MTH203

# COLLEGE ALGEBRA

Spring 2021

**Class Time and Location:** M T W R F 8-8:45 MIHS
**Instructor**: Beverly Smith BAT in Mathematics and M.Ed, Sam Houston State University
**Office Location:** 2
**Office Hours:** Posted on office door
**Contact Information:** Office (870)-867-2771
Email: beverly.smith@mtidalions.org

**Prerequisite**: Minimum score of 19 on both the mathematics and English sections of the ACT (or equivalent score on COMPASS or Accuplacer) or a grade of C or better in MTH033 (Intermediate Algebra)

**Resources**:

Text: *A Graphical Approach to College Algebra*, 4th Edition, John Hornsby, Margaret L. Lial, and Gary K. Rockswold, Addison Wesley, Pearson Education, Copyright 2007, ISBN # 0-321-35689-6

Required Materials:

1. Spiral notebook
2. Mechanical pencils only.
3. A colored ink pen
4. TI 84 plus graphing calculator (See teacher if you need check one out.)

**Face Mask Policy:** As per the Executive Order from the governor of Arkansas, all students are required to wear a proper face covering that completely covers the nose and mouth while on campus and in class. Masks with holes or masks that do not completely cover nose and mouth are not acceptable. Any student that does not have a proper mask will leave class and be referred to the Vice Chancellor for Student Affairs for possible disciplinary action.

**Food and Drink:** Food and drinks, including water are not allowed in the classroom at any time.

**Course Description**: The content of this course includes concepts linear and quadratic functions; transformations of basic curves, composition of functions; direct and inverse variations; solving and graphing problems whose mathematical models are polynomial, rational, exponential and logarithmic functions; solving systems of linear and nonlinear equations and inequalities with applications for each; determinants and matrices; linear programming; conic sections; binomial expansions; arithmetic and geometric sequences and series; and counting techniques and probability. (ACTS MATH1103)

**Program Outcomes:** The purpose of the Associate of Arts Program is to provide students with the knowledge and critical thinking skills that will enable students to analyze problems, arrive at intelligent conclusions, and make reasoned choices in their professional and personal lives.

- Students will demonstrate competency in mathematics, including analysis and applications..
- Students will apply technological skills to process information.
- Students will be prepared academically upon transfer to a four-year institution.

**Rationale:** An objective of post-secondary education is to provide a core of knowledge that is shared with most educated people. By studying and developing a deeper understanding of mathematical computations, students can better analyze, problem solve, and prepare critical thinking strategies for real world scenarios. Technological skills with the graphing calculator are necessary for future math courses.

**Course Objectives:** Upon successful completion of MTH 203 College Algebra, the student should be able to:

1. Graph equations and inequalities by hand and on the graphing calculator.
2. Solve basic algebraic equations using appropriate vocabulary and technology.
3. Analyze functions including linear, absolute value, quadratic, polynomial, rational, logarithmic, and exponential functions.
4. Synthesize information from a variety of sources to solve problems and interpret results.
5. Use technology appropriately to supplement and enhance conceptual understanding.
6. Analyze and solve applications of systems of equations, inequalities, and matrices.

Students will demonstrate mastery of the above objectives by grades of C or above on quizzes, tests, and exam.

**Topical Course Outline:**

Chapter 1: <u>Linear Functions, Equations, and Inequalities</u>

1.1 Real Numbers and Coordinate System
1.2 Introduction to Relations and Functions
1.3 Linear Functions
1.4 Equations of Lines and Linear Models
1.5 Linear Equations and Inequalities
1.6 Applications of Linear Functions

Chapter 2: <u>Analysis of Graphs of Functions</u>

2.1 Graphs of Basic Functions and Relations; Symmetry
2.2 Vertical and Horizontal Shifts of Graphs
2.3 Stretching, Shrinking, and Reflecting Graphs
2.4 Absolute Value Functions: Graphs, Equations, Inequalities, Applications
2.5 Piecewise – Defined Functions
2.6 Operations and Composition of Function

Chapter 3: <u>Polynomial Functions</u>

3.1 Complex Numbers
3.2 Quadratic Functions and Graphs
3.3 Quadratic Equations and Inequalities
3.5 Higher Degree Polynomial Functions and Graphs
3.6 Topics in the Theory of Polynomial Functions (I)
3.7 Topics in the Theory of Polynomial Functions (II)
3.8 Polynomial Equations and Inequalities; Further Applications

