Course objectives:

Chapter 2 – Functions and their properties; graphs of functions

- Use function notation to evaluate values of a function
- Compute and simplify the difference quotient
- Find the domain of a function, given its formula
- Determine whether a graph represents a function
- Use the graph of a function to find the values of the function at a specific values of x, the domain and range, intercepts, intervals on which the function is increasing/ decreasing, intervals on which f(x)<0/f(x)>0 and determine whether the function is odd/even/neither
- Check whether a function given by a formula is even/odd
- Compute values of a piecewise function; graph a piecewise function
- Know the graphs of basic functions (constant, linear, quadratic, cube, square root, cube root, absolute value, reciprocal)
- Graph a function using transformations
- Write a formula for a function whose graph was transformed
- Construct the sum/difference/product/quotient/composition of two functions and find their domain
- De-compose a function into composition of two functions
- Recognize a one-to-one function given a graph
- Graph the inverse function f^{-1}, given the graph of f
- Find the formula for the inverse of a one-to one function f; find its domain and range

Chapter 3 – Polynomial and Rational functions and their properties; solving polynomial and

rational inequalities

- Recognize a polynomial function
- Determine the end behavior of a polynomial function
- Determine whether a number c is a zero of a polynomial function
- Determine the multiplicity of each zero of a polynomial
- Know the behavior of a polynomial function at each zero
- Graph a polynomial function
- Perform long division of polynomials
- Perform synthetic division of the polynomial by a binomial (x-c)
- Determine whether (x-c) is a factor of a polynomial
- Factor completely a polynomial
- List potential rational zeros of a polynomial function
- Find zeros of a polynomial function and factor the polynomial
- Solve a polynomial equation
- Determine the domain of a rational function
- Find vertical, horizontal/oblique asymptotes of a rational function.
- Graph a rational function using transformations
- Sketch the graph of a rational function
- Solve a polynomial inequality using the graph or algebra
- Solve a rational inequality using the graph or algebra

Chapter 4- Exponential and logarithmic functions; solving exponential and logarithmic equations

- Know the graph and properties of exponential functions
- Sketch the graph of an exponential function using transformations
- Know the definition of a logarithm to the base a
- Find values of certain logarithms without using a calculator
- Know the graph and properties of logarithmic functions
- Sketch the graph of a logarithmic function using transformations
- Change a logarithmic form to exponential and vice versa
- Find the domain of a logarithmic function
- Solve logarithmic equations and exponential equations
- Use properties of logarithms to expand a logarithm of a product/quotient/ exponent
- Use properties of logarithms to write a sum/difference of logarithms as a single logarithm
- Use the change of the base formula to evaluate logarithms with bases other than e or 10
- Solve exponential equations quadratic in form

Chapter 8 and 9 – Solving systems of linear and non-linear equations; Cramer's Rule

- Solve a system of linear equations using substitution and elimination methods
- Compute 2x2 and 3x3 determinants
- Use determinants to solve a system of two equations with two variables (Cramer's Rule)
- Use determinants to solve a system of three equations with three variables (Cramer's Rule)
- Graph a system of nonlinear equations and find the solutions
- Solve a system of nonlinear equations

Chapter 10 –Conics- equations and graphs

- Recognize and graph an equation of a parabola, ellipse and hyperbola
- Find an equation of a conic with given properties
- Recognize a conic given an equation
- Find characteristics of each conic, given graph or an equation

Chapter 11 – Sequences; Binomial Theorem

- Write terms of a sequence given the general term and recursive formulas
- Develop a formula for n-th term of a sequence whose first few terms are given
- Know properties of sigma notation
- Compute given sums (in sigma notation) taking use of the formulas for the sum of the first n natural numbers and the squares of the first n natural numbers
- Determine whether a sequence is arithmetic, geometric or neither
- Find the formula for the n-th term of an arithmetic sequence given either first term and the common difference or two terms of the sequence
- Find the sum of the first n terms of an arithmetic sequence
- Find the formula for the n-th term of a geometric sequence given either first term and the common ratio or two terms of the sequence
- Find the sum of the first n terms of a geometric sequence
- Expand a power of a binomial
- Find the given term in the expansion of a binomial
- Find the coefficient of a variable in the expansion of a power of a binomia