MAC 1140 Precalculus Algebra

1. Purpose: preparation for rigor of calculus
2. Includes engineering/science students, pharmacy, pre-med, architecture, computer science, physical therapy, math/stat (few business students)
3. Since MAC means "Math for Calculus" for the most part we see MAC 1140 as a prerequisite, though we recognize that MAC 1140 is a terminal course for some programs.
4. MAC 1140 is not a Gen-Ed
5. Does MAC 1140 need to be re-defined for the 21st Century? Yes (see below) though the need for redefinition may not be related to the 21st century.

Broad list of topics

1. **Higher Order** polynomials, rational and other algebraic functions, their properties and graphs
2. Polynomial, rational, and absolute value inequalities (introduce it algebraically)
3. Review exponential and logarithmic functions, their properties, and graphs. Solve equations using the exponential and logarithmic properties with an emphasis on applications such as exponential growth and decay.
4. Conic Sections (including polar form?)
5. Matrices and Determinants
6. ~~**Partial Fractions?**~~
7. Sequences and Series
8. **Principles of Logic (terminology and concepts such as sufficiency, necessity and converse, which will arise in discussing how we apply theorems in calculus)** to include Mathematical Induction
9. Binomial Theorem
10. **Introduction to limits**
11. **Applications of the above**
12. **Systems of equations (3 variables, linear & non-linear)**

Specifics of Content

1. **Higher Order** polynomials, rational and other algebraic functions, their properties and graphs.
    a. Write polynomial given specified zeros including real and non-real.
    b. Graph polynomials indicating end behavior, y-intercept, zeros, behavior near zeros, given standard and factored form
    c. Finding zeros of polynomials.
    d. Finding zeros of rational functions
2. **Introduction to limits**
    a. Asymptotes as limits
    b. End behavior
    c. Limits of sequences
3. Polynomial and rational inequalities (If we have a consensus that MAC 1105 needs to be a sufficient prerequisite for MAC 2233, then this material needs to be covered in MAC 1105)
2. Exponential and logarithmic functions, their properties, graphs
3. Piecewise defined functions (MAC 1105)
4. Conic Sections (including polar form?)
5. Matrices and Determinants
6. ~~**Partial Fractions**~~**?**
7. Sequences and Series
8. **Principles of Logic (terminology and concepts such as sufficiency, necessity and converse, which will arise in discussing how we apply theorems in calculus)** and Mathematical Induction
9. Binomial Theorem
10. **Applications of the above**