Chapter 4: Rational, Power, and Root Functions
4.1 Rational Functions and Graphs
4.2 More on Graphs of Rational Functions
4.3 Rational Equations, Inequalities, Applications, and Models
4.4 Functions Defined by Powers and Roots
4.5 Equations and Inequalities Defined by Powers and Roots

Chapter 5: Inverse, Exponential, and Logarithmic Functions
5.1 Inverse Functions
5.2 Exponential Functions
5.3 Logarithms and Their Properties
5.5 Exponential and Logarithmic Equations and Inequalities

Chapter 7: Matrices and Systems of Equations and Inequalities
7.1 Systems of Equations
7.2 Solution of Linear Systems in Three Variables
7.3 Solution of Linear Systems by Row Transformations
7.4 Matrix Properties and Operations
7.5 Determinants and Cramer's Rule
7.6 Solution of Linear Systems by Matrix Inverses

| **Week #** | **Proposed Schedule of Topics/Activities by book section #** | **Dates** |
|---|---|---|
| 1 | Discuss syllabus; Pretest,Sections 1.1 – 1.3 | 01/11 - 01/15 |
| | **Dr Martin Luther King, Jr Day** | |
| 2 | Sections 1.4 - 1.6; Review of Chapter 1 | 01/19 - 01/22 |
| 3 | Test on Chapter 1; Section 2.1 | 01/25 - 01/29 |
| 4 | Sections 2.2 - 2.4 | 02/01 - 02/05 |
| 5 | Sections 2.5 – 2.6; Review of Chapter 2 | 02/08 - 02/12 |
| | **President's Day** | |
| 6 | Test on Chapter 2; Sections 3.1 – 3.3 | 02/16 - 02/19 |

| | | |
|---|---|---|
| 7 | Sections 3.5 - 3.8 | 02/22 - 02/26 |
| 8 | Review & Test of Chapter 3; Section 4.1 | 03/01 - 03/05 |
| 9 | Sections 4.2 – 4.5 | 03/08 - 03/12 |
| 10 | Review & Test on Chapter 4 | 03/15 - 03/19 |
| | **Spring Break 03/22 - 03/26** | |
| 11 | Section 5.1 - 5.5 | 03/29 - 4/01 |
| | **Good Friday** | |
| 12 | Review & Test on Chapter 5 | 04/05 - 04/09 |
| 13 | Sections 7.1 – 7.4 | 04/12 - 04/16 |
| 14 | Sections 7.5 - 7.6; Review for Test | 04/19 - 04/23 |
| 15 | Test on Chapter 7; Posttest; Review for Final Exam | 04/26 - 04/30 |
| 16 | Final Exam | 05/03 - 05/07 |

**Course Conduct:**

The class will be taught using a combination of lecture, group interaction, question and answer approach, and independent study. New topics will be demonstrated using the board, overhead (Elmo) projector, and TI 84+ Smartview computer program for support of graphing calculator use. Students are strongly encouraged to discuss concepts and examples as opportunities are presented during instructor presentation. It is the student's responsibility to inform the instructor when a concept is confusing or otherwise unclear.

**UA Rich Mountain Credit Hour Calculator:**

For every course credit hour, you should expect to spend at least three clock hours per week of concentrated attention on course-related work, including but not limited to time attending class, as well as out-of-class time spent completing homework, seeking help from instructor or tutors, preparing for upcoming quizzes/tests/exam, reviewing material, problem solving, and organizing your notebook. For a three hour course, a typical student should expect to spend at least nine hours per week dedicated to this course. This includes the time spent in class. Please see credit hour calculator attached to end of syllabus.

