I. COURSE DESCRIPTION (Catalog Statement)

Reviews fundamentals of algebra, linear and fractional equations and inequalities, quadratic equations, functions, relations and graphs, coordinate geometry, systems of equations and inequalities, matrices, determinants, exponential and logarithmic functions, complex numbers, theory of polynomial equations, sequences, and series, mathematical induction, the binomial theorem, elementary probability and statistics, sets and logic. Prerequisite: A score of or above on SAT (Math), or a grade of C or better in MATH 099, or a score of 18 or above on ACT (Math Comp.).

II. RATIONALE

Mathematics 131 is the first course of a sequence (Math 131 and Math 132) designed for non-science majors with Basic Math background. Math 131 might be the only course in Math some students will take. Therefore, many learning aids are built into the course. These tools are meant to be a machine for learning, one that can help focus efforts and get the most from the time and energy invested. Emphasis is on general concepts that are around us as we go through our daily activities. Many of the concepts needed to be expressed mathematically, are already known intuitively.

Exploration of the media supplements will help students to view algebra as a valuable tool for understanding the world outside the classroom. It represents a useful integration of learning techniques. Competencies gained in Math 131 are essential to the skills and practice needed in problem solving, a requirement for a successful individual.

III. COMPETENCIES

At the end of the semester, the student should be able to have the following competencies:

A. Perform arithmetic operations including exponents and use scientific notations,
B. Add, subtract, multiply, divide, and simplify rational expressions, polynomials, and matrices,
C. Solve linear, quadratic, and radical equations in one variable as well as polynomial and rational inequalities,
D. Graph lines, circles and inverse functions \((f^{-1})\) and obtain equation of each,
E. Find the slope and intercepts of a line (vertical, horizontal, parallel, perpendicular, direct variation, inverse variation...),
F. Graph exponential and logarithmic functions, and identify characteristics of each,
G. Solve applied problems and problems involving simple and compound interest,
H. Solve a system of linear equations using the method of substitution, elimination and matrices,
I. Use mathematical induction to prove statements and find the general term of a sequence, and
J. Solve certain probability problems.
IV. BEHAVIORAL OBJECTIVES

A. Describe the domain and range of basic functions.
B. Use different methods to solve equations.
C. Discuss how to determine if a relation is a function.
D. Define a function and draw its graph.
E. Apply simple algebraic operations to functions.
F. Determine the inverse of a function.
G. Draw graphs of some basic quadratic functions.
H. Recognize a complex number and evaluate complex numbers using some basic algebraic operations.
I. Use the fundamental theorem of algebra to determine the zeros of a polynomial functions.
J. Find horizontal and vertical asymptotes.
K. Use the properties of exponential and logarithmic functions to simplify expressions involving them.
L. Solve exponential and logarithmic equations.
M. Determine the determinant of a coefficient matrix and also its inverse.
N. Apply arithmetic operations on matrices.
O. Solve a system of equations using matrix methods.
P. Solve matrix equations.
Q. Determine terms in a sequence or series given the general term.
R. Use summation notation.
S. Use the principle of mathematical induction to prove a theorem.

V. COURSE CONTENT

A. PREREQUISITE CHAPTER

This is a prerequisite chapter. The student should spend his/her own time and energy in understanding the concepts in this chapter in order to understand the following chapters. Practice problems are suggested.

P.1 Algebraic Expressions, Mathematical Models and Real Numbers (p. 2-19)
   a. Algebraic expressions (p. 2)
   b. Formulas and mathematical models (p. 3-4)
   c. Sets and subsets of real numbers (p. 5-9)
   d. Absolute Value (p. 9-10)
   e. Use absolute value to express distance (p. 11)
   f. Properties of real numbers and algebraic expressions (p. 11-15)

P.2 Exponents and Scientific Notation (p. 19-33)
   a. Perform arithmetic operations including exponents (p. 19-26)
   b. Scientific notation (p. 27-30)

P.3 Radicals and Rational Exponents (p. 33-48)
   a. Vocabulary and properties of square roots (p. 34-38)
   b. Rationalizing denominators (p. 38-40)
   c. The $n^{th}$ roots (p. 40)
   d. Using identified properties of $n^{th}$ roots (p. 41-42)
   e. Rational exponents (p. 42)
   f. Simplify expressions with rational exponents (p. 44)
   g. Reduce the index of a radical (p. 45)

P.4 Polynomials (p. 49-60)
   a. Vocabulary of polynomials (p. 49)
   b. Addition, subtraction, and multiplication of polynomials (p. 50-57)
P.5 Factoring Polynomials (p. 62-73)
a. Factoring the greatest common factor of a polynomial (p. 62-63)
b. Factoring by grouping (p. 63)
c. Factoring trinomials and special formulas (p. 64-67)
d. Factoring the sum or Difference of two cubes (p. 68)
e. A strategy for factoring polynomials (p. 69)

P.6 Rational Expressions (p. 73-85)
a. Simplifying rational expressions (p. 74-75)
b. Addition, subtraction, multiplication of rational expressions (p. 75-80)
c. Simplify complex rational expressions (p. 81-82)

