Polygraph Lines, Part 2** |
| 3 | Test 1 |
| 4 | **Prep Work: 5.R.1** Greatest Common Factor **Lab: Learn, Practice, Certify 5.R.2** Factoring Trinomials by Grouping **Desmos: Marbleslide: Lines** |
| 5 | **2.3 Quadratic Equations in One Variable (Real Solutions Only)** 1: Solving quadratic equations by factoring 2: Solving "perfect square" quadratic equations |
| Week 5 9/18-9/22 | 1 | **2.3 Quadratic Equations in One Variable (Real Solutions Only)** 1: Solving quadratic equations by factoring 2: Solving "perfect square" quadratic equations |
| 2 | **Prep Work: 5.R.3** Additional Factoring Practice **Lab: Discuss Test 1 Desmos: Picture Perfect** |
| 3 | **1.6 The Complex Number System** 1: The imaginary unit and its properties 2: The algebra of complex numbers (no division) 3: Roots and complex numbers |
| 4 | **Prep Work: 1.5** Factoring Practice **Lab: Practice Factoring, Practice and Certify 1.6 Desmos: Central Park** |
| 5 | **2.3 Quadratic Equations in One Variable** 4: The quadratic formula |
| Week 6 9/25-9/29 | 1 | **3.6 Introduction to Circles** 1: Standard form  2: Graphing circles (omit completing the square to write in standard form) |
| 2 | **Lab: Practice and Certify 2.3 and 3.6 Desmos: Function Carnival** |
| 3 | **4.1 Relations and Functions** 1:Relations, domains, and ranges 2: Functions and the vertical line test |
| 4 | **Prep Work: 4.R.4** Translating Phrases into Algebraic Expressions **Lab: Practice with Functions Desmos: Circle Patterns** |
| 5 | **4.1 Relations and Functions** 3: Functional notation and evaluation 4: Implied domain of a function |
| Week 7 10/2-10/6 | 1 | **4.2 Linear and Quadratic Functions** 1: Linear functions and graphs 2: Quadratic functions and graphs (Vertex form by formula, not completing the square) |
| 2 | **Prep Work 1.R.4** Simplifying Radicals **Lab: Practice and Certify 4.1, 4.2a Desmos: Domain and Range Introduction** |
| 3 | **4.2 Linear and Quadratic Functions** 3: Max/min problems **4.3a Other Common Functions** 1: Commonly occuring functions: ax^n, ax^(1/n), absolute value only |
| 4 | **Lab: Practice and Certify 4.2b, 4.3a Desmos: Polygraph: Parabolas** |
| 5 | **2.6 Radical Equations** 1: Solving radical equations (with only one radical expression) |
| Week 8 10/9-10/13 | 1 | Review Test 2 |
| 2 | **Review activities Test 2 Desmos: Polygraph: Power, Root, Absolute Value Functions** |
| 3 | Test 2 |
| 4 | **Lab: Practice with graphing functions Desmos: Marbleslide: Parabolas** |
| 5 | **4.4 Transformations of Functions** 1: Shifting and reflecting only |
| Week 9 10/16-10/20 | 1 | **4.4 Transformations of Functions** 2: Symmetry of functions and equations 3: Intervals of monotonicity |
| 2 | **Prep Work: 6.R.2** Special Products **Lab: Practice and Certify 4.4 Desmos: What's My Transformation** |
| 3 | **2.4 Higher Degree Polynomial Equations** 2: General polynomial equations of the form ax^n=b, or cubics that have a common factor of x only, real solutions only |
| 4 | **Prep Work: 6.R.3** Special Factorizations - Squares **Lab: Practice and Certify 2.4 Desmos: Card Sort: Transformations** |
| 5 | **A.1 Polynomial Equations and Graphs (Text Section 5.1)** 1: Zeros of polynomials 2: Graphing factored polynomials **A.2 Polynomial Division and the Division Algorithm (Omit Division!) (Text Section 5.2)** 3: Constructing polynomials with given zeros |
| Week 10 10/23-10/27 | 1 | **A.4 The Fundamental Theorem of Algebra (Text Section 5.4)** 1: The fundamental theorem of algebra 2: Multiple zeros and their geometric meaning |
| 2 | **Prep Work: 6.R.1** Defining Rational Expressions **Lab: Practice and Certify A.1, A.2, A.4 Desmos: Polygraph: Polynomial Pandemonium** |
| 3 | **2.5 Rational Expressions and Equations** 1: Simplifying rational expressions 2: Combining rational expression 4: Solving rational equations |
| 4 | **Lab: Practice and Certify 2.5 Desmos: Constructing Polynomials** |
| 5 | **6.1 Rational Functions** 1: Definitions 2: Vertical asymptotes |
| Week 11 10/30-11/3 | 1 | **6.1 Rational Functions** 3: Horizontal asymptotes (no oblique) 4: Graphing rational functions |
| 2 | **Lab: Practice and Certify 6.1 Desmos: Polygraph: Rational Functions** |
| 3 | **4.5 Combining Functions** 2: Composing functions |
| 4 | **Lab: Practice and Certify 4.5 Desmos: Marbleslide: Rationals** |
| 5 | **4.6 Inverses of Functions** 2: Inverse functions and the horizontal line test 3: Finding inverse function formulas (basic only) |
| Week 12 11/6-11/10 | 1 | Review for Test 3 |
| 2 | **Review Activities for Test 3 Desmos: Inverse Functions** |
| 3 | Test 3 |
| 4 | **Prep Work: 7.R.1** Simplifying Integer Exponents I **Lab: Learn, Practice, Certify 7.R.2  Desmos: Avi and Benita's Repair Shop** |
| 5 | **7.1 Exponential Functions and Their Graphs** 1: Definition  2: Graphing 3: Solving basic equations |
| Week 13 11/13-11/17 | 1 | **Review 7.1 7.2 Applications of Exponential Functions** 3: Compound interest |
| 2 | **Prep Work: 7.R.3** Rational Exponents **Lab: Practice and Certify 7.1, 7.2 Desmos: Polygraph: Exponentials** |
| 3 | **7.3 Logarithmic Functions** 1: Definition of logarithmic functions 4: Common and Natural logarithms 2: Graphing logarithmic functions |
| 4 | **Lab: Practice with logarithms Desmos: Marbleslide: Exponentials** |
| 5 | **7.3 Logarithmic Functions** 3: Evaluating elementary logarithmic expressions |
| Week 14 11/27-12/1 | 1 | **7.4 Properties of Logarithms** 1: Properties of logarithms 3: Applications (Richter Scale only) |
| 2 | **Lab: Practice and Certify 7.3, 7.4 Desmos: Polygraph: Exponential and Logarithmic Functions** |
| 3 | **7.5 Exponential and Logarithmic Equations** 1: Converting between exponential and logarithmic forms |
| 4 | **Lab: Practice solving exponential and logarithmic equations Desmos: What Comes Next?** |
| 5 | **7.5 Exponential and Logarithmic Equations** 2: Further applications (Interest only) |
| Week 15 12/4-12/8 | 1 | **8.1 Systems of Linear Equations** 1: Definition and classification 2: Solving by substitution |
| 2 | **Prep Work: 8.R.1** Solving systems by graphing **Lab: Practice Solving Systems of Linear Equations  Practice and Certify 7.5 Desmos: System of Two Linear Equations** |
| 3 | **8.1 Systems of Linear Equations** 2: Solving by substitution, applications |
| 4 | **Review for Final Exam Desmos: Polygraph: Linear Systems** |
| 5 | Review for Final Exam |