**Course Requirements / Evaluation (Grading):**

Your grade for this course comes from tests (100 points each) at the end of each chapter, occasional quizzes ($\leq$ 50 points -- announced or unannounced), special assigned activities

(≤ 50 points), homework (checked at beginning of each test for 10 - 40 points), and a comprehensive final exam (200 points). On each of these, all work must be shown in neat form so that the teacher can grade it for partial credit even if you got the wrong answer. The final grade for the course will be determined by dividing the student's total number of points earned by the number of possible points. Grades are assigned on the basis of the following percentage scale:

90 – 100 = A  80 – 89 = B  70 – 70 = C  60 – 69 = D  0 – 59 = F

**Class Procedures/Student Requirements**:

Computer and On-Campus Resources: Your student portal contains resources/documents for each chapter studied, including assignments, examples, and review problems. You must open and print these documents prior to the beginning of each chapter. Computer labs with printers are available in several places on campus including the Johnson Learning Commons. UARM offers students assistance with quality tutors available in the Student Support Services (SSS) and Learning Enrichment and Counseling Center (LEAC) in the Johnson Learning Commons.

Attendance / Make-up Policy: If a student is absent from any class, it is the student's responsibility to contact the teacher before the next class meets to determine if the absence is to be excused and if the student will be allowed to make up the missed work. There will be no make-up tests, quizzes, or exam given except in instances of the most unavoidable, serious circumstances. Approved make-ups will be taken before the class period following the absence unless other arrangements are made ahead of time with the teacher. Meanwhile, the student is responsible for instruction missed during that class by studying the material in the book, seeking help from tutors, and/or by getting class notes from another student.

Assignment Due Dates: Students are expected to submit the assignments and other works on or before the assigned due dates. I will not accept late assignments.

Cell Phones**:** The use of cell phones in the classroom is prohibited. Turn cell phone off or on vibrate and store it out of sight during class time.

**Academic Dishonesty**: Any suspicion of academic dishonesty will result in no credit for the paper in question.

**Disability Policy:** It is the policy of UA Rich Mountain to accommodate students with disabilities, pursuant to state and federal law. Any student with a disability who needs accommodations should contact the Vice Chancellor for Student Affairs Office, 394-7622, ext. 1400.

**Arkansas Clean Air Act**: In compliance with the Arkansas Clean Air Act, UA Rich Mountain is a smoke and tobacco free facility. Students and guests are to refrain from the use of all tobacco products while on campus.

**Student Misconduct**: Students committing misconduct are subject to disciplinary sanction(s) and/or restrictions. Misconduct or prohibited behavior includes, but is not limited to endangerment, harassment, disruption, sexual misconduct, illegal drugs and/or alcohol, fire or safety issues,

gambling, property violations, computer violations or other violations as listed in the UA Rich Mountain catalog.

**UA Rich Mountain Mission:** The University of Arkansas Rich Mountain exists to provide exemplary educational and enrichment opportunities to improve the quality of life and standard of living.

**Campus Security:** UA Rich Mountain strives to provide a safe learning environment; therefore, students who know of any security risk are asked to contact a college official. For more information follow this link and look under the title Health and Safety: http://www.uarichmountain.edu/at-a-glance/disclosures

## Credit Hour Requirement Calculator

| | | | | | |
|---|---|---|---|---|---|
| **Course Information** | | | | | |
| Department, Course Number | | | | Mathematics | MTH203 |
| Course Title | | | | College Algebra | |
| Credit Hours | 3 | | | | |
| Mode of Delivery | Traditional | | | | |
| Weeks in Part of Term | 15 | | | | |
| Level of Reading Material | Advanced/Scientific/Technical (2) | | | 2 | |
| Reading Level of Students | Average Student (2) | | | 2 | |
| Average Pages per Hour | 11 | | | | |

*Enter either week or term, not both*

| **Contact Hours** | | **Hours/Week** | **Hours/Term** | **Total Hours** |
|---|---|---|---|---|
| Lecture/Recitation | | | 45 | 45 |

| | **Pages Asg'd** | **Hours/Week** | **Hours/Term** | |
|---|---|---|---|---|
| **Syllabus Items** | | | | |
| Weekly Homework Assignments | | 4 | | 60 |
| Prepare for Chapter Tests | | | 12 | 12 |
| Prepare for Final exam | | | 4 | 4 |
| Study Assigned Examples | 87 | | | 7.9 |
| | | | | 0 |
| | | | | 0 |
| | | | | 0 |
| | | | | 0 |
| | | | | 0 |
| | | | | 0 |

| | |
|---|---|
| **Total Hours** | 128.9 |
| **Required Hours** | 112.5 |
| **Difference** | Ok + 16.4 |