B. CHAPTER ONE—EQUATIONS and INEQUALITIES
(Seven instructional hours)

1.1 Graphs and Graphing Utilities
1.2 Linear Equations and Rational Equations
1.3 Models and Applications
1.4 Complex Numbers
1.5 Quadratic Equations
1.6 Other Types of Equations
1.7 Linear Inequalities and Absolute Value Inequalities

C. CHAPTER TWO - FUNCTIONS AND GRAPHS
(Five instructional hours)

2.1 Basics of Functions and Their Graphs
2.2 More on Functions and Their Graphs
2.3 Linear Functions and Slope
2.4 More on Slope
2.8 Distance and Midpoint Formulas and Circles (p. 280-286)

D. CHAPTER FOUR - EXPONENTIAL AND LOGARITHMIC FUNCTIONS
(Four instructional hours)

4.1 Exponential Functions
4.2 Logarithmic Functions
4.3 Properties of Logarithms
4.4 Exponential and Logarithmic Equations

E. CHAPTER EIGHT-SYSTEM OF EQUATIONS AND INEQUALITIES
8.1 Systems of Linear Equations in Two Variables

F. CHAPTER NINE - MATRICES AND DETERMINANTS
(Six instructional hours)

9.1 Matrix Solutions to Linear Systems

9.3 Matrix Operations and their

9.5 Determinants and Cramer’s Rule

G. CHAPTER ELEVEN - SEQUENCES, INDUCTION AND PROBABILITY
(Six instructional hours)

11.1 Sequences and Summation Notation

11.4 Mathematical Induction

11.5 The Binomial Theorem

11.7 Probability

VI. TEACHING METHOD

Learning activities include but are not limited to lectures, problem solving approach to homework assignments, tests, tutorial sessions, student’s solution manual, and the use of the Math Pack 5 Tutorial Software Package and video tapes.

The required software package is designed to generate practice exercises based on the exercises sets in the text. It provides the students with unlimited practice and generates graded and recorded practice problems with optional step-by-step tutorial. It includes a complete glossary including graphics and cross-references to related words. The instructional tapes are in a lecture format featuring worked out examples and exercises taken from each section of the text.

VII. COURSE REQUIREMENTS

1. Students must come to class with the required textbook. The required text is: Blitzer, R. (2009), Algebra & Trigonometry, 4rd Edition, Upper Saddle River, NJ: Prentice Hall. Students must also have a scientific calculator available during class.

2. Punctual class attendance (entire class period) is required. It is the student’s responsibility to meet course requirements, due dates, and catch up on all missing sessions and assignments.

3. No late work will be accepted without appropriate written documentation to qualify an absence as an excused absence. In order for the excuse to be considered, it must be submitted to the instructor at the next class period following the day of absence. In lieu of late homework, the student must make arrangements with the instructor within one week of the absence to take a quiz on the homework material, providing the absence was excused. In the case of missed test, the student must receive an excused absence from the instructor and then must make up the test within two weeks or less from the absence. Failure to do so will result in a grade of zero on the test.

4. Read the assigned sections. Be prepared to participate in class discussion of required sections.
5. Take the exams and quizzes on designated dates. Only documented excused absences will be honored. All make-up unit exams will be scheduled on specified dates during the semester to only eligible students.

6. Students who enter class more than 5 minutes late will be considered absent for computer attendance purposes.

7. Meeting the prerequisite requirements is the responsibility of the student. Grades are based on performance, not need.

No cell phones are allowed in class. If a student has his/her cell phone out to check the time, if the phone rings or if the student is checking a call on the phone during class time, that student is subject to expulsion from the class for the remainder of the period. NO QUESTIONS SHOULD BE ASKED. THE STUDENT SHOULD GATHER HIS/HER BELONGINGS AND LEAVE.

VIII. EVALUATION AND GRADE ASSIGNMENT

Unit Exams, Quizzes, Projects, Assignments, Home Work, Attendance....... 40 - 60%
Quizzes are announced and/or unannounced.

Mid-term Examination................................................................. 20%

Final Examination *................................................................. 20 - 30 %

TOTAL.............................................................................................. 100%

IX. GRADING SCALE

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<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>90 - 100%</td>
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<tr>
<td>B</td>
<td>80 - 89%</td>
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<tr>
<td>C</td>
<td>70 - 79%</td>
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<tr>
<td>D</td>
<td>60 - 69%</td>
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<tr>
<td>F</td>
<td>Below 60%</td>
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NOTES
A grade of “C” or better in Math 131 is a prerequisite for enrollment in Math 132.

SUPPLEMENTARY MATERIALS
1. Test Prep Discs
2. Computer software (included in the required textbook package)
3. Student Solution Manuel
4. Math Pak 5

ADA SPECIAL SERVICE STATEMENT
Grambling State University complies with the Americans with Disabilities Act, which requires us to provide reasonable accommodations to students with disabilities. If you need accommodations in this class related to disability, please make an appointment as soon as possible. My office location and hours are listed below.
• **FINAL EXAM SCHEDULE AND EXAM SECURITY**

  The final exam for all sections in Math 131 will be given according to the university final exam schedule.

  During exam periods all students will be required to show a valid University ID.

  If you have any concern(s)/problems(s) regarding any aspect of the course or the instructor, please discuss it **FIRST** with the instructor **AND THEN** with the Dept. Head, Dr. B. Sims, Tel. 274-6177 if necessary. The departmental form designed for this purpose should be used.